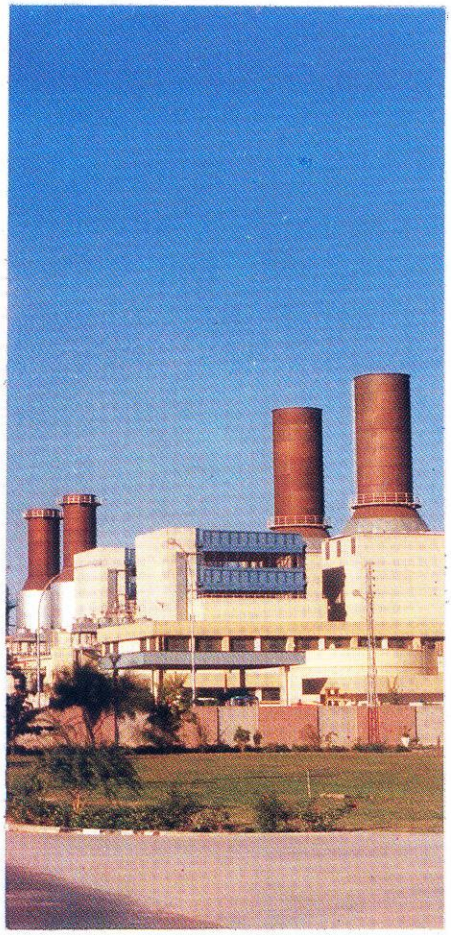

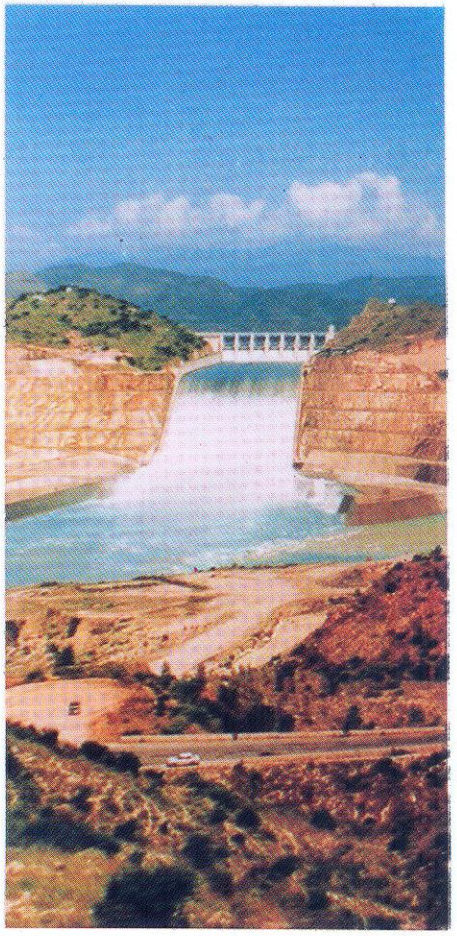

REPORT OF

PRIME MINISTER'S TASK FORCE ON ENERGY

JANUARY 1994

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FOREWORD

Pakistan is faced with the challenge of implementing a gigantic economic development programme, in order to achieve the objective of entering the twenty-first century as a self-reliant and progressive nation. Central to the theme of national self-reliance is energy autarky.

Recognizing the key role of the energy sector in national development, immediately after coming into power in October 1993, Prime Minister Benazir Bhutto constituted a 12 member Task Force on Energy, which was entrusted with the task of drawing up an outline of a co-ordinated and comprehensive Energy Policy, formulating strategies for elimination of load shedding, recommending proposals for mobilization of resources and promoting private sector investment, and making recommendations for enhancing indigenous oil and gas production. The time given by the Prime Minister to formulate its recommendations was 6 weeks.

The first meeting of the Task Force was held on November 7, 1993. In view of the wide range and spectrum of expertise spanned by the Terms of Reference, the Task Force co-opted 23 additional members, to increase its professional resource base. Three separate sub-committees on Power, Private Sector Participation and Oil and Gas were also constituted. The sub-committees met separately and held on almost daily basis intense brainstorming sessions to which independent experts, representatives of various interest groups such as multinational financing agencies and DFIs, and local and foreign investors and entrepreneurs were also invited.

Instead of following the oft-beaten track, the emphasis of these deliberations was on trying to identify innovative approaches, based on strategies adopted by other countries of the region to successfully overcome similar difficulties. In particular, the policy framework and package of incentives to attract large scale investment in power generation and energy related infrastructure was designed to impact upon a fairly competitive international capital market.

The Task Force was intensely aware of the fact that the success of its recommendations, particularly those with financial or regulatory implications, would ultimately depend upon support and backing from key GOP formations like Ministry of Finance, Central Board of Revenue and Corporate Law Authority. This is why before finalizing its recommendations, the Task Force held prolonged discussions with representatives of these key GOP formations to enlist their support. The recommendations and action plan contained in this report were presented to the Cabinet on Feb 13, 1994, and had the unique distinction that not a single dissenting voice or objection was raised by any of the GOP ministries or departments on any of the substantive recommendations.

(Contd.)

I would like to take this opportunity of conveying to the Prime Minister, heartfelt gratitude and felicitations on behalf of the Members of the Task Force, the intelligentsia, the business and investment community, and my own behalf, for addressing the problems of the long-neglected energy sector promptly after assuming office.

I would also like to place on record the Prime Minister's appreciation of the intense intellectual effort and brainstorming, the zeal, total commitment and the dedication with which the members of the Task Force approached the task entrusted to them. I have every confidence that if properly implemented, these recommendations will go a long way in revamping and revitalizing the energy sector over the next three to four years.

SHAHID HASAN KHAN
Chairman, Task Force on Energy

REPORT OF THE TASK FORCE ON ENERGY

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EXECUTIVE SUMMARY

I. INTRODUCTION

* On October 30, 1993, the Prime Minister constituted a Task Force on the Energy Sector, and entrusted it with the task of drawing up an outline of a new Energy Policy, formulating strategies for elimination of load shedding, promoting private sector investment, and enhancing indigenous gas and oil production.

  The main recommendations of the Task Force are presented in this report.

II. CURRENT STATUS

* The current state of affairs in the energy sector is highly unsatisfactory, vis a vis major national policy objectives such as self-reliance in energy, reduction in imported energy, maintaining the supply-demand balance, development of fuel transportation infrastructure, and enhancing energy efficiency. The technical, financial and operational energy parameters of power, gas and oil sector utilities have also exhibited a sharp deterioration in recent years. The major failures and shortcomings characterizing the development and operation of the energy sector are:

  - Lack of strategic forward planning, and a management approach based on adhocism and maintenance of status quo.

  - Hurdles in development of indigenous energy resources such as hydro, coal, gas and oil.

  - Inability to arrest the high growth rate of demand for energy in non-productive sectors.

  - Poor performance of power and gas utilities vis a vis quality and reliability of supply, shortages, losses, pilferage, project implementation delays, low plant availability, revenue leaks, corruption and bureaucratic red-tapism.

  - Failure to mobilize private sector funds for investment in power plants, oil and gas exploration, refineries and pipelines.

* A major overhaul and revamping of the energy sector is essential to support the economic uplift and industrial development programme of the Government. Bold new initiatives must be taken to put Pakistan on its way to achieving energy autarky. In particular, there is a compelling need to move quickly and decisively towards introducing an incentives package which can enable Pakistan to successfully compete for funds on the international capital market with countries like Chile, Argentina, Thailand and Philippines.

III. POWER SECTOR

* Since the early eighties, power shortages ranging between 15 to 35% of system peak demand have become a permanent feature of the national energy scenario, costing the nation between Rs 5 to 12 billion annually in direct and indirect economic losses. With demand growth rate anticipated at 8.8 percent, if the traditional planning approach is followed, a minimum of 7000 MW of generation capacity would need to be added to the system to enable the existing shortages to be gradually overcome by the year 1998.

* Addition of 7000 MW of generation capacity, and associated generation and transmission facilities would require a total investment outlay of Rs 329 billion over five years. Present projections of private sector investment are around Rs 54 billion. This means that Rs 275 billion would have to be provided in the public sector, which is totally unrealistic. The Task Force has therefore devised a multipronged strategy to reduce investment requirements through improvement in sectoral efficiency. This strategy, which is based on the successful experience of other regional utilities operating within similar socio-cultural environment and constraints, comprises of the following main elements:

(i) Demand Side Management

Launching of an aggressive Demand Side Management(DSM) Policy to control and regulate the growth of the unproductive component of demand, and discourage wasteful and expensive patterns of consumption. The main components of the DSM policy would be:

- Reduction in domestic demand growth rate through price disincentives which would discourage large connected loads and disproportionately high levels of consumption in domestic sector.

- Introduction of time-of-use pricing for industrial and large domestic/commercial consumers (i.e. higher energy prices during evening peak hours) to discourage excessive and unnecessary consumption during peak hours.

- Introduction of seasonal tariffs (high tariffs during low hydro, and lower tariffs during peak hydro seasons) for industry to enable them to schedule maintenance outages and carry out production planning accordingly.

- Off-peak supply for agricultural tubewells (no supply during evening peak hours in return for cheap supply).

- Policy package and fiscal incentives to modify price structure of lamps to discourage unnecessary use of high wattage incandescent lamps, and to promote consumer preference for energy-efficient fluorescent lamps vis a vis incandescent lamps. For low to middle income bracket household consumers, front-end costs are proposed to be borne by WAPDA/KESC/ENERCON.

- Policy package to promote manufacture and use of energy-efficient motors for tubewells, pumps and compressors.

The net effect of the recommended DSM policy would be a projected reduction in potential peak demand of about 2100-2200 MW by 1998, without any reduction or loss of productivity, consumer or utility surplus.

(ii) **Energy Loss Reduction**

The performance of both WAPDA & KESC, particularly KESC, vis a vis energy loss reduction in the past has been pathetic. At present total system losses in WAPDA are estimated at around 23.2%, and in KESC at around 33.6%. The Task Force has set the following targets for energy loss reduction for the two utilities:

- For WAPDA, 0.5% reduction every six months for the next five years.

- For KESC, 2% reduction every six months for first two years, followed by 1.5% reduction every six months for three years.

This will translate into a reduction in gross system peak demand of about 520 -550 MW, and will reduce annual operating costs by about Rs 4.5 billion by 1998.

(iii) **Operational Improvements**

Current level of operational efficiency in both WAPDA and KESC are much below industry standard. The Task Force has set improvement targets vis a vis thermal plant availability, thermal efficiency, and upgrading of operational regimes, which should increase the net available supply by about 460 MW, and result in fuel cost savings to the tune of Rs 4.7 billion annually by 1998.

- With the implementation of these sectoral efficiency improvement measures, the total requirement for additional generation capacity over the next five years would reduce to around 5000 MW. Under this scenario, deficits ranging between 400 to 1000 MW (4 to 11% of peak demand) will persist during the first three years of the Eighth Plan period, after which the system will move to a situation where supply-demand balance will more or less be achieved (for average water inflow conditions). In case of dry year (low water inflows), shortages of upto 1300 to 1900 MW (13 to 21% of peak demand) during the first three years, and of 700-1000 MW (7 to 10% of peak demand) during the last two years of the plan period may be encountered.

- In view of public sector resource constraints, the Task Force has recommended that WAPDA/KESC should focus on the completion of the ongoing projects involving installed capacity of 2400 MW during the next 5 years, whereas atleast 2500 MW of new projects should be implemented in the private sector under the BOO/BOOT scheme.

In addition, 500-600 MW of co-generation capacity should be developed in the industrial sector over next five years, particularly in sugar, textile and cement.

In order to meet these private sector targets, financial closure of about 700MW of steam plants by September 1994, and another 600-800 MW of diesel engine/combustion turbines or combined cycle plants by March 1995 (besides the 1292 MW Hub project) must be achieved. Vigorous efforts simultaneously should be launched to identify and solicit additional power projects in the private sector including both new thermal projects as well as some small to medium sized hydro projects. Similarly, new industrial co-generation projects totalling 200 to 250 MW must be initiated every year during the period 1994-96 and beyond, in order that the requisite private power generation capacity can be on bars by 1997-98.
An appropriate and internationally competitive incentives package, and other improvements in modus operandi for processing private sector power proposals has been devised by the Task Force to facilitate the achievement of these targets.

The total financial outlay required to implement this programme over the Eighth Plan period works out to be Rs 319.5 billion of which Rs 194.3 billion will be required in foreign currency and Rs 125.2 billion in local currency. The public sector would contribute a total of Rs 217.7 billion comprising Rs 107.9 billion in foreign currency and Rs 109.8 billion in local currency while the private sector shall have to contribute Rs 102 billion of which Rs 86 billion will be in foreign currency and about Rs 16 billion in local currency. This implies a reduction in the public sector development outlay of Rs 57 billion (Rs 11.4 billion annually) compared with the original public sector investment programme proposals.

The Task force has also recommended a number of other short, medium and long term measures and policies to improve sectoral performance. These include rationalization of load shedding priorities (which could save the nation Rs 3 to 5 billion annually in direct and indirect economic losses), steps to eliminate project implementation delays (which have cost the nation more than Rs 35 billion in consequential losses over the three year period 1989-92), promotion of local design/manufacturing for power projects (which can reduce investment outlays by 15 to 30% in the medium to long term), and launching of at least one major hydro-storage project (after achieving the necessary consensus) to reduce dependence on imported fuel.

The Task force has formulated a consolidated set of targets for ensuring implementation of the proposed programmes and improvement of the operations of the power sector. Achievement of these targets will require concerted and sustained efforts by WAPDA, KESC, MWP, and other organizations directly or indirectly related with power sector. Strict vigilance and close monitoring of the performance of the two power utilities will be necessary.

IV. PRIVATE SECTOR PARTICIPATION IN POWER GENERATION

* Over the Eighth Plan period, an estimated amount of 102 billion, comprising Rs 86 billion in foreign currency and about Rs 16 billion in local currency, would have to be raised in the private sector for financing the generation programme. Resource mobilization on such a massive scale in the face of fierce international competition for attracting foreign direct investment, and a rather limited domestic capital market, will not come about, unless major policy reforms and structural changes are undertaken to make the investment environment attractive for foreign and domestic investors.

* Major factors which have discouraged perspective investors in the past include:

  - A history of lack of continuity & consistency of government policy, frequent changes in legislation, and poor financial track record of power utilities.

  - Sale price of electricity & financial incentives package which is neither internationally competitive, nor attractive to domestic investors vis a vis alternative investment opportunities.

  - Lengthy and complicated procedures for processing private sector proposals.

* The Task Force has devised an attractive policy package for attracting overseas investment and to facilitate the creation and encouragement of a corporate debt securities market essential to raise local financing for power development projects. This package has been discussed and agreed to in principle by all concerned ministries/formations of the Government, and in fact some of the proposed changes have already been introduced. The main features of this package are:

  - Standardized Implementation, Fuel Supply and Power Purchase Agreements.

  - Introduction of an internationally competitive bulk tariff of 6.5 cents per KWH for 10 years. A premium of 0.25 c/Kwh for projects above 100 MW commissioned by 1997.

  - Allowing private investors the option of making their own arrangements for import and transportation of fuel/oil for their power plants.

  - Permission to power generation companies to issue Corporate Bonds, both bearer and registered.

  - Permission to issue shares at discounted prices to enable venture capitalists to be provided higher rates of return proportional to the risk, without the current stipulated 10% discount limit.

- Exemption from Iqra Surcharge, Flood Relief Surcharge, and Import License Fees which would be treated as a part of custom duty for power projects. The total impact of existing and proposed front-end exemptions will be to decrease local currency financing requirements by 35-40 percent.

- Permission to foreign banks to underwrite the issue of share and bonds by the private power projects.

- Change in Companies Ordinance to permit registration anywhere in Pakistan to allow them to avail reduction in Stamp Duty and Registration Fees for registration of debt documents allowed by the Federal Government.

- Same tax facilities for private sector instruments as those available to NBFIs.

- Classification of NBFIs as financial institutions.

- Recommendation by GOP to State Bank for modification of Prudential Regulations to allow 80:20 debt equity ratio.

- Removal/reform of Section 13 of 1947 Foreign Exchange Regulation Act to enable non residents to purchase securities issued by Pakistanis without State Bank permissions.

- Abolition of 5% limit on investment of equity in associated undertakings.

- Government approval for an independent rating agency so that individual investors can make informed decisions.

- For local engineering and manufacturing companies, the present SRO 555(1)/90 to be made applicable to private power plants.

- Orders received by local engineering & manufacturing companies from private sector projects to be treated as export for refinance under State Bank Finance Scheme for Exports.

- One Window Operation through the establishment of a Private Power Board.

- Issuance of a separate SRO consolidating all existing and new exemptions and incentives for private sector power plants.

* In order to give impetus to setting up of industrial co-generation plants in industry, the Task Force recommends that legislation along the lines of PURPA, i.e. Public Utility Regulatory Policy Act of 1978, USA should be enacted, guaranteeing that the utility will buy any and all such power offered for sale and that the <u>full avoided costs</u> will be paid for such purchases. Alternately, the producer may opt for an as-available, as-needed,

arrangement for sale at 80% of the bulk tariff rate. The GOP should also pro-actively support and promote development of generation capacity in the industrial sector through part sponsorship of projects on public-private partnership basis, creation of a fund for project preparation, and undertaking feasibility reports in respect of projects based on energy-efficient generation technologies.

V. FUEL SECTOR

* Pakistan's current indigenous supply of oil and gas are sufficient to meet only 20% and 76% respectively of the current demand. It is feared that unless an aggressive exploration programme can be formulated and adequately funded, the current energy import bill of US$ 1.5 billion may reach US$ 5 to 6 billion by the year 1997/98.

* The Task Force has accordingly devised a four pronged approach for acceleration of oil and gas exploration comprising:

  - Specific budgetary allocations to carry out exploration activities.

  - Investment of a certain minimum percentage of OGDC's profits on exploration.

  - Provinces to be encouraged to allocate a portion of proceeds of royalties and development surcharges of provinces for exploration.

  - Improvement of concession terms to attract foreign and local private sector investment in the country.

* The major focus of the recommendations of the Task Force vis a vis oil and gas exploration is on improvement of the investment environment to make it internationally competitive as well as favorable to the local investor. Salient policy improvements recommended by the Task Force are:

  - Reduction of Government's working interest on commercial discoveries by defining three different exploration zones depending on risks and costs involved as shown in the map (Fig.1).

  - Delinking of gas price from HSFO and zone wise re-fixation of gas prices in dollar terms, indexed to a basket of crude oils. Premiums of 25% and 10% on Zones 1 and 2 respectively compared to Zone-3 price.

  - Linkage of the price of crude oil to the basket of Arabian/Persian Gulf crude oils with delivery at the nearest refinery gate.

  - C&F parity prices for new LPG projects based on proper port off-loading facilities. For incremental production over the current committed level, a price equivalent to the international FOB price of LPG in the Arabian/Persian Gulf region subject to a maximum of US$ 175 per metric ton.

- Payment of a separate amount equivalent to 3% of the total equipment/material imported on annual basis to CBR after the first commercial discovery has been made in lieu of import duties.

- Elimination of discrimination in fixation of income tax. Fixed income rates for the three zones as follows:

  Zone-1 - 50%
  Zone-2 - 52½%
  Zone-3 - 55%

- For discoveries made in zone-3, decision by GOP to allocate gas to specified buyers (gas companies/fertilizer/power plant etc.) within three months. For zone-1 and zone-2, the producer to be free to find a potential consumer on his own, and negotiate an appropriate deal without any GOP interference.

- The local companies to be paid 30% of their sale proceeds in foreign currency to meet their day to day operational requirements.

- A local company investing a minimum of 5% during exploration phase to be assigned an additional 2½% share of Government working interest after commercial discovery.

* On the downstream side, the existing gas and POL supply infrastructure is already loaded beyond capacity, and major investments are required in gas transmission and distribution, refineries, white & black oil pipelines, storages and associated infrastructure to keep pace with the rapidly growing volume. To stimulate private sector investment to fund the proposed development programme on the downstream side, the following recommendations are made:-

i) <u>Natural Gas</u>

- Any gas discovered in Zone-3 should be injected in the pipeline system and first priority for pipeline gas should be given to domestic sector. The remaining available quantity, after honoring all the existing commitments in respect of fertilizer and other industrial sectors, no priority should be fixed. Pipeline companies should be free to line up their own customers and improve capacity utilization.

- For Zones 1 and 2, no priority should be fixed. Producer should be allowed to sell either to gas companies or to specific consumers (whichever suits them to expedite gas utilization).

- High priority should be given to import of gas over oil or coal in view of the large amount of sunk capital to create gas network in the country. In case the demand of import of gas for Pakistan does not support the economics of a pipeline project, the prospective exporter of gas may be allowed to expand its market to improve the project economics by selling gas to other countries as well.

- Both Sui Northern and Sui Southern Gas companies should continue to supply gas to new towns in accordance with the existing formulae for cost per consumer. However, the cost per consumer should not be worked out for one town in isolation, but should be applied to all towns covered under a supply scheme taken as a group.

- The pipeline construction and augmentation programme of gas companies should be expedited. Formula for bulk purchase price should be announced for sale of gas to private distributors to encourage private sector participation in natural gas distribution.

ii) **Oil**

- For refineries based on indigenous crude, or offering definite logistic advantage for meeting upcountry demand, a minimum rate of return of 25% on paid up capital should be allowed. Other refineries should be offered import parity formula.

- A concessionary rate of import duty of 5¼% including duty, sales tax, Iqra surcharge or other related surcharges should be levied for replacement of parts.

- Limit of 10 - 40% on rate of return on existing refineries to be removed, subject to their entering into agreement with MPNR to invest in refineries modernization, extension and storage development etc.

- Income earned from non-refinery operation to be retainable by the refineries.

- For strategic & logistic reasons, the Task Force has specifically recommended that an oil refinery of 4-4.5 million ton capacity may be established on the right bank of Indus.

- For import of equipment, materials and machinery not available locally for new refineries, extension and modernization/upgrading of existing refineries, and pipeline projects, there should be no import duties/surcharges and no import license/authorization fees.

- For new pipelines projects a through-put charge equal to the railway freight should be offered.

- GOP should pro-actively assist the investors by providing guidance on route, and acquisition of right of way.

- The commission of the marketing companies and dealers should be reviewed yearly by ECC to enable them to invest in the construction of POL commercial storage, logistics and allied facilities, for which a specific linkage should be stipulated.

iii) Privatization

- To increase the participation of private sector, PARCO, PSO, NRL, PRL, SNGPL, and SSGC, should be privatized through dilution of the Government share holding in the above mentioned entities to less than 50% by offering all the new equity in the private sector to public at large. Alternatively, Government's present direct and indirect shareholding should be reduced by off-loading its shares in the market to the public sector in large quantities.

- All new refinery & pipeline projects should be formulated in private sector for which an incentives and concessions package has been proposed by the Task Force.

VI. ENERGY EFFICIENCY

* Energy efficiency has become a key global issue in recent years because of worldwide scarcity of physical and financial resources, its impact on overall GDP growth rate, and concerns about global warming and greenhouse effect. Increase of energy efficiency should form one of the top priorities for the medium to long term planning horizon. Policy recommendations in this regard include rationalization of consumer connection policy and energy pricing, enactment of energy efficiency legislation, introduction of a transport policy which promotes the use of energy-efficient modes of public transport (mass transit systems and railways), and introduction of five day week with the same aggregate working hours per week as at present.

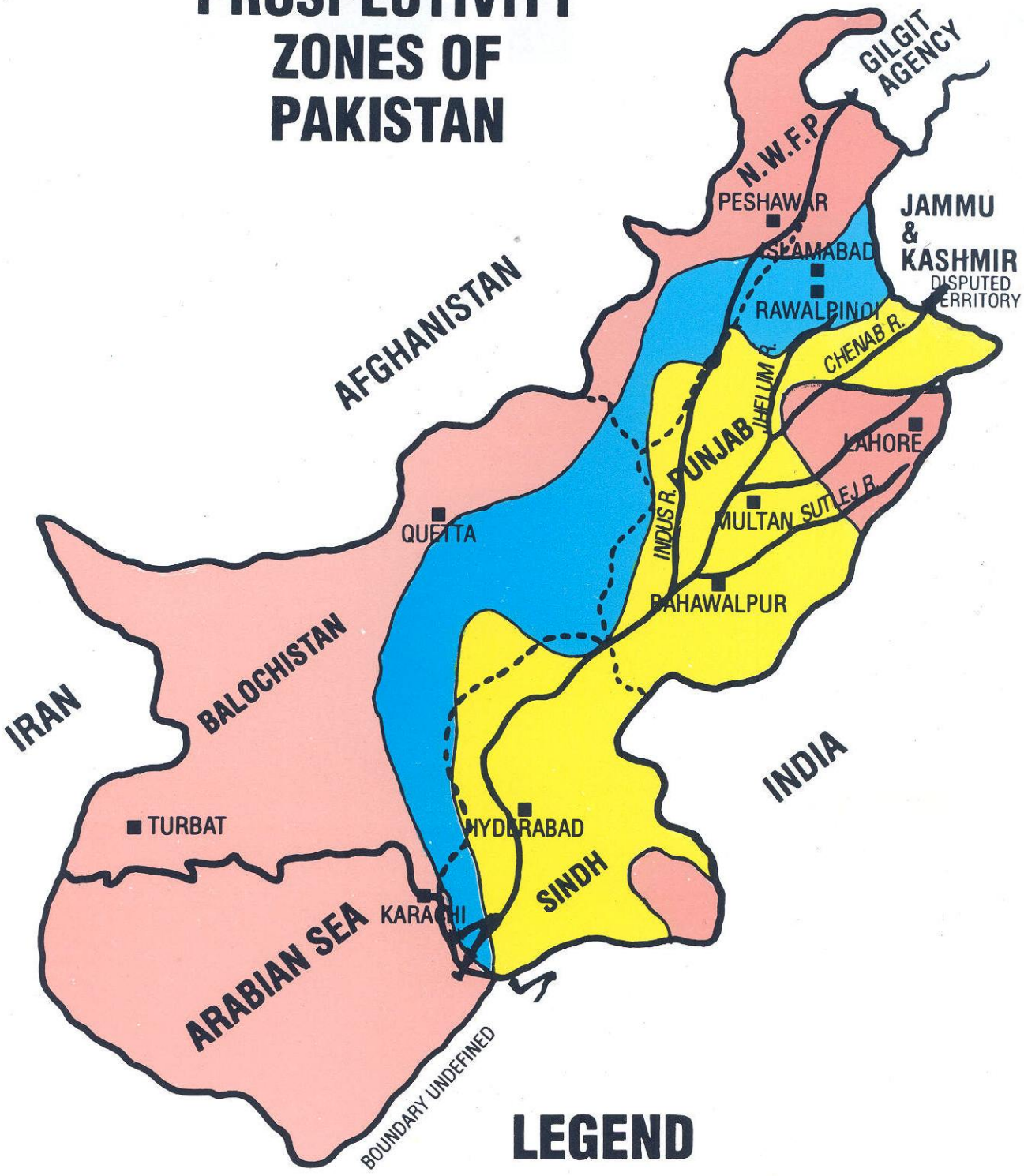
VII. HUMAN RESOURCE DEVELOPMENT

* The Energy Sector is one of the largest employers of technically trained and skilled manpower in the country. Estimates of new job opportunities in energy sector over the next five years, including utilities, services, manufacturing sector, contractors and general industry are estimated at around 90,000 engineers, technicians and paraprofessionals. These include some 25,000 new public and private sector job opportunities in the power sector.
* To ensure successful implementation and operation of the recommended Energy Sector Programme steps should be initiated by energy sector organizations and utilities for overhauling their training programmes, institutional reinforcement of the formations responsible for training, and upgrading their training center facilities. Simultaneously these organizations should establish a working relationship with engineering universities and polytechnic institutes so that their educational programmes can be tailored to the qualitative and quantitative requirements of the energy sector.

VIII RECOMMENDED PHYSICAL TARGETS AND INVESTMENT REQUIREMENTS FOR 1993-98

* Tabular summaries of the proposed targets for the energy sector recommended by the Task Force for the period 1993-98, and corresponding investment requirements are presented in Exhibits 1 & 2. The projects on which the investment programme is based are listed in the main report.

PROSPECTIVITY ZONES OF PAKISTAN



LEGEND

- ZONE I — HIGH RISK - HIGH COST
- ZONE II — MEDIUM RISK - HIGH COST
- ZONE III — LOW TO MEDIUM RISK - LOW COST

EXHIBIT 1

MAJOR ENERGY SECTOR TARGETS

(1993 - 1998)

SR. NO.	DESCRIPTION		BENCHMARK 1992/93	1997/98
	POWER			
1.	Installed Capacity	(MW)		
	- Public sector		9649	13585
	- Private		-	2700
	- PAEC & Others		137	137
	- Total		9786	16422
	- Addition in Capacity		2992	6636
2.	Maximum Demand	(MW)		
	- System Demand		8611	11173
	- Addition in Demand		2724	2562
	- Growth Rate (%)		7.9	5.35
3.	Energy Generated	(GWh)		
	- Annual Energy		48639	68617
	- Addition in Annual Generation		15442	19978
	- Growth rate w.r.t 1987-88 (%)		7.94	7.12
4.	System Losses			
	- WAPDA		23	18.5
	- KESC		34	19
5.	Consumers	(Millions)		
	- Urban		4.7	6.0
	- Rural		4.6	6.4
6.	No.of Villages/Abadis Electrified			
	- Cumulative		35171	54871
	- Addition		17447	19700
	FUEL			
7.	Oil Demand (Domestic)	(000 tons)	12200	18300
8.	Oil Production	(000 BPD)	60	123.3
	- Public Sector			52.2
	- Private			71.1

SR. NO.	DESCRIPTION		BENCHMARK 1992/93	1997/98
9.	Oil Bill	(Mill. $)	1578	3000
10.	Refinery Capacity	(Mill. Tons)	6.33	17
11.	Storage Capacity	(Metric Tons)	70000	110000
12.	No. of Wells Drilling		235	350
	- Exploratory			
	o OGDC			70
	o Private			72
	- Development			
	o OGDC			110
	o Private			98
13.	Gas Production (Peak)	(MMCFD)	1855	2554
	Gas Production (Average)	(MMCFD)	1598	2200
14.	No. of Gas Consumers	(Millions)	1.8	3.3
15.	LPG Production	(Tons/Day)	303	595
16.	Coal Production	(Mill./Tons)	6.46	10.52
	PRIMARY ENERGY			
17.	Demand Growth Rate (%)			
	- Power		7.94	7.12
	- Oil		6.1	10
	- Gas		6.3	9.4
	- Coal		5.7	10.3
	- Biomass		2.5	2.6

EXHIBIT 2
SUMMARY OF RECOMMENDED ENERGY SECTOR INVESTMENTS
(1993–98)

All Figures are in Million of Rupees

SR. NO.	DESCRIPTION	PUBLIC SECTOR			PRIVATE SECTOR			TOTAL		
		T	F	L	T	F	L	T	F	L
A.	POWER*									
1.	Generation	104,307	62,323	41,984	101,727	86,327	15,400	206,034	148,650	57,384
2.	EHV Transmission	34,637	18,229	16,408	–	–	–	34,637	18,229	16,408
3.	Secondary Transmission & Grid Station	35,852	14,195	21,657	–	–	–	35,852	14,195	21,657
4.	Distribution & ELR	11,789	1,775	10,014	–	–	–	11,789	1,775	10,014
5.	DSM & Operational Efficiency Programmes	15,238	8,217	7,021	–	–	–	15,238	8,217	7,021
6.	Rural Electrification	15,905	3,182	12,723	–	–	–	15,905	3,182	12,723
	TOTAL POWER	217,728	107,921	109,807	101,727	86,327	15,400	319,455	194,248	125,207
B.	OIL & GAS									
1.	Exploration & Development	36,917	23,246	13,671	35,000	24,500	10,500	71,917	47,746	24,171
2.	Refineries	15,780	5,251	10,529	58,870	49,200	9,670	74,650	54,451	20,199
3.	Oil & Pipelines & Storage	37,760	10,615	27,145	29,590	12,805	16,785	67,350	23,420	43,930
4.	Gas Transmission and Distribution	17,007	4,853	12,154	155,874	52,722	103,152	172,881	57,575	115,306
	TOTAL OIL & GAS:	107,464	43,965	63,499	279,334	139,227	140,107	386,798	183,192	203,606
C.	COAL	4,756	1,245	3,511	–	–	–	4,756	1,245	3,511
	TOTAL COAL	4,756	1,245	3,511	–	–	–	4,756	1,245	3,511
	GRAND TOTAL	329,948	153,131	176,817	381,061	225,554	155,507	711,009	378,685	332,324

*(Excluding Nuclear)

MAIN REPORT

1. PREAMBLE

On October 30, 1993, the Prime Minister constituted a Task force on the Energy Sector with main objectives of preparing an outline of a new Energy Policy, formulating strategies for elimination of load shedding, recommending proposals for mobilization of resources and promoting private sector investment, as well as making recommendations for enhancing indigenous oil and gas production. Notification of the constitution of the Task Force and its Terms of Reference are placed at Annexure 1.1.

The first meeting of the Task Force was held on November 7th 1993, in which three separate Sub-Committees on (i) Power (ii) Private Sector Participation and (iii) Oil and Gas were constituted (Refer Annexure 1.2). The Sub-committees held separate meetings from November 9th to November 28, 1993, in which various independent experts, entrepreneurs and representatives of various interest groups were also invited to furnish their view and recommendations. Subsequently, a series of meetings were held with senior officials of CBR and Ministry of Finance, to ascertain their viewpoint on those recommendations which have a major financial impact. The Sub-Committees presented their reports on November 28, 1993. This report presents the main conclusions and recommendations of the Sub-Committee reports, which have been designated as Appendices 1, 2 and 3 respectively.

The Task Force has been commissioned at a time of massive global changes and upheavals involving major political transformations, radical restructuring of economies, rapid technological progress and emerging concerns for preservation of the environment. The issues facing the energy sector in Pakistan have become more complex in the context of the rapidly changing global scenario, and new dimensions have been introduced. The challenges facing the energy planners relate not only to meeting the demand, but also restructuring of hitherto predominantly public sector monopolies, devising of strategies to increase the proven domestic energy resource base, resolution of the impasse in exploitation of hydel and coal resources, constraints of transmission and distribution infrastructure, and requirement for massive resource mobilization for project implementation.

All these issues have been duly deliberated upon by the Task Force. Its recommendations focus on meeting the energy demand in an efficient and optimal manner, through increased self-reliance, redefining and limiting the scope of the public sector, deregulation and decentralization of the energy sector, and provision of better service to the consumers.

The report is organized such that major issues pertaining to each sub-sector/discipline are discussed, and policies and strategies relevant to these issues are proposed, along with specific project proposals. The report also includes estimates of investment required for project implementation, and presents options for financing the investment programme. A set of targets for each subsector are also identified for the short and medium term horizon.

2. NEED FOR REVOLUTIONARY STEPS

There have been a quantum changes in the magnitude and scale of operations in the energy sector over the past two decades, as supply and consumption of fuel and electrical power has increased manifold. Unfortunately, this increase in scale has been accompanied by an equally marked decline in sectoral performance. The overall state of affairs both with respect to national policy objectives such as self-reliance and reduction of imports, maintaining the supply-demand balance, development of logistics support infra-structure, and efficient utilization of energy as well as the macro-level performance parameters governing the technical, financial and operational efficiency of the sector has deteriorated to an all time low. The major failures and shortcomings characterizing the development and operation of the energy sector have been:

i) Lack of strategic forward planning, and adhocism in resource allocation to the sector, depending upon varying priorities of successive Governments. For example, resource allocation for power development programme has varied between 7% to 35% of the Annual Development Outlay over the past fifteen years. Because of the lack of a consistent and cohesive policy, even investment outlays in the range of 35% have not helped to ease the power shortage situation, or to improve sectoral performance.

ii) Failure to achieve plan targets. During the 5th, 6th and 7th Five Year Plan periods, the actual increments to generation capacity were only 79, 55 and 72 percent of plan targets respectively.

iii) Stereotyped management approach based on maintaining status quo, and reacting to situations post-facto, rather than taking fresh and timely initiatives to respond to evolving challenges. A case in point is our failure to devise a simple modus operandi and attractive incentives package capable of attracting funding from the international capital market for the energy development programme while other newer entrants to the race, such as Chile and Argentina in South America, and Thailand and Philippines in Asia have succeeded in setting the pace.

(iv) Inability to develop and exploit the indigenous energy potential of the country vis-a-vis hydro, coal, gas and oil, for a variety of reason including lack of political consensus on hydro, insufficient pace of exploration for coal, and lack of interest exhibited by overseas firms for oil and gas prospecting. The net result has been that the country's reliance on imported energy has increased from 5.8 to 11.5 MTOE over the last decade (1983 to 1993).

(v) Inability to address and arrest the runaway rate of growth of demand in the non-productive sectors. Lack of a coherent policy to eliminate waste in patterns of use of energy (e.g. use of cars vs.buses and mass transit systems) has resulted in

Pakistan having one of the highest consumptions of energy in TOE per thousand dollar of GDP in South East Asia (1.18 against 0.75 in India).

(vi) Poor performance of power and gas utilities characterized by quality and low reliability of supply, prolonged supply interruptions and load shedding, high plant unavailability, huge losses and pilferage, protracted delays in project implementation, distortions in tariff structure, leakage and delays in revenue collection, apathy towards consumer dealings, and an organizational culture infested with bureaucratic inertia and corruption.

Clearly, this situation cannot be allowed to persist, for not only is it undermining the capital efficiency of investment in the sector, but has also resulted in energy shortages which are stifling industrial and agricultural growth, and emerged as the main bottleneck in economic development. The Task Force has concluded that a major overhaul and revamping of the energy sector is essential to support the economic uplift and industrial development programmes of the Government. Bold new initiatives must be taken, and revolutionary strategies devised and forcefully implemented, if Pakistan is to have any hope of entering the twenty first century as a nation well on its way to political, technical and economic autarky.

A basic constraint in the implementation of energy sector programme has been, and will remain for the foreseeable future, the lack of funds. At present, there is fierce international competition between developing countries for securing financing for their energy sector development programmes both in the public & private sectors. Huge investments in energy development have been planned by developing countries. For power alone, the planned cumulative outlay amounts to about US$ 1 trillion over the decade of the nineties to support aggregate capacity additions of 384,000 MW. Global availability of finance for energy from conventional sources, being limited by comparison, Foreign Direct Investment (FDI) is expected to be the major source of funds in the future. FDI however, will flow to countries that can provide better investment environment policies and attractive package of incentives. At this time, several recently privatized Western utilities have surplus funds and are looking for good investment opportunities. ***The time is ripe for Pakistan to seize the initiative, through quick reforms in policy and modus operandi, or else this source of funds will also dry up. Opportunity stands knocking at our doors, and must not be turned away, for it knocks but once.***

3. POWER SECTOR

3.1 Performance Evaluation

At present, the power system of Pakistan is still in relatively early stages of its development and the benefits of electricity have still to reach a major part of the population (exceeding 60%). Per capita consumption lags far behind many other countries

of the region, productivity of utilization of power is low, and the system is characterized by shortages for a major part of the year.

In the past few years, power sector has accounted for the single largest share of public sector investment. Consequently, the performance of this sector has a profound impact on the national economy. The Task Force has reviewed the performance of the power sector over the past decade and has come to the conclusion that over the past few years, the performance of both power utilities i.e. WAPDA and KESC has been dismal, and there is major scope for improvement in the operation of both utilities.

While it is true that both utilities are operating in an environment which is riddled with limitations and constraints, principally the lack of adequate financial resources to fund their power development programmes, many other problems can be traced to poor planning and management, adhocism and lack of strategic and timely initiatives. These include high system losses, mounting arrears, protracted delays in project implementation, high incidence of forced outages, antiquated operational regimes and poor customer service. The Task Force has concluded that unless these problems are addressed and management priorities and targets set right, the capital utilization efficiency of the sector will remain low, and the desired improvements in the power supply situation will not be forthcoming irrespective of the amount of additional funding pumped into the power sector.

3.2 Power Shortages

Since the early eighties, power shortage has become a permanent features of the national scene, and has emerged as the main hurdle in economic growth and industrial development. The magnitude of shortages have varied between 1000 to 2200 MW (15 to 35% of peak demand) in different years, depending upon various factors such as river inflow conditions. ***According to different estimates, these shortages have cost the nation between 5 to 12 billion rupees annually in direct and indirect economic losses.***

The main reasons that have contributed towards the development of a perennial power shortage situation are:

(i) Planning approach has thus far focussed on expansion of supply facilities only, while demand side regulation options have remained completely neglected.

(ii) Inadequate financial resources for supporting development programmes of power utilities, particularly with regard to local currency financing.

(iii) Very high demand growth rates (specially in non-productive sectors) on account of restricted access of population to electricity, subsidized tariffs, and accumulated suppressed demand.

(iv) Poor performance standards of power utilities particularly with regard to system losses, plant availability, plant efficiency and other technical parameters which prevent optimal use of existing facilities.

(v) Chronic and protracted delays in project implementation.

(vi) Technical limitations and difficulties in planning new projects because of constraints of development and exploitation of indigenous primary energy resources, non-availability of domestic natural gas for power generation, and inadequate infrastructure for transportation of imported oil.

3.3 Demand Growth

The natural, unrestricted rate of growth of demand for electricity in Pakistan corresponding to GDP growth rate of 6 to 6.5% is estimated to be in the range of 11 to 12%. However, in view of various physical, financial and technical constraints limiting the rate of system expansion, the total demand for power in the areas having access to electricity is projected to increase at an average rate of around 8.8% per annum. Accordingly, demand projections for the combined WAPDA & KESC system are as follows:

Year	Potential Peak Demand (11 % growth)	Restricted Peak Demand (8.8% growth)
1993-94	9,100 MW	9,100 MW
1997-98	13,900 MW	12,800 MW
2002-2003	23,500 MW	19,500 MW

Although the actual demand growth during the Eighth plan period is anticipated to be to the tune of 3700 MW, required generation capacity additions are much larger on account of the following reasons:

- Backlog of existing shortages is to be cleared
- Variations of hydro-capacity according to the season of the year are to be accounted for
- Provision of adequate spinning and maintenance reserves has to be kept to ensure supply reliability.

Accounting for these factors, a minimum of 7000 MW of generation capacity would need to be added to the system between January 1994 and June 1998 if the current shortages are to be eliminated by 1998. It may be emphasized that even with the addition of 7000 MW to the system, the total generation capacity would be insufficient to cover any unusual shortfalls in hydro capacity on account of dry inflow conditions, even by the year 1998.

unusual shortfalls in hydro capacity on account of dry inflow conditions, even by the year 1998.

3.4 Investment Outlays for Power Development Programme

The estimated public investment outlay required to support a generation expansion programme of around 7000 MW and associated transmission and distribution facilities for the 8th Plan Period is estimated to be of the order of Rs. 329 billion, of which Rs. 191 billion is required in foreign currency. The public sector is expected to contribute Rs. 275 billion, while the balance would have to be mobilized through the private sector.

This implies that over 43% of the total expected Public Sector Investment Outlay would have to be allocated to the Power Sector.

3.5 Strategies for Increasing Sectoral Efficiency

Allocation of such high proportions of Annual Development Outlay to the power sector alone can only be sustained at the cost of other equally important sectors of the national economy. Disproportionally high allocations to energy would result in starving the social sectors such as education and health. There is clearly a need to improve the technical efficiency indicators of the power utilities, increase the efficiency of capital utilization in the power sector and find additional financing through private sector resource mobilization, so that public sector investment can be reduced without aggravating the power shortage crisis. The Task Force has devised a multipronged approach in this regard.

3.5.1 Demand Side Management

To date, in Pakistan, no attention has been paid to regulating the growth of demand for electricity through Demand Side Management (DSM). Failure to implement a DSM policy has resulted in an ever increasing requirement of funds for financing the power development programme. Also, major component of demand growth is in the non-productive sectors, so that economic returns on investments made in power sector are steadily diminishing.

The Task Force therefore strongly recommends that an aggressive DSM policy comprising of various demand regulation, load management and energy conservation programmes be formulated, and pilot/experimental programmes be initiated immediately to gain experience of various alternate types of hardware and technologies, and to fine tune and adapt these policies in the light of consumer response. The full scale programme should be launched by January 1995. Technical guidelines on the design and implementation of these programmes are provided in Appendix I.

The main features of this DSM programmes, alongwith the projected impact of each on power and energy demand by 1997-98 are as follows:

	Reduction in Peak demand (MW)	Reduction in Annual Energy (GWh)
i. Reduction in domestic demand growth rate by discouraging large connected loads and disproportionately high levels of consumption.	620	3300
ii. Introduction of time-of-use pricing for industrial and large commercial and domestic consumers (i.e. higher energy prices during evening peak hours), and seasonal shift incentive for industry.	510	
iii Off-peak supply for agricultural tubewells (no supply during evening peak hours).	740	
iv Policy package and fiscal incentives * to modify price structure of lamps; - to discourage unnecessary use of higher wattage incandescent lamps where lower wattage lamps are required. - to promote customer preference for energy- efficient fluorescent lamps vs incandescent lamps.	210	760
v. Policy package to promote manufacture and use of energy efficient motors for tube-wells, pumps & compressors.	65	400
Total:	2145 MW	4460 Gwh

* Prices of 40, 60 & 100 W incandescent bulbs will either reduce or remain virtually unaltered under this policy package.

The net effect of the implementation of Demand Side Management measures, if properly designed and forcefully implemented, would be a reduction in potential system peak demand of 2145 MW by 1998, without any corresponding reduction or loss of productivity.

3.5.2 Energy Loss Reduction

At present WAPDA's system losses (comprising losses in plant auxiliaries, transmission and distribution) are around 23.2%, whereas in the case of KESC the present level of losses is estimated at 33.6%. Both utilities had targeted for a minimum of 1% annual reduction in losses during the Seventh Plan period, bringing them down to 19% on a system-wide basis. However, in the case of WAPDA, the net total reduction over five years was only about 1.8%, while in case of KESC, the losses actually increased by about 9%. This represents a colossal waste of investment as well as fuel since each 1% reduction in technical losses on a country-wide basis means a saving of Rs. 1.2 billion in operational costs and reduction in gross system peak demand of 120 MW (1997-98).

Task Force has recommended that losses in the WAPDA system should be reduced by 0.5% every six months. For KESC, with vigorous management effort, a target of 2% reduction in losses every six months during first 2 years, followed by 1.5% reduction every six months for the balance of the Eighth Plan period is considered feasible. ***This will translate into a reduction in gross system peak demand of about 520-550 MW by 1998, and will reduce operational costs by Rs. 4.5 billion.***

The Task Force has recommended a multipronged programme of energy loss reduction/power system rehabilitation for WAPDA and KESC. This programme envisages surveying and mapping of all existing MV and LV feeders, computer-aided planning for network reconductoring and reconfiguration, shunt capacitor compensation, metering of feeders and transformers for controlling pilferage, and other loss reduction techniques.

In addition to the measures to be undertaken by the power utilities, ***Task Force also recommends enactment of legislation providing strict penalties including permanent disconnection, levy of very heavy fines, and imprisonment for pilferage of electricity.***

3.5.3 Operational Improvements

Current level of operational efficiency in both WAPDA and KESC systems is much lower than the industry standard. Unit availability of thermal plants is in

the range of 82% on account of high incidence of forced outages, which are in the range of 9-10% instead of 5-6 % as in other utilities. Similarly, overall thermal efficiency is currently around 28-29% compared to about 33-34% in other utilities.

The Task Force has set following targets of operational efficiency for WAPDA and KESC so as to bring the performance of these utilities to the level of other comparable Asian Utilities:

i) Thermal Plant availability in MWs to be improved from 82 to 87% i.e. 5% by January 1995.

ii) Thermal efficiency to be improved to 33% by January 1996.

iii) Improvement of operational regime through introduction of two shift operation of selected base load units, low load operation and integrated WAPDA-KESC despatch, by January 1995.

These improvements are expected to increase the net available supply by about 460 MW and result in fuel cost savings to the tune of Rs. 4.7 billion annually by June 1998.

3.6 Generation Programme

The net potential effect of implementation of the efficiency improvement measures outlined in Section 3.5 above, on the projected demand growth would be as follows (Refer Annexure 3.1):

Year	Peak Demand (without DSM)	Peak Demand (with DSM)
1993-94	9,100 MW	9,100 MW
1997-98	12,800 MW	11,200 MW
2002-2003	19,500 MW	16,500 MW

The actual demand reflected on the system will of-course depend upon the determination and forcefulness with which efficiency improvement measures outlined in Section 3.5 are implemented. Considering the anticipated increase in peak demand over the period 1993/94 to 1997/98 of 2100 MW, a maintenance reserve margin averaging 8% of the system thermal capacity, and a spinning reserve equal to the combined rating of the largest thermal and the largest hydro unit in the system, it is estimated that a minimum of 5000 MW of additional power capacity would be required in 5 years (January 94 to June 98). In view of the resource constraint and necessity to induct private sector in power

generation, the Task Force has recommended that WAPDA/KESC should focus on the completion of the ongoing projects during the next 5 years for 2400 MW, whereas atleast 2500 MW of new projects should be implemented in the private sector under the BOO/BOOT scheme. In addition, 500-800 MW of co-generation capacity should be developed in the industrial sector over next five years, particularly in sugar, textile and cement.

On the basis of the portfolio of projects submitted to the Task Force, the Task Force recommends that projects listed in Annexure 3.2 should form the core investment programme, for generation in the public sector. In addition, out of the private sector BOO project proposals currently filed with GOP, listed in Annexure 3.3, financial closure of about 700 MW of steam plants by September 1994, and another 600-800 MW of diesel engine/combustion turbines or combined cycle plants by March 1995 (besides the 1292 MW Hub project) must be achieved. Vigorous efforts simultaneously should be launched to identify and solicit additional power projects in the private sector, including the new thermal project identified in Section 4.3 of this report, as well as some small to medium sized hydro projects. Similarly, new industrial co-generation projects totalling 200 to 250 MW must be initiated every year during the period 1994-96 and beyond, in order that the requisite private power generation capacity can be on bars by 1997-98.

The public sector core investment programme should be reviewed periodically depending upon the progress of private sector BOO & industrial co-generation projects. Any 'core' project in which the private sector exhibits interest should be partially divested in accordance with the concept of public-private partnership.

Based on the present commissioning schedules of these projects, the revised demand growth projections, and assuming about 80-85% success in development of private sector targets, the overall power demand supply situation is expected to evolve as follows:

YEAR	Demand Projection (with DSM) (MW)	Installed Capacity (Public Sector) (MW)	Installed Capacity Private Sector (BOOT & Industrial) (MW)	Total Installed Capacity (MW)	Peak Deficits/Min. Surplus (MW)	
1	2	3	4	5	Average Year	Dry Year
1993-94	9127	11729	0	11729	-1000	-1900
1994-95	9695	13075	0	13075	-800	-1700
1995-96	10245	13585	300	13885	-400	-1300
1996-97	10746	13585	2000	15585	-150	- 950
1997-98	11173	13585	2700	16285	+250	- 650

With this scenario, deficits ranging between 400 and 1000 MW (4 to 11% of peak demand) will persist during the first three years of the Eighth Plan period, after which the system will move to a situation where supply-demand balance will more or less be achieved (for average water inflow conditions). In case of dry year (low water inflows), shortages of upto 1300 to 1900 MW (13 to 21% of peak demand) during the first three years, and of 700-1000 MW (7 to 10% of peak demand) during the last two years of the plan period may be encountered.

The Task Force would, however, like to caution that the success of the programme is hinged on forceful and effective implementation of demand management measures. The recommended generation programme is essentially a hard core programme based on 'managed' demand growth projections. Any additional private sector projects that can be lined up would serve to back up any contingencies arising out of slippage, as well as non-realization of some of the demand management targets or higher growth in demand than projected.

3.7 EHV Transmission Programme

The Task Force has reviewed WAPDA & KESC's existing plans for expansion of the EHV and HV transmission grid and Secondary Transmission network in the country for the Eighth Plan period. The 500 kV super grid is proposed to be reinforced through the addition of a fourth circuit from Jamshoro to the Northern Market, while spurs at 500 & 220 kV levels will connect this backbone with major Power Stations and Load Centers such as Hub, Chashma & Quetta (Refer Annexure 3.4).

While these plans will have to be appropriately modified to take into account the location and size of the private sector power plants, these modifications are not likely to have a major impact on the overall configuration or cost of the network, with the possible exception of WAPDA-KESC interconnectors which may have to be reinforced if additional generation capacity in the private sector does not materialize at West Wharf, Korangi or another site within KESC area of franchise.

The Task Force strongly recommends that WAPDA/KESC should undertake technical studies to look into the possibility of introducing state-of-the-art technologies like FACTS and SVS as an alternative to construction of additional transmission lines.

3.8 Secondary Transmission & Grid Station(STG) Programme

Under the Secondary Transmission and grid station programme, ***seventy nine new areas are proposed to be opened up for electrification, bringing the prospects of improvement in quality of life and heightened economic activity to the people of these regions.*** (Refer Annexures 3.5 & 3.6).

3.9 Distribution Expansion Programme

The Task Force has reviewed the existing programmes of WAPDA & KESC for Distribution System expansion during the Eighth Plan period. ***These programmes envisage expansion of the network to provide electricity to about 3.1 million new consumers in urban and rural areas in addition to the 9.27 million existing consumers as follows:***

(Figures in 000)

	Urban	Rural	Total
Domestic/commercial	1252	1777	3029
Industrial	22	30.1	52
Agicultural	3.6	31.6	35.2
Others	1.5	0.8	2.3
Total:	1279.1	1839.5	3118.6

Province-wise breakup of the existing and new consumers is provided in Annexure 3.7. This includes 0.968 million new rural consumers in newly electrified villages, for which funds will be provided under rural electrification programme.

The anticipated reduction in peak demand and annual energy and the simultaneous improvement of load factor as a result of DSM and load management measures, would reduce the burden on the distribution system resulting in improvement in voltage profile and losses. As a result, the Task Force feels that WAPDA/KESC's proposed investment outlays for distribution system expansion for the Eighth Plan period are adequate, subject to optimization of detailed design and engineering of the system by WAPDA & KESC.

3.10 Rural Electrification

The Government remains committed to expanding the electricity network to villages and rural areas so that a greater percentage of population in the country may have access to electricity. The Task Force endorses this policy and has recommended that power shortages should be shared equitably, instead of leaving a large population under what amounts to 24 hours of load shedding. Since the demand per village is of the order of roughly 20 KW per village (which is the equivalent of one urban house in Defence or other posh localities with 6-8 air conditioners), the rural electrification programme will not significantly aggravate the overall load shedding situation.

WAPDA estimates that its construction staff can handle upto 4000 villages a year. Funds for electrification of 7705 villages are available from OCEF & IBRD loans for rural electrification, which must be utilized before the end of the next fiscal year. ***The Task Force therefore recommends that a crash programme for electrification of 7705 villages***

by June 1995 be launched, for which WAPDA's own construction staff's capabilities should be supplemented through hiring of local consultants and contractors thus creating job opportunities for engineers, technicians and skilled and unskilled labour.

For the longer term programme, the Task Force has taken note of the fact that the present rural electrification policy suffers from many shortcomings, and that electrification of new villages is not translating into a corresponding increase in the number of rural consumers. Accordingly, the Task Force has recommended major changes in the strategy for rural electrification based on development of a comprehensive village data base, development of an integrated computerized distribution information system, development of a backbone distribution system for rural electrification, rehabilitation works in existing villages, emphasis on increasing consumer saturation and other technical and institutional improvements to ensure that rural electrification programme does not adversely affect the power system vis a vis losses, supply reliability etc. The pace at which these system improvements can be implemented and the number of villages that can be electrified each year will of course depend upon the availability of funding.

It is also recommended that Area Electricity Boards, if privatized, should be required to commit a specific amount of investment on extension of electricity to rural areas and villages. The Government should also set incentives to promote electrification through cooperatives. WAPDA may however remain the main agency to set the design specification so that the private efforts of rural electrification and distribution should meet the requisite standards.

3.11 Load Shedding Policy

There are no short term solutions to load shedding, and the present level of load shedding will continue at least for another three years before the situation begins to improve. The extent of this improvement will depend upon the degree of success achieved in effective implementation of DSM and other sectoral efficiency improvement measures, timely implementation of projects in the public sector, extent of the private sector investment, and the river inflow conditions. To provide partial relief in the short term, the Task Force strongly recommends that gas be made available for the proposed combined cycle plants at Quetta and Sahiwal to be undertaken in the private sector. The gas-turbine portion of these power plants can be brought on bars within a period of two years, as compared to gestation periods of about 4 years for steam turbines, thus providing a degree of much needed interim relief. But basically, load shedding will continue to be a part of the national energy scenario for the next few years, so that it is imperative that this fact be recognized and a strategy devised to deal with it in a cost-effective manner.

In order to minimize the adverse economic impact of load shedding in the country, the Task Force recommends that a policy of distributing the power shortages on the consumers in reverse order of productivity losses should be adopted. A merit order for

disconnection of feeders, based on increasing incremental failure costs per KWh associated with each type of the feeder, should be developed for this purpose and strictly adhered to. ***Estimates of potential annual reduction in direct and indirect losses to the economy through strict adherence to this policy range between Rs. 3 to 5 billion.***

Consumers should be provided advance notice of the load shedding programme. In particular, efforts should be made to inform large industrial consumers of any planned outages at least three weeks in advance to enable them to reschedule production with minimum losses.

3.12 Tariff Restructuring

Existing tariffs for certain consumers categories such as domestic and agricultural are insufficient to recover the cost of supply. Heavy inter-sectoral cross subsidies in the existing tariffs are a major cause of imbalance in the demand growth patterns. The Task Force has therefore recommended rationalization and restructuring of the tariffs for removal of distortions and cross-subsidies, recovering the cost of supply, (thereby, furnishing a commercially sound basis for power utility operations), and as a tool for load management and curbing non-productive demand growth.

Flat rate tariffs were introduced for Agricultural tubewells in 1985, which is contrary to international utility practice. This causes considerable losses due to wasteful use of electricity and encourages malpractices. It is estimated that a loss of Rs. 4-5 billion/annum is caused due to application of flat-rate tariffs to Agricultural consumers.

Similarly, flat-rate tariffs are applied to all consumers in FATA which cause a loss of Rs. 1 billion/annum.

The Task Force recommends that all consumers (including agricultural tubewells and FATA) should be metered and charged according to their electricity consumption and any subsidies should be transparent.

In case the Government announces any tariff concession or other measures, any financial losses/reductions in revenues to the utilities incurred as a result of such concessions should be debitable to the Government.

3.13 Promotion of Local Design/Manufacturing for Power Projects

Dependence on import of technology, equipment and erection & commissioning services not only undermines the goal of power autarky, but also increases required investment outlays by 15 to 30%. The Task Force recommends that the Government should accord highest priority to development of indigenous technical skills and infra-structure and encourage the existing indigenous heavy industry to expand its scope of operations and undertake progressive indigenous manufacture of power plant and equipment.

A target of at least 50% indigenous design, manufacturing and installation by value for plant and equipment for generation (excluding civil work) may be planned over next ten years. A higher indigenisation level of 50-70% may be aimed at over next five years for grid stations and T&D network extension projects.

To achieve these targets, local consultancy, design, manufacturing and construction of power sector should be stimulated through fiscal and other incentives. These include encouragement of co-financing and co-manufacturing between local engineering industries and overseas suppliers, support to local equipment suppliers to line up foreign, availability of local currency financing under LMM scheme on concessional interest rates, availability of soft credit to local manufacturers for up-grading and expanding their manufacturing facilities, strict adherence to provisions of SRO-1083, limiting imports of locally manufactured items, and standardization of steam power plant units to ensure a continued market justifying investments in expansion of manufacturing plant, which should still be liable to ICB procedures.

3.14 Hydel Development

Pakistan has a fairly sizeable economically exploitable potential for hydro-energy estimated at about 30,000 MW. However, the pace of development of the country's hydel resources is being hampered because of the following reasons:

i) Lack of consensus on development of large hydel storage projects.

ii) Environmental and ecological concerns.

This impasse on development of hydro, particularly the large multipurpose hydro projects like Kalabagh and Basha and associated irrigation, flood control and drainage works is costing the nation dearly in terms of loss of agricultural productivity and consequent requirement for food imports, increased fuel imports for thermal generation, increased requirement for oil logistics support infrastructure, higher electricity tariffs and lost job opportunities. Adverse effects of delay in construction of large multipurpose dams on river Indus are estimated as follows:

- *Annual additional requirement of 4-5 tons of fuel importation*
- *Shortfalls in indigenous production of food of 25% by year 2000.*
- *Loss of 1 million potential job opportunities*
- *Loss of Rs.45 billion a year in direct and indirect benefits.*

In order to resolve the impasse impeding the development of hydro-potential of the country, the Task Force recommends the following course of action:

3.14.1 Run-of-River Projects

There exist different views on the role and impact of storage projects vis-a-vis interprovincial water allocation and resettlement issues. By contrast, there are no tangible objections from any quarters to run-of-the river projects like Ghazi Barotha. The Task Force has noted with satisfaction that GOP has already given go-ahead to Ghazi Barotha 1450 MW hydro-project and Donors conference has already been convened to line up financial package. Other run-of-the river projects such as Neelum-Jhelum-Kohala 1500 MW complex should also be expedited.

3.14.2 Large Storage Projects

Development of large storage projects is essential not only from the point of view of easing the power supply situation, but more importantly, for sustenance of agriculture and food production. The Task Force recommends that the integrated valley development approach devised in 1990 under which both Kalabagh and Basha dams were to form a part of a 20 year overall development package comprising massive irrigation, drainage, flood control and power projects worth about Rs 500 billion, benefiting the population of all four provinces of the country, be revised. This plan should be openly discussed at all levels, and a consensus on its implementation developed amongst the targeted population, the intelligentsia, and the bureaucratic and the political echelons of the Provincial and Federal Governments.

A target date of September 1994 should be considered for final resolution of the issues relating to Kalabagh and Basha dams to enable an integrated approach to be formally launched during the calendar year 1994.

3.14.3 Small and Medium Hydel Projects

Feasibility studies, investigations, and project preparation of small and medium sized hydel stations in NWFP/Northern Areas, FATA and Azad Kashmir should be stepped up through local agencies from their respective allocations. Implementation of schemes that can be integrated with the national grid, and fit in with the least cost generation expansion programme should be entrusted to WAPDA.

3.14.4 Allocation of funding for studies/investigations and project preparation

Identification, studies/investigations and project preparation for hydro-projects is a fairly cost-intensive and lengthy exercise. The Task Force recommends that in order to maintain adequate portfolio of projects ready for implementation an amount of at least Rs. 200-300 million be allocated from GOP funds for an on-

going programme of studies/investigations and project preparation of hydro projects, for which donor funds are not available.

3.15 Nonconventional Sources

Some experimental research and pilot programmes, such as solar powered photovoltaic installations for electrification of villages far removed from the national grid have been initiated and implemented in the country from time to time. The Task Force has reviewed the status of non-conventional technologies for power generation and the scope of their use in mitigating and easing the power/energy shortages in the short to medium term. It has been concluded that with the possible exception of solar preheating for boilers and high efficiency gas-diesel technology for power generation, options such as solar photovoltic, wind, wave or tidal power do not represent cost-effective solutions for the short to medium term planning horizon.

The Task Force nevertheless does recommend that a small R & D programme for development and indigenization of these technologies be maintained in order to keep these options alive for the long term.

3.16 Management Issues

3.16.1 Organizational Culture & Leadership

The Task Force has stressed that for revitalization of the power sector, and to enable it to cope with the challenge of improving technical and capital utilization efficiency, a major change in the corporate/management culture of the two power utilities will be required. Excess of bureaucratic red tape and centralization/overlaps in decision-making, lack of technical, administrative and financial discipline, political influence in administrative decisions, delays in evaluation and award of contracts, corruption, neglect of training and human resource development/career management, and lack of a system of setting performance targets for which the senior management can be held responsible, shall have to be weeded out. Not only must the goals and policy measures to achieve them be fully understood and accepted, but it must also be ensured that those entrusted with the responsibility of implementation of these policies have the necessary vision, know how, and commitment, and are willing to be held accountable. ***The ambitious programme recommended by the Task Force involves reshaping and revamping of the entire gamut of operations of the power sector, which can not succeed without proper leadership possessing professional experience.***

3.16.2 Elimination of Project Implementation Delays

The Task Force has noted with grave concern that protracted delays in project implementation are chronic in both WAPDA and KESC. On virtually all recent generation and transmission projects, delays ranging between 4 and 38 months have been encountered, resulting in as much as 1200 MW of additional load shedding during certain critical periods (Refer Annexure 3.8). Consequential losses to the economy for each MW delayed by a month are to the tune of Rs. 0.7 to 2 million, depending upon the period of the year. ***Thus, the total economic loss incurred by the nation on account of project delays during the three year period 1989-92 exceeds Rs.35 billion.***

In order to ensure that projects are implemented according to schedule, the Task Force recommends that:

i) The Project Director appointed for each project should be fully authorized to take decisions at his level and should be held accountable for delays and cost overruns. The current system whereby the decision making process is diffused over several layers of organizational hierarchy is a major factor contributing to delays, and lack of accountability.

ii) Financial powers must be exercised by the officer who is empowered under the existing rules, rather than abdicating them for exercise by the Authority. WAPDA Authority must curtail its involvement in micro-financial management of projects.

iii) WAPDA/KESC's existing rules stipulating time limits for evaluations, negotiations and awards should be strictly enforced.

iv) Project progress monitoring on a bi-monthly basis by MWP/GOP should be institutionalized.

3.16.3 Performance Evaluation and Accountability

The Task Force recommends that consultants/experts should be immediately commissioned to develop a set of realistic and practical performance improvement targets for the two power utilities vis a vis key technical, operational and financial parameters in the light of the implementation targets proposed by the Task Force. ***An annual audit of the technical and management performance of the utilities should be carried out by independent technical auditors engaged by MWP, and the senior utility management should be held accountable for any lapses in performance.*** A system of substantive rewards/punishments should be initiated for all tiers of official hierarchy with executive powers.

3.17 Institutional Improvements

In order to improve the efficiency and performance of the power sector, a programme of restructuring and deregulation of the power sector must be undertaken. The Task Force has reviewed the Strategic Plan for the Privatization of WAPDA as well as the Water and Power Institutional Improvements Study prepared by USAID & ADB funded consultants, and concurs with the need to reorganize the industry through a horizontal split between generation, transmission and distribution functions as recommended in these studies.

The Task Force therefore recommends that the Govt. should proceed with the corporatization of various profit centers in WAPDA and KESC. Subsequent divestiture of assets should be undertaken with reference to the operational experience for these corporatised units and their profitability and transfer pricing vis a vis other functional units.

3.18 Implementation Targets and Monitoring Programme

The Task Force has formulated a consolidated set of targets for implementation of the proposed programmes and improvement of the operations of the power sector, which will require concerted and sustained efforts by WAPDA, KESC, MWP, and other organizations directly or indirectly related with power sector. Strict vigilance and close monitoring of the performance of the two power utilities will be necessary for achievement of these targets.

Annexure 3.9 summarizes the performance improvement targets set by the Task Force for the power sector, and defines a monitoring programme based on realistic and workable monitoring intervals for each parameter. Corrective measures shall have to be promptly devised and initiated in case progress on the achievement of any of the targets is not forthcoming.

3.19 Financial Outlay for Programme Recommended by Task Force

The total financial outlay required to implement the power sector programme comprising generation, transmission, distribution, Demand Side Management and associated programmes as recommended by the Task Force for the Eighth Plan period works out to be Rs. 319.5 billion of which Rs. 194.3 billion will be required in foreign currency and Rs. 125.2 billion in local currency (Annexure 3.10). The public sector would contribute a total of Rs. 217.7 billion comprising Rs.107.9 billion in foreign currency and Rs. 109.8 billion in local currency while the private sector shall have to contribute Rs. 102 billion of which Rs. 86 billion will be in foreign currency and about Rs. 16 billion in local currency.

The recommended public sector investment outlay entails a reduction of Rs. 57 billion (Rs. 11.4 billion annually) compared to the programme prepared by WAPDA and KESC. It may be stressed that WAPDA & KESC's programme would only succeed in closing the gap between supply and demand only by end of the 8th Plan Period. The programme recommended by the Task Force would on the other hand result in easing the load shedding situation atleast two years earlier i.e. by 1996-97, particularly if the DSM programme is forcefully implemented, and targeted resource mobilization in the private sector can be achieved as a result of the package of policy reforms and incentives recommended by the Task Force.

These estimates do not include the financial outlay required to implement the ongoing nuclear generation programme, for which separate GOP allocations are made.

4. PRIVATE SECTOR PARTICIPATION IN POWER GENERATION

In order to support the power development programme of the country for the Eighth Plan period, an amount of 102 billion, comprising Rs. 86 billion in foreign currency and Rs. 16 billion in local currency, would have to be raised in the private sector. Resource mobilization on such a massive scale in the face of fierce international competition for attracting foreign direct investment, and a rather limited domestic capital market, will not come about, ***unless major policy reforms and structural changes are undertaken to make the investment environment attractive for foreign and domestic investors.***

This is exemplified by the fact that although a policy for setting up private sector BOO & BOOT power plants has been in effect since 1986, the pace of progress in this regard has remained painfully slow. Major factors which have discouraged perspective investors include:

i) Perception of overseas investors that Pakistan is a high risk country because of a history of lack of continuity & consistency of government policy, frequent changes in legislation, and poor financial track record of power utilities.

ii) Protracted and detailed negotiations on technical & financial aspects of the projects leading to Power Purchase and Implementation Agreements.

iii) Sale price of electricity not internationally competitive.

iv) The implementation agreement, although signed on behalf of the Government is not always expected as binding on the Ministries/CBR.

v) Custom clearance difficulties due to inadequate legal cover and lengthy procedures.

vi) Lack of clarity about facilities and concessions available to investors in private power plants.

vii) The existing regime of import charges is subject to mis-interpretation and at the same time requires the potential investor to arrange large sums of money for making demands of custom duties and taxes etc.

viii) Need for improvement in financial incentives package.

The Task Force has recommended the following set of measures for improving upon the present efforts for inducting private sector funds for investment in power and energy development.

4.1 BOO/BOOT Power Projects

4.1.1 Standardization of Agreements

Implementation agreement, fuel supply agreement and power purchase agreements should be standardized and widely circulated to prospective investors in power sector.

4.1.2 Bulk Tariff

Purchase price of electricity for 10 years should be calculated and notified so that any prospective investor should have a guarantee of prices upfront. In this context the prices offered by some countries namely Philippines, Thailand, Malaysia and India are in the range of 6.5 - 7 cents per KWH. The Task Force is of the view that a price of 6.5c/kwh may be announced for 10 years (4.9 c/KWH average tariff over 30 year plant life). This includes 2 c/kwh of fuel cost and 0.36 c/kwh of Foreign Exchange Risk Insurance (FERI) as pass through. Further, for investors signing implementation agreements with appropriate guarantees in the year of announcement of this policy for installation of atleast 100 MW or above capacity for commissioning by end 1997, a premium of 0.25c/kwh over the above price should be announced.

4.1.3 Import of Fuel

Private investors in power plants should be allowed the option of either making their own arrangements for import and transportation of fuel (Oil, LPG & LNG) for their power plants (including development of port handling and transportation infrastructure if needed), or enter into a fuel supply contract with marketing companies.

If a party prefers to make its own arrangements, the same pass-through charge for fuel as specified in Section 4.1.2 above would be admissible, irrespective of the actual costs to the sponsors.

The Task Force has further recommended that the duty structure on import of HSFO & LPG/LNG should be carefully reviewed so that these fuels are treated equally judicious vis-a-vis import duties on a per BTU basis, to provide an alternate viable pollution free fuel for power plants.

4.1.4 Fiscal Improvements

The present policy is based on the following elements :-

i) Debt equity ratio of 80:20
ii) Loan upto 40% of cost of the project from PSEDF
iii) Exemption from custom duties
iv) Exemption from corporate tax.

Following further improvements have been recommended by the Task Force to attract overseas investment, and to facilitate the creation and encouragement of a corporate debt securities market essential to raise local financing for power development projects. This package has been discussed and agreed to in principle by all ministries/formations of the Government, and in fact some of the proposed changes have already been introduced. The salient features of this package are:

i) Mobilization of local finance in adequate amounts has been one of the major impediments in the way of successfully achieving financial closure. In order to address this problem, the Task Force recommends that permission may be allowed to issue Corporate Bonds, both bearer and registered, to be offered for subscription to the general public on the capital markets.

ii) Permission to power project companies to issue shares at discounted prices to attract venture capitalists, without 10% discounting limit stipulated in Companies Ordinance.

iii) Iqra Surcharge, Flood Relief Surcharge and Import License Fee on plant and machinery should be treated as part of import duty for power generation projects from which they are already exempted. The total impact of existing and recommended exemptions would reduce local currency financing requirements by about 35-40 percent.

iv) Due to small local capital market base, foreign banks may be allowed to underwrite the issue of share and bonds by the private power projects.

v) Same tax facilities should be provided to private sector instruments as are available to NBFI's.

vi) Classification of NBFI's as financial institutions may be notified by CLA on case to case basis on the basis of an objective criteria approved by the Government.

vii) Permission should be granted to companies to register anywhere in Pakistan to avail the reduction in Stamp Tax and Registration fee for registration of loan documents by, Federal, NWFP & Balochistan Governments.

viii) The State Bank has announced Prudential Regulations specifying the operating parameters of local banks and financial institutions. One such regulation is the maintenance of a Debt Equity Ratio of 60:40 for project loans. The Government of Pakistan has specifically allowed a Debt Equity Ratio of 80:20 for power projects keeping in view their heavy capital investment. It is therefore recommended that the Government may recommend to State Bank to modify Prudential Regulations to allow an exemption to power projects from the requirement of maintaining the Debt Equity Ratio of 60:40.

ix) Removal/reform of Section 13 of 1947 Foreign Exchange Regulation Act should be done to enable non-residents to purchase Securities issued by Pakistanis without State Bank Permission.

x) The Corporate Law Authority has decided that no party should be allowed to invest more than 5% of its equity in an associated undertaking. This restriction will limit the marketability of shares and growth of private sector investment. It is therefore recommended that private power projects may be exempted from this regulation.

xi) For local engineering and manufacturing companies, the present SRO 555(1)90 (Annexure 4.1) should be made applicable to private power plants.

xiv) Orders received by local engineering and manufacturing companies from private power plants manufacture of equipment currently being imported should be treated as an export for refinance under the State Bank Finance Scheme for Exports.

xv) The National Insurance Corporation Act of 1976 requires that insurance for the projects being funded by World Bank, ADB etc. must be done by the National Insurance Corporation. As a bulk power tariff is being offered, it is recommended that power projects may be exempted from this

compulsion. They can get insurance as per requirements of lender and utilities. NIC being Government organization, this exemption will also reduce risk coverage by GOP.

xvi) Government should accord approval for an independent rating agency, so that individual investors can make informed decisions.

4.1.5 One Window Operation

A Private Power Board be constituted so as to facilitate one window operation. The Board should be responsible for coordinating with all the agencies and Ministries concerned and take decisions, monitoring the performance of private sector projects in accordance with the agreements, and safeguarding the interests of the consumers.

4.1.6 Issuance of Separate SRO

A number of exemptions and fiscal incentives are already in existence, while certain new incentives have been proposed above by the Task Force. It is recommended that a separate SRO be issued for private sector power plants so that incentives and concessions given in various regulations and directives are placed together and consolidated in order to clarify any confusion.

4.2 Industrial Co-generation Projects

The incentives offered by Government for setting up companies for self-generation by industries have drawn an encouraging response. In order to give further impetus, and accelerate setting up of industrial co-generation plants in industry, the Task Force recommends that legislation along the lines of PURPA i.e. Public Utility Regulatory Policy Act of 1978, USA should be enacted to encourage small to medium scale power production in the industrial sector by consumers who have the potential for installing cogeneration plants because they either have a waste product which can be burnt to generate heat, or because they have to generate steam to meet their process steam requirements. The proposed legislation will provide such industries with the following options:

i) Sale of surplus power to the power utility, subject to the guarantee that the utility will buy any and all such power offered for sale, and that the **full avoided costs** will be paid for such purchases. These currently vary between 73 & 206 Ps/Kwh depending upon time of the day & season.

Alternately, the producer may opt for an as-available, as-needed type of arrangement for sale at 80% of the bulk tariff rate.

ii) In case of industry situated in rural areas, away from the national grid, the industry will be encouraged to set up and operate a rural distribution network in its vicinity, for which subsidies similar to those implicit in WAPDA's rural tariffs will be provided by the Government. A package of incentives for siting industry in rural areas to promote integrated rural development should be a part of the proposed legislation.

In addition to the proposed legislation, the Government should pro-actively support and promote development of energy-efficient generation capacity in the industrial sector through the following measures:

- Part sponsorship of private sector generation projects on public-private partnership basis.

- Creation of a fund for project preparation and other front-end costs which would be capitalised on project implementation.

- Preparation of feasibility reports in respect of energy-efficient generation technologies such as combined cycle gas turbine, gas-diesel plants and thermal plants using agricultural wastes as fuel.

4.3 New Thermal projects

The Task Force has proposed that all new thermal power projects identified by WAPDA/NPP may first be offered for competitive bidding in the private sector for which necessary tender documents and basic engineering documents should be prepared by WAPDA. To start with following projects may be offered:

- Proposed gas fired power station at Quetta
- Proposed extension at Jamshoro
- Power station at Sahiwal
- Korangi Thermal power station
- West Wharf power station
- Proposed power station at Mian Channu
- Proposed power station at Bhiki, Ballaki coastal areas, Guddu Taunsa etc.

The core public investment programme would be reviewed 3 months after the date of enforcement of the proposed bulk tariff and associated package for the private sector. In case of insufficient response, the principle of reserving all new thermal power projects be reconsidered.

4.4 Sale of Existing Assets

As stated in Section 3.17, the Task Force has reviewed the Strategic Plan for Privatization as well as the recommendations of the Water and Power Institutional Study, and agrees with the modus operandi suggested in these reports for sale of WAPDA & KESC Assets, i.e. the sale of assets must be preceded by corporatization in order to establish the operational and financial viability of the proposed profit centers and to establish transfer pricing.

4.4.1 WAPDA Assets

The issue of sale of WAPDA is linked with amendment of WAPDA Act and amicable settlement of the related issues.

4.4.2 KESC Assets

There is no dispute over the privatization of KESC between the Provinces. Therefore privatization of KESC can be expedited. The generation of KESC can be disinvested to the private sector either on a plant by plant basis on the same principle as enunciated above for WAPDA, or converted into one separate generation company selling power to a transmission and distribution company in public sector.

4.4.3 Reinvestment of Sale Proceeds

The Task Force has recommended that the sale proceeds of the divested assets of WAPDA/KESC should be reinvested in the energy sector for hydel projects.

4.4.4 Operational Standards

Clear operational standards must be laid down for the new owners of WAPDA/KESC assets.

4.4.5 Investment Guarantees

Minimum investments of a certain magnitude in power system expansion within a predetermined time frame should be mandatory for the new owners (except in the case of investors who have already invested in a BOO project).

4.5 Regulatory Bodies

In view of increasing deregulation and privatization proposed for the future, systems will have to be evolved to ensure that the privatization does not lead to replacement of public

sector monopoly by a private sector monopoly or cartel. Accordingly, the existing regulatory structure would have to be strengthened, and regulatory bodies will have to be set up to oversee the operations of the power sector, regulate price and ensure continuity of supply wherever monopolistic situations exist, and to ensure that all parties adhere to their contracted responsibilities. These bodies would lay down the ground rules for fair and transparent business practices, orderly continuation of supply expansions, review and recommend tariffs, curb mal-practices, set technical performance and safety standards, adjudicate disputes, guard against windfall profits, and in general protect the interest of the consumers.

The Task Force recommends that regulatory responsibilities be consolidated in an independent National Regulatory Authority (NRA) whose functions will include the following:

- Liaising with the proposed Private Power Board (to be set up in Ministry of Water and Power by merging the existing Private Power Cells of WAPDA, MWP & NDFC) for issue of licenses for electricity supply to private companies.

- Review of the load forecasts prepared by the new national transmission and despatch entity, and review and confirmation of the least-cost development plan based upon them.

- Creation and implementation of a methodology for setting tariffs at retail and bulk despatch sale points, and approval of proposed tariff changes in the light of this formula.

- Establishment, monitoring and enforcement of technical safety standards for electricity supply.

- Investigation and resolution of customer complaints against electricity suppliers.

Establishment of the NRA and development of its responsibilities will require enactment of a National Electricity Regulation Act, which will set out its statutory duties.

5. FUEL SECTOR

5.1 Fuel Resource Situation

5.1.1 Dwindling Reserves

At current levels of consumption and growth in demand, the proven fuel resources of the country are equal to about 2 years demand for oil, about 18 years for gas, about 20 years for coal, as shown in the following table.

Type of Resource	Proven Recoverable Resources remaining as on 1st July, 1991	Level of Prod. 1992-93	Present level of Consumption 1992-93	Expected Consump-tion level 1997-98	Expected G.R. 1993-98	Resources Span if all demand is met from local production
OIL	203 Million Barrels	60,000 BBL/Day	91 Million Barrels	137 Million Barrels	8.5%	About 2 years
GAS	23.63 TCF	1431 MMCFD	1282* MMCFD	2545 MMCFD	9.4%	18.45 Yrs
COAL	313.5 Million** Tons	5.63 Million Tons	5.63 Million Tons	10.52 Million Tons	10.3%	19.50 Yrs

* 149 MMCFD consumed in compression, surface facilities and losses.

** Excluding Thar (potential estimated at about 100 billion tons as per preliminary results).

At present, 80% of the oil requirements are met by imports for which the current import bill is about $ 1.5 billion. However, in view of declining trend in oil production at present and demand growth exceeding @ 10% per annum, the import requirements in future are projected to grow exponentially, resulting in a manifold increase in the import bill, which is expected to reach $ 5 - 6 billion by 1998, particularly if the price also registers an upward trend.

5.1.2 Inadequate Oil and Gas Exploration

At present, the number of wells drilled in Pakistan are around 0.35 per thousand square kilometer, as compared to 7 wells/thousand kilometers for developing countries. Despite the fact that some improvements in the oil exploration and development policies were made in the recent past, investment in the oil and gas exploration has not been forthcoming. The reasons include:

i) Lack of risk money in public sector due to pressing demands on the budget.

ii) Inability of OGDC to allocate large amounts of funds for exploration due to commercial considerations.

iii) Pakistan is perceived as a gas-prone country, but the current terms of award of concessions are viewed as unattractive. Improvements in gas producer price, and associated package enabling faster utilization of discoveries are required.

iv) Ambiguities and operational/implementation difficulties in the existing policies regarding various fiscal incentives.

v) Lack of major oil and gas discoveries (max oil field size discovered so far is only 50-55 MMBL).

vi) Lack of data, infavourable drilling prospects and medium to high risk geology.

vii) General law and order conditions and security problem in Marri/Bugti area of Baluchistan.

viii) Need for institutional restructuring and reinforcement, and regulatory framework.

ix) Other countries (e.g. Central Asian States, China, Vietnam & Latin America) are offering confirmed and virtually risk-free options to the potential investors. Hence funds are being diverted to these countries for development of proven reserves, rather than for exploration.

x) Decline in oil prices, less reserves available to oil companies and world wide competition for exploration fund.

5.1.3 Slow Exploitation of Coal Reserves

The pace of exploration and exploitation of coal reserves has been slow in the past primarily because of the following reasons:

i) Jurisdictional issues between Federal and Provincial Governments.

ii) Inadequate drilling programmes for confirmation of reserves and project development.

iii) Protracted delays and unattractive terms for award of concessions.

iv) Unviable block sizes leased to companies without proven necessary technical, and administrative skills and financial resources.

v) Ambiguities and shortcomings of fiscal and financial incentives.

vi) Poor institutional framework for coal development lacking confidence and commitment.

vii) Lack of experience and know how in state-of-the-art techniques for large scale/mechanized mining operations and mine management.

5.2 Oil and Gas Exploration

Pakistan's current indigenous supply of oil and gas are sufficient to meet only 20% and 76% respectively of the current estimated demand. The prospects for any major increase in production levels appear remote because of the slow pace of exploration, and it is feared that unless an aggressive exploration programme can be formulated and adequately funded, the current energy import bill of US$ 1.8 billion may reach US$ 5 to 6 billion by the year 1997/98.

The Task Force has accordingly devised a four pronged approach for acceleration of oil and gas exploration:

(i) Specific budgetary allocations to carry out exploration activities for which private sector funds are not readily forthcoming because of availability of more confirmed and less risky prospects elsewhere. These exploration contracts be awarded to public/private companies on competitive basis.

(ii) OGDC being a national oil company should be strengthened institutionally, and its shareholding be offered to the general public. OGDC should be required to invest a certain minimum percentage of its profits on exploration.

(iii) Provinces should be encouraged to allocate a suitable component of their proceeds of royalties and development surcharges for further exploration in their areas on a competitive basis.

(iv) Concession terms should be improved to attract foreign and local private sector investment in the country.

The major focus of the recommendations of the Task Force is on improvement of oil and gas policy so as to offer an investment environment which is internationally competitive as well as favorable to the local investor. The following improvements are recommended:

5.2.1 Improvement in Concession Terms

The Task Force held a series of meetings with the representatives of Oil & Gas companies to ascertain their point of view. After considering their demands for improvement in concession terms (which were much larger in quantum and scope), the Task Force has formulated the following recommendations:

(i) Zonation & GOP Share

At present, GOP contributes 5% of the cost in exploration stage and its working interest on commercial discovery is 35% for on-shore and 20% for

off-shore discoveries. It is now proposed that the Government interest may be further reduced depending upon the risk involved, by defining three separate zones as shown in the map (Fig 1).

Zones	Govt. Share after Commercial Discovery
Zone-1 High risk/high cost (off-shore) Balochistan Basin, etc.	= 15%
Zone-2 Medium risk/high cost	= 20%
Zone-3 Low to medium risk/ high cost	= 25%

(ii) Price Linkage

The existing price linkages for gas, condensate, oil and LPG in the present policy have failed to draw an adequate response from international companies, primarily in view of the fact that other countries e.g. Egypt are offering more attractive terms. In particular, Central Asian States represent a very attractive alternative for oil and gas multinationals, because the drilling programmes involved are more for development rather than exploration, and are consequently risk free. In order to successfully compete for the exploration dollar on the international market, the Task Force has recommended the following changes in pricing policy.

- Gas Price

Currently, gas prices for produce are determined on the basis of the border price of high sulphur fuel oil (HSFO) set at fuel oil parity. Since fuel oil is generally perceived to be a product which would gradually be phased out due to environmental concerns, the producers consider this linkage as dis-advantageous in the long run. A number of countries such as Indonesia, Abu-Dhabi, Algeria and Egypt have changed from HSFO to crude oil linkage in the recent past. The Task Force has carefully considered this matter and has recommended that the existing linkage with fuel oil (HSFO) should be dispensed with. Instead, the producer gas price be determined on the basis of absolute value in dollars at a fuel oil (HSFO) price of 80/ton and indexed to the growth rate of Arabian light crude oil in the international market. A premium of 25% be allowed for zone 1 and 10% for zone 2.

- Crude Oil Price

The price of crude oil produced is set at parity with the price of basket of crude only, with discounts depending upon the area of discovery. The Task Force has recommended that the provision for discount should be dispensed with and the price of crude oil should be based on the basket of Arabian/Persian Gulf crude oils with delivery at the nearest refinery gate. The cost of transportation to the nearest refinery is in fact a significant discount. However, the adjustments on account of quality differential between the basket and the local crude should continue to be applicable as at present.

- LPG Price

In view of the shortage of LPG in the country a policy for allowing C&F parity prices for new projects based on proper port off-loading facilities should be allowed. For incremental production over the current committed level by the existing producers coming on stream after the acceptance of the recommendations of the Task Force, a price equivalent to the international FOB price of LPG in the Arabian/Persian Gulf region subject to a maximum of US$ 175 per metric ton may be announced so that there is incentive to make investment in the existing plants.

iii) Import Duties:

At present, no import duty is leviable on machinery imported for exploration purposes, while a 5-1/4% duty is leviable on machinery imported for development and production purposes.

In order to simplify procedures, reduce the difficulties of interpretation of various SROs and agreements, and to create an incentive for the investors, the Task Force has proposed that no import levies (including custom duties, sales tax, Iqra surcharge or any other surcharge related thereto) should be applied on machinery, equipment, materials and consumables for petroleum exploration, development and production including enhanced recovery and compression projects and other agreements. The companies should, however, separately pay an amount equivalent to 3% of the total equipment/material imported on annual deferred basis to CBR after the first commercial discovery has been made.

iv) Income Tax:

Under regulations of mine and oil fields and mining development (Government control) Act, 1948 as amended in 1976, the Ministry of

Petroleum & Natural Resources has the discretion to determine the income tax rate between 50 to 55%. To eliminate the element of discretion, the income tax rates for the three zones mentioned above are proposed to be as follows:

Zone-1 = 50%
Zone-2 = 52½%
Zone-3 = 55%

v) Gas Utilization:

At present, GOP has to decide within six months of commercial discovery to allocate gas to a specified buyer. Thereafter, the gas producer and specified buyer are expected to enter into an agreement on "take-or-pay" basis. In case no agreement takes place, the producer is free to dispose off the gas as he wishes. This arrangement, however, discourages the potential investors because they desire to have an immediate market outlet or freedom to negotiate a contract with the potential consumer without any delay so that they may begin to benefit from the accruing revenues. On the other hand, the Government desires to allocate gas in accordance with its priorities and to safeguard,inter alia, the interests of the domestic sector which can only be supplied through a pipeline network.

As a compromise between the two positions, the Task Force has recommended that for those discoveries which are made in zone-3, the Government will decide within 3 months of commercial declaration to allocate gas to specified buyers (gas companies/individual consumers like power/fertilizer). The gas producers and the specified buyers will thereafter enter into an agreement within 6 months, specifying the time frame for the development of the field and pipeline infrastructure for the sale/purchase of gas on a "take or pay" basis. If no allocation of gas is made by the GOP within 6 months of commercial declaration the producers will be free to dispose of their gas as they wish. In case of discoveries made in zones 1&2 the producers will be free to dispose of their gas as they wish.

5.2.2 Additional Incentives for local exploration and production companies

In addition to the improvement in concession terms outlined in Section 5.2.1 above, the Task Force recommends the following additional incentives for local exploration and production companies.

- After a commercial discovery, the local companies should be paid 30% of their sale proceeds in foreign currency to meet their day to day operational requirements. For new local companies who do not have the inflow of 30%

of the sale proceeds in foreign currency, it is proposed that they may be able to receive foreign exchange from the State Bank of Pakistan provided they have a valid permit, license, lease or concession agreement with GOP.

- A local company investing a minimum of 5% during exploration phase should be assigned an additional 2½% share of Government working interest after commercial discovery out of the percentages noted in 5.2.1 (i) above. If two or more than two local companies are already participating in the joint ventures then GOP should assign a maximum of 5% of its working interest for prorata distribution amongst them. For all other purposes, the local and foreign companies should be treated equally. Further, the local companies eligible for this encouragement would be neither affiliated, associated, holding or subsidiary companies. This facility may, however, be available for 2 years.

5.2.3 Option to Accept New Policy Package

Companies who have submitted their bids after the recent licensing rounds or otherwise applied for before the introduction of this policy but have not signed the petroleum concession agreement should be provided an opportunity to either accept the terms already offered/negotiated or the new policy, as a package. The proposed improvements in the policy should be applicable to new exploratory efforts after 1-1-1994. However, the incentives pertaining to GOP working interest after commercial discovery shall only be applicable to new permits/licenses/leases and concession agreements signed after the announcement of the policy.

5.2.4 Formation of Regulatory Board

In view of the proposed role of private operators and deregulation of the oil and gas sectors in the future, regulatory bodies will have to be created to oversee the operations of the sector, regulate price, ensure that technical and safety standards are met, intervene in monopolistic situations, and in general guard the interest of the State and the consumer.

In order to delink the functions of regulation from investment of Government portfolios, as well as to ensure that the public sector companies compete with the private sector companies on even keel, it is recommended that the Government investments may be held in the name of Ministry of Finance or through any other suitable mechanism while the Directorate General of Petroleum Concession should gradually merge into the regulatory body. However, during the transition period, the GOP investment in joint ventures may continue to be handled by Ministry of Petroleum & Natural Resources.

The Regulatory Body/bodies should provide technical, economic and other advice to MPNR in its policy-making role, both at MPNR's request and on its own initiative, and should have its own legal, finance and accounting, and administrative support services.

5.3 Downstream Sector

On the downstream side, the existing gas and POL supply infrastructure is already loaded beyond capacity, and major investments are required in gas transmission and distribution, refineries, white & black oil pipelines, storages and associated infrastructure to keep pace with the rapidly growing volume. To stimulate private sector investment to fund the proposed development programme on the downstream side, the following recommendations are made:

5.3.1 Gas Allocation Policy

At present the following priorities in allocation of gas are being followed:

i) Fertilizer production.
ii) HSD replacement in power sector (base year round requirements)
iii) Kerosene replacement in domestic sector.
iv) Kerosene replacement in commercial sector.
v) Furnace oil replacement in industrial sector.
vi) Furnace oil replacement in power sector.

Allocation of scarce resource always entails difficult choices. The Task Force after due deliberation, is of the view that in the past, highest priority to fertilizer production was accepted because of low prices of oil in the world. With the increasing prices of oil, the economic value of natural gas for use of power generation or as fuel in other industrial sectors has become higher as compared to fertilizer which can be procured from international market relatively easily at cheaper prices. At present the Government has to subsidize the fertilizer production directly as well as through reduced feedstock gas prices.

The only sector which cannot compete for allocation of gas on pricing considerations is the domestic sector, whose interests must be safeguarded by GOP. ***Accordingly, it is recommended that any gas discovered in zone-3 should be injected in the pipeline system and first priority for pipeline gas should be given to domestic sector. For the remaining available quantity, after honouring all the existing commitments in respect of fertilizer and other industrial sectors, no priority should be fixed. Pipeline companies should be free to line up their customers and improve capacity utilization.***

For zone-1 and zone-2, also no priority should be fixed. Producer should be allowed to sell either to gas companies or to specific consumers (whichever suits them to expedite gas utilization).

5.3.2 Gas Imports

The present proven domestic natural gas reserves are almost entirely committed to the existing consumers to meet their demand of about 1.6 BCF per day. It is further projected that by June 1998 this demand will grow to about 2.5 BCF per day. Aggressive policy measures have been recommended by the Task Force for increasing domestic oil and gas production. Nevertheless, the demand for imported energy is likely to increase substantially in the future in view of growing demand of the existing categories of consumers of natural gas, further increases in thermal power generation and declining trend of domestic oil production.

Import options include import of oil, coal and gas. In view of the large amount of sunk capital to create gas network in the country, experience and expertise available in gas transmission and distribution, environmental preference for natural gas which would facilitate location of power stations closer to the load centres and various other merits, the Task Force is of the view that high priority should be given to import of gas over other options, where-ever practically feasible. The Ministry of Petroleum & Natural Resources have indicated that an amount of at least 1.6 BCF per day by the turn of the century can be safely committed for import of gas.

Various sources of gas including Qatar, Iran and Oman individually or through joint venture of appropriate nature can be considered. The options for laying the pipelines include submarine and/or surface pipelines are currently being discussed with the Governments/agencies concerned. The Task Force has strongly recommended that the import of natural gas from the most desirable and feasible option may be expedited, and in case the demand of import of gas for Pakistan does not support the economics of a pipeline project, the prospective exporter of gas may be allowed to expand its market to improve the project economics by selling gas to other countries as well.

Gas import options have remained on the anvil for quite some time without any substantial progress. Further delay in the preparation of these projects should be avoided. In view of the involvement of various Governments, companies and donors, etc., it is desirable that the Ministry of Petroleum & Natural Resources should take a very pro-active role in formulating a concrete and financeable project by June, 1994. Towards this end the Directorate General of Gas may be strengthened and a cell for handling this project may be created.

5.3.3 Gas Transmission and Distribution

At present, gas pipeline systems are run by two public sector companies which primarily cater for the growth in demand of existing areas. Both are in the process of privatization which is expected to be completed by June, 1994. The Task Force is of the view that the gas network should be expanded and private distributors be also encouraged. Towards this end following recommendations are made :-

- Both Sui Northern and Sui Southern Gas Companies should continue to supply gas to new towns in accordance with the following formula :-

		Maximum capital cost per consumer
i)	Punjab and Sindh	Rs. 20,000
ii)	NWFP	Rs. 40,000
iii)	Balochistan	Rs. 100,000

The cost per consumer should not be worked out for one town in isolation, but should be applied to all towns covered under a supply scheme taken as a group.

- During the period 1993-98, gas should be supplied to 78 towns as per the lists attached in Annexure 5.2.

- A regulatory framework for inducting private sector in gas distribution should be put in place within one year and thereafter the qualified private distributors should be encouraged to purchase gas in bulk from the pipeline gas distribution in the specified area. Formula for the bulk purchase price should be announced for sale of gas to private distributors to encourage private sector participation in the natural gas distribution.

- The pipeline construction and augmentation programme of gas companies should be expedited.

- **Natural Gas Allocation for Privatization**

  After appropriate regulatory framework is in place and subject to availability of gas, the private sector may obtain gas from trunk mains for distribution in specific areas or for specified purposes like power generation and fertilizer.

Natural Gas Consumer Price

The consumer price of Natural Gas will be suitably and gradually adjusted to expand the current transmission and distributing system of gas for gas supplied to existing and new consumers.

5.3.4 POL Supply Infrastructure

The present demand of POL products is about 14.5 million tons which will increase to 20 million tons by the year 2000. Based on the existing infrastructure, the gap in the refining, Port storage and logistics capacity upto year 2000 is given below:

Million Tons

	1993-94	1995-96	1997-98	1999-2000
Port	-3.750	-1.138	+ 1.209	- 0.921
Storage	-0.400	-0.590	- 0.857	- 1.185
Refining	-8.050	-9.840	-11.990	-14.120
Logistic	-1.852	-1.640	- 3.800	- 5.920

The above gaps are not due to factors which have cropped up overnight but are mainly because of low investment on these facilities in the past. The following measures are proposed for affecting improvement in these facilities to reduce front up cost and to ensure resource mobilization for investment.

Refinery Policy

The refining capacity in the country is 6.7 million tons. Based on demand/supply balances the gap in the refining capacity would be about 14.0 million tons by the year 2000. In order to bridge this gap, the following incentives are offered for attracting investment in the refining sector:

(a) The pricing for new refinery should be based on import parity formula. For refineries based on indigenous crude or offering definite logistic advantage for meeting up-country demand in central Punjab and above, a minimum return of 25% on paid up capital should be allowed.

(b) The limit of 10-40% on the rate of return for existing refineries should be removed subject to agreements being executed with the Ministry of Petroleum & Natural Resources covering development and expansion plans.

(c) Other income earned from non-refinery operation can be retained by the refineries.

(d) There should be no import license fee, duty or taxes for import of equipment not manufactured locally for setting up of new refineries or expansion or modernization/upgradation of existing refineries.

(e) Concessionary import tariff of 5-1/4% should be prescribed for existing refineries for replacement of their equipment not manufactured locally.

(f) Import of all equipment/chemicals required for pollution, environmental and safety control should be exempted from import license fee, duty and taxes.

For strategic and logistic reasons the Task Force has recommended that an oil refinery of 4-4.5 million tons capacity may be established on the right bank of Indus.

Port Handling

The progress on development of port handling facilities and storage infrastructure for oil has not kept pace with the consumption and a serious crisis of oil logistics would be faced if adequate measures are not taken in hand on crash basis. At present the port capacity both at Keamari and Port Qasim for handling of liquid cargo is 10.6 million tons/annum. As against this the imports are 14.3 million tons including 2 million tons of non POL products. Therefore, the gap is about 4 million tons. This will bridge up with commissioning of OP-V at Keamari and oil terminal at Port Qasim during 1997-98. The situation would be negative again in the year 2000. As such it is recommended that an offshore single point mooring (SPM) of 12 million tons per annum capacity to handle crude and products be developed at Khalifa point/Hub Balochistan.

Oil Movement

The biggest bottleneck in the movement of petroleum products is the geographical location of the ports and long lead time as products have to be moved to the consumption areas upcountry. The products are presently being moved through pipeline rail and road tankers. Currently there is one white oil pipeline of 4 million tons per annum capacity which will increase to 6 million tons per annum this year. The remaining quantity is being moved by rail and road. The movement of oil by road is highly undesirable as it not only involves higher transportation cost, consumption of more energy but also ruins the roads and create traffic congestion. Accordingly the Task Force recommends following projects:

i) A mid-country refinery by PARCO alongwith a crude oil pipeline of 5 million tons per annum capacity by the year 1999.

ii) Second white oil pipeline from Karachi to Multan to be commissioned by 1998.

iii) A furnace oil pipeline from Karachi Port Qasim to jamshoro by 1995, to meet the furnace oil requirement of Jamshoro power station as well as other thermal power station upcountry by movement of the product by rail with establishment of railways yard facilities at Jamshoro utilizing un-utilized railway track on the right bank of river Indus.

iv) A pipeline from Port Qasim to Hub Power Station by 1996.

v) Extension of existing PARCO pipeline from Multan to Faisalabad and Machike by 1996 (currently under implementation).

vi) Construction of 900,000 tons of strategic storage by year 2000.

It is proposed that all the new pipelines should be undertaken in the private sector. It is also recommended that the following incentives should be given to attract investment in pipelines including common carriers storages and distributions handling facilities:

i) For pipeline projects, through put charge equal to railway freight would be offered for new white oil pipeline projects. Black oil pipeline projects would be allowed to generate a 25% rate of return on paid up capital in excess of the railway freight. This incentive would be valid for projects set up within next five years.

ii) Import of all machinery, equipment and material not manufactured locally should be free of import license fee, duty and taxes.

iii) GOP should provide guidelines on route of the pipeline and extend all possible support in acquisition of the right of way.

Oil Marketing

Recently, after twenty eight years, marketing company margins & dealer's commissions were revised in the September policy. The marketing companies are stressing that these revisions have taken care of the backlog only, and further

stressing that these revisions have taken care of the backlog only, and further increases are required to maintain a reasonable degree of profitability. The Task Force recommends that the commission of the marketing companies and dealers should be reviewed yearly by ECC to enable them to invest in the construction of POL commercial storage, logistic and allied facilities, for which a specific linkage should be stipulated. Improved margins and infrastructure will also help to eliminate short measuring, adultration and other malpractices.

5.4 Private Sector Participation in Oil & Gas Sectors

In the fuel sector, the private sector investment had traditionally been made in oil and gas exploration, transportation and marketing, and to some extent in refineries and gas companies. To increase the participation of private sector, the Task Force has recommended that the following entities in the energy sector should be privatized:

- PARCO
- PSO
- NRL
- SNGPL
- SSGC
- OGDC

OGDC will be re-structured on commercial lines, and its Board of Directors strengthened to allow to it complete autonomous authority in all administrative, operational and financial matters. As a first step OGDC may be converted into a joint stock company after necessary amendments to the OGDC's Ordinance. GOP may restructure its investment in OGDC to make it a viable joint stock company in private sector.

A time table for privatization of these companies should be furnished by Ministry of Petroleum & Natural Resources to the Government which should be then strictly adhered to. The principle of privatization should be to dilute the Government share holding in the above mentioned entities to less than 50% by offering all the new equity in the private sector to public at large. Alternatively, Government's present direct and indirect share holding should be reduced by off-loading its shares in the market to the public sector in large quantities. First preference be given to consumers and public directly benefitting and having stake in the operations of the companies. Foreign participation to the extent of 25% may be offered to some experienced and well established gas and oil companies subject to their acceptance of clear targets for efficiency improvements, continued expansion of the system in the new areas by ploughing back a certain percentage of profits, and with a provision of golden share for the state to safeguard national and public interests.

All new refinery and pipelines projects should be formulated in the private sector (except projects like Pak-Iran refinery which are taken up on the basis of Government to Government protocols). A package of incentives and concessions needed for stimulating

investment in refineries and pipeline have already been proposed in Section 5.3.4 above.

5.5 Development of Coal Resources

Large resources of fairly good quality coal, with probable estimated reserve of over 100 billion tons, have recently been discovered at Thar. It is imperative that the task of firming up the quality and quantity of the proven reserving of deposits, and devising a well conceived development strategy be completed on a priority basis so that a viable and cheaper alternative to imported oil becomes available.

In order to expedite the development of Thar and other further finds in an optimal manner, the Task Force has evolved the following set of recommendations.

5.5.1 Priorities of Use

Thar coal and other similar finds should be used primarily as fuel for electric power plants with unit size of 200 MW or larger. The second priority should be export.

5.5.2 Development in Private Sector

Development, ownership of mines, mining operations and associated power plants should be entrusted to financially sound and technically competent and experienced private sector companies, on competitive basis.

A conducive investment environment comprising financially viable and attractive block size, taxation policy, guarantees, financing, minimal regulation and infrastructure support should be created to attract international entrepreneurs.

International Competitive Bidding for purchase of power from power plants integrated with coal mines should form the basis of leasing and licensing for coal mine development.

5.5.3 Exemption from Front End Taxes

Coal mining equipment for development of coal mines should also be exempt from custom duties, Iqra and other front-end taxation just like power plants, refineries and pipelines.

5.5.4 Role of Federal and Provincial Governments

Ownership of coal, leasing of mining rights and receipts of royalties are a prerogative of the Provincial Government. The option of large scale coal

development for power generation with direct foreign investment can however be best pursued only under an approved mechanism in which Federal and Provincial governments both participate. The Provinces having large coal potential should set up Coal Development Authorities for preparing overall plans for development and use of coal, co-ordinated by the Federal government.

6. POLICIES & PRIORITIES FOR INCREASING ENERGY EFFICIENCY

Energy efficiency has become a key global issue in recent years because of the following factors:

i) Scarcity of physical and financial resources to keep up with wasteful and inefficient patterns of consumption of energy which were in vogue when the fully developed countries of today were going through various phases of development.

ii) Concerns about global warming and greenhouse effect.

In particular, the overall GDP growth rate of developing countries who spend a major chunk of their annual development outlay on energy sector, is regulated by the efficiency of the energy production - transportation - consumption cycle.

Unfortunately, in Pakistan to date, the issue of energy efficiency has never been properly addressed and no coherent or comprehensive policy has ever been instituted in this regard. The Task Force has taken cognizance of this situation and has strongly recommended that ***increase of energy efficiency should form one of the top priorities for the medium to long term planning horizon***. Policy recommendations in this regards are summarized in Section 6.1 to 6.5 below

6.1 Consumer Connection Policy

Maximizing the productive output from energy use is a basic element in increased energy efficiency, and implies preference to industrial and agricultural connections over domestic connections. However, in a country where large sections of the population are without access to electricity, gas or other convenient commercial forms of energy, access to electricity and gas for use in the home for the citizens of Pakistan understandably remains one of the priority objectives for the Government in the energy sector. To this end the Government undertakes distribution network expansion programmes aimed at increasing coverage area of gas and electricity, and sets targets for connection of new consumers.

The Task Force recommends that while there should be no change in the priority or targets for according new domestic consumer connections, unnecessary large connected loads or excessive consumption in the household on a scale not consistent with the

objective realities and resource constraints, be discouraged. A system of steep rise in connection charges for larger domestic connected loads should be instituted, and subsequent billing monitored through an auxiliary module of the billing software to ensure that consumption levels are consistent with the declared connected load.

All new connections should be provided subject to availability of capacity in the distribution network, which should be augmented and reinforced as and when required.

Under the new connection policy, all industrial, agricultural and large commercial/domestic connections should be provided with meters/devices enabling their inclusion in load management schemes.

6.2 Consumer Pricing Policies

Another potent tool for increasing energy efficiency is pricing, which gives the signal to the consumer regarding the true value of the resource. Setting the consumer price at a level which will or enables the utility to meet its cost of supply and generate sufficient surplus to finance its development programme is essential for financial viability of the industry. The Task Force has formulated the following guidelines for consumer pricing:

i) With the exception of consumers in lowest income bracket (lifeline consumers) cost of services must be gradually revised from all other categories of consumers. FAC should be progressively increased to its full value for high income domestic power consumers, so that at least the cost of service may be recovered from the domestic sector taken as a whole.

ii) Tariff restructuring should be undertaken with the following objectives:

- Removal of distortions and cross-subsidies
- Furnishing a commercially sound basis for power & gas in utility operations.
- Controlling the growth of non productive demand
- As a primary tool for load management

iii) Time-of-use pricing for electricity should be introduced for industrial and large 3 phase commercial and domestic consumers equipped with double register meters/ripple control devices under the new connection policy, or under the meter replacement/retrofit programme.

iv) A seasonal variation in electricity and gas tariffs should be introduced for industrial consumers to provide an incentive for scheduling maintenance outages and planning production in such a way that load on the system during periods of shortages is minimized.

v) A five year programme for gradual rebalancing of tariffs to eliminate cross-subsidies should be undertaken. Annual across-the-board tariffs increases dictated by inflation, increase in operational costs, and the utility's financial performance criteria, should be subjected to gradual re-balancing adjustments. These pricing policies have been integrated into the Demand Side Management measures proposed in Section 3.5.1.

6.3 Energy Efficiency Legislation

At present the term 'energy conservation' does not exist in Pakistan Law. Legal authority does not exist for the promulgation and enforcement of even the most rudimentary energy efficiency regulations, such as labelling of appliances showing technical parameters, introduction of energy accounting systems in major industrial units, designating high energy consuming factories as energy control factories, energy manager system in major industrial/commercial installations, or equipment designation system for such machinery and equipment which are used in large numbers and consume a considerable quantity of energy.

The Task Force strongly advocates that an appropriate Energy Conservation Law be drafted and enacted.

6.4 Transport Policy

The largest consumer of white fractions in the country is the transport sector, in which demand has been increasing at a phenomenal rate during the past few years. The efficiency of use of energy/fuel in the transport sector has been sharply declining in recent years because of the lack of a transport policy suited to the needs of an energy-resource deficient country, namely:

- Rapid proliferation in import and indiscriminate use of cars, taxis and smaller vehicles rather than energy-efficient public transport options e.g. buses.

- Lack of mass transit systems in metropolitan cities.

- Use of trucks and road transport instead of rail for long haul transportation of goods.

The situation has been further aggravated because the improvement and expansion of highways and municipal roads have not kept up with the vastly increased traffic resulting in frequent and prolonged traffic jams and bottlenecks, pollution and further waste of fuel.

The Task Force therefore strongly recommends that an energy efficient transport policy based on increased emphasis on public transportation and systems of mass transit for larger metropolitan cities, and revitalization and revamping of the railway system be formulated and implemented. Traffic flow studies be conducted in all major cities, and

a system of fly overs one-way traffic and co-ordinated operation of traffic signals be devised and implemented so as to eliminate traffic jams and bottlenecks at traffic signals.

6.5 Weekly Holidays & Working Hours

The weekly schedule of work has a major impact on the overall energy consumption pattern. Although no detailed and rigorious study on the subject exists, prima facie, a five day work week should result in about 16 percent reduction in fuel consumption on account of office and school related traffic. Similarly, depending upon the choice of working hours vis a vis daylight hours, there is some scope for reduction in consumption of electrical energy in the commercial sector, estimated at 1.2% of the total generated energy.

The Task Force recommends the impact of introduction of two weekly holidays and recommends that a study be performed under the aegis of ENERCON to determine the optimum working hours for summers and winters. Depending on the results of this study, a five day work week be introduced with effect from April 1994.

7. HUMAN RESOURCE DEVELOPMENT AND JOB OPPORTUNITIES

The Energy Sector as a whole is one of the largest employers of technically trained and skilled manpower in the country. The total number of employees in the energy sector are estimated to be to the tune of 250,000 including the utilities, services, manufacturing sector, contractors and general industry (Refer Annexure 7.1). ***Estimates of new job opportunities in energy sector over the next five years, including both public and private sector jobs are estimated at around 90,000 engineers, technicians and paraprofessionals, including some 25,000 new public & private sector job opportunities in the power sector utility business.***

At present, many energy sector organizations like WAPDA, KESC, NRL, PARCO etc. are maintaining in-house training centers, where fresh inductees are given job-specific training at the start of their career, and management training is imparted to employees when they have reached middle management cadres. In addition, these organization also sponsor overseas training programmes in specific disciplines. However, by and large, the situation with regard to training and human resources development is unsatisfactory, because of the following reasons:

i) The training programmes being offered at various training institutes have not kept pace with the state-of-the-art. Excellent facilities like KESC Training Simulator and at GTZ Institute near Hub are not being properly utilized.

ii) Selection of trainees for courses are largely arbitrary and not subject to a long term career management plan. Thus it is not uncommon for an engineer who has acquired training in Load Despatch overseas, to return to Pakistan and get himself transferred to Distribution.

iii) Brain drain to Saudi Arabia and other Middle Eastern countries of personnel trained in state-of-the-art techniques.

In future, the situation is likely to aggravate further when this limited resource pool of trained manpower will have to be shared by the public sector organizations with the private sector. In fact, because of more lucrative terms normally offered by private sector, the public sector may have to reconcile and prepare to work with a situation where the best quality brainpower will no longer be available to them.

The successful implementation and operation of the recommended Energy Sector Programme will only be possible by making available and training the right balance of technicians/engineers in the respective disciplines and improving the unutilized technical capacity of the present pool of manpower. This entails;

- Complete review of the existing training programme of the utilities/organizations.
- Devising of new methodologies/syllabi for training of technicians/engineers for planning, operation and maintenance of power, gas and oil systems.
- Ensuring availability of equipment and personnel of requisite standards and qualifications at the Training Centers.

The entire training effort for the fresh appointees and in-service technicians/engineers should be implemented through a Central Training Establishment in each organization/ sector, which should be responsible for;

- Defining and determining training needs and priorities according to job requirements.

- Approving and supervising training of different theoretical and practical courses.

- Making necessary administrative and financial assistance available to the training center.

- Increasing the already available facilities for trainees and staff at the training center.

The Task Force accordingly recommends that steps should be initiated by WAPDA, KESC, OGDC, SNGPL, SGTC & other organizations and utilities for overhauling their training programme, institutional reinforcement of the formations responsible for training, and upgrading their training center facilities with the assistance of qualified consultants and donor agencies to improve the capabilities of the present staff, and to ensure availability of the required number of personnel for future projects. Simultaneously these organizations should establish a working relationship with engineering universities and polytechnic institutes in order to ensure that these institutions are able to tailor their educational programmes to the qualitative and quantitative requirements of the energy sector.

8. RECOMMENDED ENERGY INVESTMENT PLAN (1993-1998)

Table 8.1 presents a summary of the recommended energy sector investment plan for the period 1993-98. The total investment outlay is to the tune of Rs. 711 billion, of which the foreign exchange component is Rs. 379 billion. An amount of Rs. 381 billion is expected to be contributed by private sector, while the balance of Rs. 330 billion would have to be catered for in the public sector development budget.

ANNEXURES

ANNEXURE I-I

SECRET/IMMEDIATE

CABINET SECRETARIAT
(CABINET DIVISION)

...

No.54/CS/93. Islamabad, the 30th October,1993.

Subject : Task Force on Energy Sector.

The Prime Minister has been pleased to constitute a Task Force on Energy Sector consisting of the following members :-

COMPOSITION

1.	Mr. Shahid Hasan Khan, Special Assistant to the Prime Minister for Economic Affairs.	Chairman
2.	Secretary-General, Ministry of Water & Power.	Member
3.	Additional Secretary Incharge, Ministry of Petroleum and Natural Resources.	Member
4.	Chairman, WAPDA.	Member
5.	Chairman, OGDC.	Member
6.	Senior Chief (Energy) Planning Commission.	Member
7.	Director General, Petroleum Concession.	Member
8.	Mr. Zahid Muzaffar.	Member
9.	Mr. M.R. Zubairi.	Member
10.	Mr. Razzaq Daud.	Member

11. Mr. Tanveer Azhar. — Member

12. Mr. Daud Beg,
Additional Secretary (P),
Ministry of Water & Power. — Member/Secretary

TERMS OF REFERENCE

i) Draw up an outline of new Energy Policy.

ii) Formulate strategy for elimination of load shedding.

iii) Recommend proposals for mobilization of resources for Energy Sector.

iv) Recommend proposals for promoting private sector investment (foreign and domestic).

v) Make recommendations for enhancing indigenous oil and gas production.

2. The Task Force will finalize its recommendations within 4-6 weeks and submit its report to the Prime Minister and the Cabinet. The Chairman of Task Force may co-opt additional members, if necessary.

3. The Secretariat assistance for the Committee will be provided by the Ministry of Water & Power.

(Mansoor Elahi))
Joint Secretary to the Cabinet

Mr. Shahid Hasan Khan,
Special Assistant to the Prime Minister
for Economic Affairs.

Secretary-General,
Ministry of Water & Power.

Additional Secretary Incharge,
Ministry of Petroleum and
Natural Resources.

Chairman, WAPDA.

Chairman, OGDC.

Senior Chief (Energy)
Planning Commission.

Director General,
Petroleum Concession.

Mr. Zahid Muzaffar.

Mr. M.R. Zubairi.

Mr. Razzaq Daud.

Mr. Tanveer Azhar.

Mr. Daud Beg,
Additional Secretary (P),
Ministry of Water & Power.

All Secretaries General/Secretaries and Additional Secretaries Incharge of Ministries/Divisions.

Copy forwarded for wide publicity of the Committee on T.V., Radio and Press to :-

i) Secretary,Information & Broadcasting Division
ii) Principal Information Officer.

Copy to Mr.Nisar Hussain Khan, Joint Secretary,E&F.I,Prime Minister's Secretariat with reference to their u.o.No.11(11)/E&F.I/93, dated 27th October,1993.

(Mansoor Elahi)
Joint Secretary to the Cabinet

ANNEXURE 1-2

TASK FORCE SUB-COMMITTEES

1. **Sub-committee on Power Sector:**

1)	Mr. Tanveer Azhar G.M. NESPAK	Chairman
2)	Dr. Z. Fikri, MD, FACE Ltd.	Secretary
3)	Mr. M.R. Zubairi, Executive Vice President, Crescent Group of Services (PVT) Ltd.	Member
4)	Mr. Mumtaz Hameed, Chairman WAPDA.	Member
5)	Mr. Salman Khaliq, Chairman & MD, KESC.	Member
6)	Mr. A. Rashid Kakar, Technical Adviser, WAPDA.	Member
7)	Mr. Ashfaq Mahmood, or a representative Senior Chief (Energy), Planning Commission	Member.

2. **Sub-committees on Privatisation of Power:**

1)	Dr. A. Razak Dawood, Managing Director, Descon Engineering (PVT) Ltd.	Chairman.
2)	Mr. Daud Beg Additional Secretary (Power) Ministry of Water and Power.	Secretary

3)	Mr. M. R. Zubairi, Executive Vice President, Crescent Group of Services (PVT) Ltd.	Member
4)	Mian Azam Saigol, Managing Director, Saigol Group (PVT) Ltd.	Member
5)	Mr. Mumtaz Hameed, Chairman WAPDA.	Member
6)	Dr. Shahid K. Haq, MD, PARCO	Member
7)	Mr. Shahid Hafeez Ahmad, Director General, PPC	Member
8)	Mr. Shahid Sattar	Member

3. **Sub-committee on Oil and Gas:**

1)	Mr. Shahid Ahmad, DG, Petroleum Concession.	Chairman
2)	Mr. Saleem Zulfiqar, Managing Director, Khan and Paracha Co.	Secretary
3)	Dr. Gulfraz Ahmad, Chairman, OGDC.	Member
4)	Dr. Shahid K. Haq, Managing Director, PARCO	Member
5)	Mr. Karim Mahmood	Member
6)	Mr. Ahmad Masood	Member
7)	Mr. Zahid Muzaffar	Member

ANNEXURE 3.1
PROJECTED IMPACT OF SECTORAL EFFICIENCY IMPROVEMENT MEASURES

ESTIMATE OF INCREASE IN SYSTEM POWER SUPPLY CAPABILITY (MW)

DESCRIPTION	JUNE 94	JUNE 95	JUNE 96	JUNE 97	JUNE 98
1. Improvement of Plant Availability	79	373	460	460	460
TOTAL:	79	373	460	460	460

Base : December 1993 levels

ESTIMATE OF REDUCTION IN PEAK DEMAND/LOAD SHEDDING (MW)

DESCRIPTION	JUNE 94	JUNE 95	JUNE 96	JUNE 97	JUNE 98
1. Reduction in System Losses	20	116	245	390	535
2. Connection Policy & steeper domestic tariffs	14	64	165	340	620
3. Time-of-Use pricing	4	39	160	310	510
4. Off-peak tariffs	20	180	340	540	740
5. Lighting fixtures substitution	12	27	60	106	212
6. Energy efficient motors	5	10	30	50	65
TOTAL:	75	436	1000	1736	2682

Base : December 1993 levels

ESTIMATE OF REDUCTION IN ANNUAL ENERGY DEMAND (GWh)

DESCRIPTION	1993-94	1994-95	1995-96	1996-97	1997-98
1. Connection Policy & steeper domestic tariffs	37	340	880	1800	3300
2. Lighting fixtures substitution	22	95	215	380	760
3. Energy efficient motors	7	60	180	300	400
TOTAL:	66	495	1275	2480	4460

Base : December 1993 levels

ANNEXURE 3.1
ESTIMATE OF SAVINGS IN OPERATIONAL (FUEL) COSTS

(In Million 1993 Rs.)

DESCRIPTION	1993-94	1994-95	1995-96	1996-97	1997-98	TOTAL
1. Improvement in Thermal Efficiency	685	3095	4035	4275	4325	16415
2. Improvement in Operational Regime	30	80	400	400	400	1310
TOTAL:	715	3175	4435	4675	4725	17725

Base : December 1993 levels

ESTIMATE OF ADDITIONAL REVENUES/SAVINGS IN FINANCIAL COSTS

(In Million 1993 Rs.)

DESCRIPTION	1993-94	1994-95	1995-96	1996-97	1997-98	TOTAL
1. Reduction in Losses	720	1150	2070	3180	4520	11640
2. Increase in Availability of Thermal Plant	445	2510	2620	2770	2800	11145
3. Removal of Tariff cross-subsidies & adjustments	-45	-120	-160	-120	80	-365
4. Reduction in financial costs due to Arrear Reduction (@ 14% per annum)	275	1100	1170	1240	1340	5125
TOTAL:	1395	4640	5700	7070	8740	27545

Base : December 1993 levels

DEMAND GROWTH - RECOMMENDED SCENARIO

Current Demand (1993 - 94) : 9127 MW

Natural Growth Rate : 11%

Years	Gross Demand MW	Imp. Thru Losses	Imp. Thru DSM	Net Demand
1993-94	9127	-	-	9127
1994-95	10131	116	320	9695
1995-96	11245	245	755	10245
1996-97	12482	390	1346	10746
1997-98	13855	535	2147	11173

: Projected improvements upto June 1994 have been neglected

ANNEXURE : 3.2

ECOMMENDED PUBLIC SECTOR GENERATION "CORE PROGRAMME"

STATION NAME	UNIT NO.	INSTALLED CAPACITY(MW)	STARTING DATE	DATE OF COMMISSIONING
PROJECTS TO BE COMPLETED BY JUNE 1998				
Guddu C.C. (s)	9	145	O/G	Jan. 94
Mangla	10	100	O/G	Jan. 94
Faisalabad C.C (s)	9	40	O/G	Jan. 94
Lakhra F.D	1	50	O/G	Jan. 94
Muzaffargarh (s)	2	210	O/G	Mar. 94
Muzaffargarh (s)	5	200	O/G	Jul. 94
Lakhra F.D	2	50	O/G	Jul. 94
Muzaffargarh (s)	3	210	O/G	Sep. 94
Kotri C.C (s)	7	40	O/G	Sep. 94
Kot Addu C.C (g)	13	132	O/G	Sep. 94
Kot Addu C.C (g)	14	132	O/G	Oct. 94
Lakhra F.D	3	50	O/G	Dec. 94
Muzaffargarh (s)	6	200	O/G	Jan. 95
Kot Addu (C.C (s)	15	132	O/G	May 95
Kot Addu (C.C (s)	11	100	O/G	Jun. 95
Kot Addu (C.C (s)	12	100	O/G	Jun. 95
Muzaffargarh (s)	4	300	O/G	Jul. 95
Bin Qasim Unit 6	1	210	O/G	Apr. 96
TOTAL		**2401**		
PROJECTS TO BE COMPLETED DURING 9TH PLAN PERIOD				
Chashma (Hyd)	1-8	184	Jan. 94	Sep. 98
Chashma (Nuc)	1	300	Feb. 92	Sep. 99
Ghazi Barotha Hyd.	1	285	May. 95	Dec. 99
Ghazi Barotha Hyd.	2	285	May. 95	Feb. 2000
Ghazi Barotha Hyd.	3	285	May. 95	Apr. 2000
Ghazi Barotha Hyd.	4	285	May. 95	Jun. 2000
Ghazi Barotha Hyd.	5	285	May. 95	Aug. 2000
Neelum Jhelum/Kohala Hydel	1	120	June 97	June 2002
Neelum Jhelum/Kohala Hydel	2	120	June 97	Sept. 2002
Neelum Jhelum/Kohala Hydel	3	120	June 97	Dec. 2002
Neelum Jhelum/Kohala Hydel	4	120	June 97	Mar. 2003
TOTAL		**2409**		

ANNEXURE 3.3
PRIVATE SECTOR POWER PROJECTS

SR. NO.	NAME OF THE PROJECT	CAPACITY (MW)
1.	Hub Thermal Power Project	1,292
2.	Uch Combined Cycle Plant	584
3.	120 MW Thermal Plant, Lahore	120
4.	Steam Turbine Project at Lasbela, Balochistan	300
5	Steam Turbines at Muzaffargarh (AES)	315
6.	Steam Turbines at West Wharf Karachi	420
7.	Combined Cycle, Kabirwala	147
8.	Combined Cycle, Quetta	200
9.	New Proposals expected under recommended policy	1,500
	TOTAL:	4,878

ANNEXURE : 3.4
EHV TRANSMISSION EXPANSION PROGRAMME

SR. NO.	DESCRIPTION	DATE OF COMPLETION	LENGTH (KM)
1.	500 KV TARBELA-LAHORE	1993 - 94	397
2.	SECOND 200 KV GUDDU-SIBBI-QUETTA	1994 - 95	387
3.	SECOND 500 KV LAHORE - JAMSHORO	1994 - 95	1075
4.	500 KV TARBELA - PESHAWAR	1995 - 96	117
5.	UPGRADATION OF GHAKKAR GRID STATION TO 500 KV	1995 - 96	
6.	UPGRADATION OF 500 KV REWAT-LAHORE	1995-96	
7.	500 KV HUB - JAMSHORO	1995 - 96	2X200
8.	UPGRADATION OF 220 KV MUZAFFARGARH SUBSTATION TO 500 KV	1995 - 96	
9.	THIRD 500 KV JAMSHORO - LAHORE	1996 - 97	1057
10.	4TH 500 KV JAMSHORO - LAHORE	1997 - 98	1057
11.	220 KV KOT ADDU - LORALAI	1997 - 98	400
12.	500 KV PESHAWAR-GHAZI BAROTHA	1998 - 99	
13.	TARBELA - REWAT IN & OUT AT GHAZI BAROTHA	1998-99	
14.	500 KV TARBELA - REWAT	1999 - 2000	

ANNEXURE : 3.5
SECONDARY TRANSMISSION AND GRID STATION PROGRAMME (STG)

SR. NO.	NAME OF LOAD CENTRE	NEW			AUGMENTATION		EXTENSION			CONVERSIO	TOTAL TRANSFER CAPACITY ADDED MVA	TRANSMISSION LINES			REMARKS
		220	132	66	132	66	220	132	66			220	132	66	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	PESHAWAR	2	24	5	12	2	0	5	3	9	1474.4	200	780	111	
2	RAWALPINDI	2	7	0	7	1	0	2	0	2	914.7	75	251	0	
3	DAUD KHEL	1	4	0	0	2	0	0	2	0	426.4	195	79	0	
4	SARGODHA	1	1	0	1	2	0	2	2	4	481.4	100	67	0	
5	FAISALABAD	1	14	0	7	0	0	5	5	6	1035	8	387	0	
6	GUJRANWALA	1	13	0	3	0	0	3	2	0	758.5	50	127	0	
7	LAHORE	1	21	0	0	0	0	12	0	10	1390.4	45	167	0	
8	SAHIWAL	1	7	0	5	5	0	5	3	2	705.3	327	239	0	
9	MULTAN	1	15	0	12	5	1	7	4	5	1099	90	724	0	
10	SUKKUR	1	3	0	4	6	1	2	0	3	627.2	125	323	26	
11	HYDERABAD	1	5	0	8	3	2	6	0	0	903.8	30	246	70	
12	QUETTA	0	13	0	5	3	0	7	1	1	340.5	0	652.5	0	
	TOTAL(WAPDA)	13	127	5	64	29	4	56	22	42	10156.6	1245	4042.5	207	
13	KESC		16	0	12	0	2	0	0	6	2060	124	192	0	
	TOTAL (1993-98)	13	143	5	76	29	6	56	22	48	12216.6	1369	4234.5	207	
	TOTAL EXISTING										30404.1	2021	13461		
	TOTAL 1998										42620.7	3380	17696		

ANNEXURE : 3.6
LIST OF GRID STATIONS IN NEW AREAS

SERIAL NUMBER	GRID STATION	SERIAL NUMBER	GRID STATION
	BALOCHISTAN		
	QUETTA		**GUJRANWALA**
1.	Nagar Panear		
2.	Belendeh	43.	Kotri
3.	Gawadar	44.	Tatle Aly
4.	Duki	45.	Sheranwala Bagh
5.	Jiwani	46.	Ahmed Nagar
6.	Kohle	47.	Chantan Wali
7.	Mani Khawa	48.	Kot Hassan Khan
8.	Hair Din	49.	Badiana
9.	Chamman	50.	Lala Pur
10.	Sumangli	51.	Ghunki
11.	Chaghai		
12.	Dal Badin		**FAISALABAD**
14.	Nal		
15.	Huran Zai	52.	Rajan
		53.	Chori
	SIND		
	HYDERABAD	54.	Hast Khewa
		55.	Chak 106
16.	M.W. Gorchain	56.	Panwari
17.	Jan Nawaz Ali	57.	Feroze Wattoan
18.	River Bund		
19.	Nagar Parker		**SARGODHA**
20.	Bhan Saidabad		
		58.	Kot Shakir
	SUKKUR		
21.	Gorakh Hill		**DAUD KHEL**
22.	Thari		
23.	Rato Dero	59.	Isakhel
24.	Chandko	60.	Kalabagh
25.	Nawazabad		
			RAWALPINDI
	PUNJAB		
	MULTAN		
26.	Yazman	61.	Chattar
27.	Miran Pur	62.	Nila
28.	Jangal Marhala		
29.	Musa Virk		**N.W.F.P**
30.	Nawazabad		**PESHAWAR**
		63.	Darban Khurd
	SAHIWAL	64.	Lakki
31.	Hota	65.	Bahadar Khel
32.	Chunawala	66.	Domail
33.	Malleke Taru	67.	Doaba
34.	Dulla	68.	Tordher
35.	Hira Singh	69.	Kaka Sahib
		70.	Rajar
	LAHORE	71.	Naguman
		72.	Katlang
36.	Chak-65	73.	Rustam
37.	Khana	74.	Dhobian
38.	Sunder	75.	Oghi
39.	Kala Khthai Road	76.	Madyan
40.	Fateh Pur	77.	Warai
41.	Chichuki Malian	78.	Munda
42.	Bhakki	79.	Barhaman

ANNEXURE : 3.7

TARGET OF CONNECTIONS IN URBAN AND RURAL AREAS

PROVINCE	BENCHMARK* 1992-93 (CUMMULATIVE)	DOMESTIC INCLUDING COMMUNITY	COMMERCIAL	INDUSTRIAL	TUBEWELL	OTHERS	TOTAL	1997-98 (CUMMULATIVE)
URBAN AREAS								
Punjab	2748347	683807	69332	11317	1832	381	766669	3515016
Sindh	353242	46589	5425	1659	740	263	54676	407918
N.W.F.P	348168	16715	2252	422	64	32	19485	367653
Balochistan	101058	30543	5696	495	722	87	37543	138601
Sub-total	3550815	777654	82705	13893	3358	763	878373	4429188
KESC	1158074	284000	107000	8000	250	750	400000	1558074
Grand Total(Urban)	4708889	1061654	189705	21893	3608	1513	1278373	5987262
RURAL AREAS UNDER (D.O.P)								
Punjab		576042	58406	9534	1543	321	645846	645846
Sindh		17079	1993	609	272	96	20049	20049
N.W.F.P		167436	22560	4230	645	314	195185	195185
Balochistan		7952	1482	129	188	23	9774	9774
Sub-total		768509	84441	14502	2648	754	870854	870854
UNDER RE PROJECT								
Punjab		495804	0	8845	16577	0	521226	521226
Sindh		224096	0	3690	6916	0	234702	234702
N.W.F.P		160394	0	2374	1781	0	164549	164549
Balochistan		43390	0	696	3720	0	47806	47806
Sub-total		923684	0	15605	28994	0	968283	968283
TOTAL RURAL AREAS								
Punjab	3183317	1071846	58406	18379	18120	321	1167072	4350389
Sindh	340739	241175	1993	4299	7188	96	254751	595490
N.W.F.P	946361	327830	22560	6604	2426	314	359734	1306095
Balochistan	90860	51342	1482	825	3908	23	57580	148440
Grand Total (Rural)	**4561277**	**1692193**	**84441**	**30107**	**31642**	**754**	**1839137**	**6400414**
Grand Total (Overall)	**9270166**	**2753847**	**274146**	**52000**	**35250**	**2267**	**3117510**	**12387676**

*** Upto April, 1993**

ANNEXURE : 3.8
MAJOR GENERATION PROJECT DELAYS 1989/90 - 1991/92

Project	Scheduled Date	Actual Date	Delay Days
Guddu G.T. Unit 7 & 8	Jul. 1991	Jun. 93	691
C.C. at Guddu	Jul. 1992	Sep. 94	548
Muzaffargarh Steam Unit 1	Dec. 1990	Sep. 93	1004
Muzaffargarh Steam Unit 2	Jun. 1991	Mar. 94	1187
Muzaffargarh Steam Unit 3	Dec. 1991	Sep. 94	1004
Mangla Unit 9	Nov. 1991	Sep. 93	660
Mangla Unit 10	Feb. 1992	Jan. 93	365
Tarbela Unit 14	Jul. 1991	Apr. 92	244
Tarbela Unit 13	Nov. 1991	Jul. 92	212
Tarbela Unit 12	Jul. 1992	Jan. 93	155
Tarbela Unit 11	Mar. 1992	Feb. 93	305
Bin Qasim Unit 3	Jun. 1989	Jun. 91	730
Bin Qasim Unit 4	Oct. 1989	Jul. 91	638

ANNEXURE : 3.9
POWER SECTOR IMPROVEMENT TARGETS AND MONITORING PLAN

Item	Existing Dec. 93	June 94	Jan. 95	June 95	Jan. 96	June 96	Jan. 97	June 97	Jan. 98	June 98	Recommended Monitoring Interval
I - SUPPLY SIDE TARGETS											
1. System Losses (Auxiliary + T&D) (%)											
WAPDA	23	22.5	22	21.5	21	20.5	20	19.5	19	18.5	6 months
KESC	34	32	30	2.8	26.5	2.5	23.5	22	20.5	19	
2. MW Availability of Thermal Plant: (%)											
(WAPDA + KESC)	82	83	85	87	87	87	87	87	87	87	6 months
3. Thermal Efficiency: (%)											
(WAPDA + KESC)	28	29	31	32	33	33	33	33	33	33	6 months
4. Operational Regime (Two shifting & low load operation, integrated despatch)	-	-	*	*	*	*	*	*	*	*	1 month
5. Least Cost Load Shedding, Plan implementation	-	*	*	*	*	*	*	*	*	*	1 month
6. Public Sector Generation Program (Additional MW beyond Dec. 1993)	-	545	1359	1891	2191	2401	2401	2401	2401	2401	3 months
II - DEMAND SIDE TARGETS											
1. Demand growth rate % (domestic sector)	16	15.5	15	14.5	14	13.5	12.9	12.3	11.6	10.8	6 months
2. Load Management:											
Number of customers under L/M											
- Industrial	-	300	300	10000	25000	45000	65000	90000	120000	150000	3 months
- Agricultural	-	5000	27000	45000	6500	85000	110000	135000	160000	185000	3 months
- Domestic & Commercial	-	1000	5000	30000	55000	80000	105000	135000	165000	200000	3 months
Introduction of seasonal incentive for industry	-	*	*	*	*	*	*	*	*	*	6 months
3. System Load Factor (%)	64	64.5	65.0	65.5	66	66.5	67	68	69	70	6 months

* : Measure in force & operational

ANNEXURE : 3.9

POWER SECTOR IMPROVEMENT TARGETS AND MONITORING PLAN

Item	Existing Dec. 93	June 94	Jan. 95	June 95	Jan. 96	June 96	Jan. 97	June 97	Jan. 98	June 98	Recommended Monitoring Interval
4. Substitution of incandescent by floursecent fixtures											
- Reduction in sales of incandescent lamps((Dec. 93 base)	-	2%	5%	8%	11%	15%	20%	30%	40%	50%	6 months
- Increase in sales of floursecent & energy efficient lamps(Dec. 93 base)	-	4%	10%	16%	22%	30%	40%	60%	80%	100%	6 months
5. Promotion of high energy devices:											
- Media campaign	-	*	*	*	*	*	*	*	*	*	1 months
- Design assistance service to manufacturer:	-	-	*	*	*	*	*	*	*	*	3 months
- Establishment of Testing laboratories	-	-	-	*	*	*	*	*	*	*	6 months
- Efficiency-related excise duty/taxation	-	-	-	-	*	*	*	*	*	*	6 months
III - FINANCIAL											
1. Arrears Reduction WAPDA/KESC	85/160	50/75	45/45	45/45	45/45	45/45	45/45	45/45	45/45	45/45	3 months
2. Rebalancing of Tariffs:											
- Industry	-	-2.5%	-5%	-7.5%	-10%	-12.5%	-12.5%	-12.5%	-12.5%	-12.5%	6 months
- Domestic (lower slab)	-	+2.5%	+5%	+7.5%	+10%	+12.5%	+15%	+15%	+15%	+15%	6 months
- Domestic (upper slab)	-	+5%	+10%	+15%	+20%	+25%	+30%	+30%	+30%	+30%	6 months
- Agricultural	-	+5%	+10%	+15%	+20%	+25%	+30%	+30%	+30%	+30%	6 months
IV -INSTITUTIONAL IMPROVEMENT TARGETS											
- Formation of organization for implementation monitoring of WAPDA & KESC Programmes	-	*	*	*	*	*	*	*	*	*	N.A.
- Commercialization/Corporatization of WAPDA & KESC	-	* Jan.94	*	*	*	*	*	*	*	*	1 month
- Amendments in WAPDA Act	-	*	*	*	*	*	*	*	*	*	1 month
- Formation of corporations	-	*	*	*	*	*	*	*	*	*	1 month

* : Measure in force & operational

POWER SECTOR IMPROVEMENT TARGETS AND MONITORING PLAN

Item	Existing Dec. 93	June 94	Jan. 95	June 95	Jan. 96	June 96	Jan. 97	June 97	Jan. 98	June 98	Recommended Monitoring Interval
- Creation of additional jobs (including private sector) (base Dec.1993)											
o Engineer's & Technicians	-	-	1330	2660	2940	3220	3880	4540	4975	5410	6 months
o Para-professional support	-	-	5320	10640	11755	12870	14915	16960	18120	19280	6 months
V - PRIVATE SECTOR GENERATION											
- Financial Closure (MW)	-	2000	2500	3000	3500	4000	4500	5000	5500	6000	3 months
- Implementation in progress (MW)	1290	1290	1410	2000	2500	3000	3500	4000	45000	5000	3 months
VI- INDUSTRIAL CO-GENERATION TARGETS											
- Legislation	-	*	*	*	*	*	*	*	*	*	1 month
- Creation of Fund	-	-	*	*	*	*	*	*	*	*	2 months
- Approved project feasibilities.(Total MW)	250	300	400	600	800	100	1200	1300	1500	1500	3 months
- Projects under Construction (Total MW)	-	-	200	250	300	500	700	800	900	1000	3 months
VII - RURAL ELECTRIFICATION PROGRAMME TARGETS											
- Number of villages electrified/year	3600	2500	2600	2600	2000	2000	2000	2000	2000	2000	3 months
- Revision of criteria & electrification plan	-	*	*	*	*	*	*	*	*	*	3 months
VIII- INDIGENIZATION OF DESIGN/ MANUFACTURE TARGETS (Percent by Value)											
- Consultancy	20%	20%	22%	25%	30%	35%	40%	45%	50%	55%	6 months
- Generation plant	15%	15%	17.5%	20%	22.5%	25%	27.5%	30%	32.5%	35%	6 months
- Grid stations & T&D network	25%	25%	27.5%	30%	33%	37%	41%	46%	52%	60%	6 months

* : Measure in force & operational

ANNEXURE : 3.10

RECOMMENDED POWER SECTOR INVESTMENT OUTLAY (1993 TO 1998)

ITEM	93-94			94-95			95-96			96-97			97-98			Total Eighth Five Year Plan		
	T	F	L	T	F	L	T	F	L	T	F	L	T	F	L	T	F	L
GENERATION	18,849	10,257	8,592	18,966	10,358	8,608	20,029	11,228	8,801	20,832	13,258	7,574	25,631	17,222	8,409	104,307	62,323	41,984
TRANSMISSION	5,315	2,827	2,488	8,810	4,803	4,007	7,798	4,292	3,506	6,549	3,152	3,397	6,165	3,155	3,010	34,637	18,229	16,408
SECONDARY T/L & G.S.	4,293	1,683	2,610	9,498	3,740	5,758	11,406	4,480	6,926	5,790	2,312	3,478	4,581	1,696	2,885	35,568	13,911	21,657
DISTRIBUTION	2,208	396	1,812	2,091	296	1,795	2,229	317	1,912	2,550	366	2,184	2,711	400	2,311	11,789	1,775	10,014
DSM, LOAD MANAGEMENT & ENERGY CONSERVATION	718	365	353	2,393	1,216	1,177	2,632	1,337	1,295	2,895	1,471	1,424	3,184	1,618	1,566	11,822	6,007	5,815
OPERATIONAL EFFICIENCY IMPROVEMENT	70	40	30	380	270	110	380	270	110	380	270	110	380	270	110	1,590	1,120	470
MISCELLANEOUS STUDIES AND INVESTIGATIONS	86	50	36	435	260	175	435	260	175	435	260	175	435	260	175	1,826	1,090	736
RURAL ELECTRIFICATION	1,978	396	1582	4,016	803	3213	3,098	620	2478	3,299	660	2639	3,514	703	2811	15,905	3,182	12,723
PUBLIC SECTOR	33,517	16,014	17,503	46,589	21,746	24,843	48,007	22,804	25,203	42,730	21,749	20,981	46,601	25,324	21,277	217,728	107,921	109,807
PRIVATE SECTOR (BOOT AND INDUSTRIAL CO-GENERATION)	8,890	7,460	1,430	17,640	14,870	2,770	23,100	19,640	3,460	35,460	30,160	5,300	16,637	14,197	2,440	101,727	86,327	15,400
TOTAL	42,407	23,474	18,933	64,229	36,616	27,613	71,107	42,444	28,663	78,190	51,909	26,281	63,238	39,521	23,717	319,455	194,248	125,207

All figures are in Million of Rupees

Elimination of Load Shedding by 1996-97 through DSM and Industrial Co-generation

Annex-4.1

GOVERNMENT OF PAKISTAN

MINISTRY OF FINANCE

Islamabad, the 7th June, 1990

NOTIFICATION

CUSTOMS

S.R.O. 555(I)/90.- In exercise of the powers conferred by section 19 of the Custom Act, 1969 (IV of 1969), sub-sections (1) and (2) of section 7 of the Sales Tax Act, 1951 (III of 1951), and sub-section (2) of section 5 of the Finance Act, 1985 (I of 1985), the Federal Government is pleased to exempt from customs duty specified in the First Schedule to the Customs Act, 1969 (IV of 1969), regulatory duty leviable under sub-section (2) of section 18 of the Customs Act, 1969 (IV of 1969), sales tax and iqra surcharge such raw materials and components as are not produced or manufactured locally and are imported for use in the manufacture of machinery, equipment, vehicles and intermediary or capital goods to be supplied against international tender to the project financed out of the funds provided by the international loan or aid giving agencies, subject to the following conditions:-

(i) the importer-cum-manufacturer has suitable in-house facilities to manufacture the articles in respect of which he claims exemption under this notification;

(ii) at the time of import, the importer makes a declaration on the bill of entry to the effect that the raw materials and components have been imported in accordance with his entitlement for manufacturing machinery, or equipment, vehicles and intermediary/ capital goods, as the case may be, to be supplied to the projects financed out of the funds provided by the international loan or aid giving agencies against international tender duly supported by a certificate of entitlement from Chief Survey and Rebate, Central Board of Revenue;

(iii) furnished as insurance guarantee to the Collector of Customs at the time of importation of the raw materials and components equal to the amount of customs duty, sales tax and iqra surcharge and an undertaking to abide by the condition laid down in this notification, failing which he shall pay the customs duty and sales tax, surcharge and iqra surcharge exempted under this notification and shall make payment of any penalties that may be imposed by the Collector of Customs in this behalf; and

(iv) the manufacturer shall, within the validity of the insurance guarantee, apply to the Collector of Customs for discharging the insurance guarantee, the application being supported by a certificate in the Form set out below issued by the Assistant Collector, Customs and Central Excise, within whose jurisdiction the manufacturing unit is located and a certificate from the incharge of the concerned project that the articles pertaining to the international tender have been supplied to it.

FORM

Certificate No ..... dated.....

I.....Assistant Collector, Customs and Central Excise..... am satisfied that the raw
(Name of the officer) (Place of posting)
materials and components imported by Messrs.....under the provision of S.R.O..... dated.....against the insurance guarantee No..... dated ..... bill of entry No ..... dated..... have been used for the manufacture of .....
in accordance with the scale laid down by the Chief (Survey and Rebate) vide certificate No ..... dated..... and the articles have been supplied against the international tender No ..... dated ..... to Messrs .....

Stamp and Signature

G. A. JAHANGIR
Additional Secretary

[C.NO.79-80/Mach/1(61)]

As amended

S.R.O.602(I)/91, - dated 01.07.1991.
S.R.O.428(I)/92, - dated 14.05.1992.

GAS PRICE ANALYSIS

		DOMESTIC PRODUCTION ($/MCF)			
	IMPORTATION $/MCF	Existing Policy	Proposed Policy Zone-1	Proposed Policy Zone-II	Proposed Policy Zone-III
Importation Price	1.50 1	-	-	-	-
Production Price 2	-	2.32	2.89	2.56	2.30
Royalty (12.5%)	-	(0.29)	(0.36)	(0.32)	(0.29)
Taxes	-	(0.79)	(0.98)	(0.87)	(0.78)
govt. Net Cash Flow	-	(0.46)	(0.17)	(0.31)	(0.46)
Bonus	-	(0.01)	(0.01)	(0.01)	(0.01)
Net Cost to Govt.	**11.50**	**0.77**	**1.36**	**1.05**	**0.76**

1 AVG 1994 HSFO PRICE ($68/MT), $1.67/MCF

2 1000 BTU/CF IMPORTED GAS, 1138 BTU/CF DOMESTIC PRODUCTION

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PROPOSED PETROLEUM POLICY ANALYSIS
NON ASSOCIATED ONSHORE GAS FIELD EXAMPLE

		EXISTING POLICY SEPTEMBER 1993	PROPOSED POLICY ZONE I	ZONE II	ZONE III
Royalty		12.5%	12.5%	12.5%	12.5%
Tax (onshore)		55%	50%	52.5%	55%
Depreciation		10%	10%	10%	10%
GOP/OGDC Carry (Expl).		5%	5%	5%	5%
GOP Backin (Onshore)		35%	10%	20%	30%
Oil discount	$0–16/Bbl	0%	0%	0%	0%
	$16–25/Bbl	5%			
Marine freight		YES	YES	YES	YES
Non associated Gas Price (Onshore)		100% HSFO	125% HSFO	110% HSFO	100% HSFO
		$ 80/MT FLOOR 50:50 SPLIT OF INCREASE ABOVE $ 80/MT MARINE FREIGHT INCLUDED NO DISCOUNT			
CONDENSATE PRICE		INTERNATIONALLY QUOTED COMPARED CONDENSATE WITH SAME DISCOUNTS FOR OIL AND NO MARINE FREIGHT MURBAN CRUDE USED IN THIS EXAMPLE		EQUAL TO COMPARABLE INTERNATIONAL CONDENSATE PRICE NO DISCOUNT MURBAN CRUDE USED IN THIS EXAMPLE	
NEW LPG		CNF	CNF	CNF	CNF
IMPORT DUTY DURING EXPL.		0%	0%	0%	0%
AFTER COMMERCIAL DISCOVERY.		5–1/4%	3%	3%	3%

PRODUCTION BONUS

$MM	CUMULATIVE PROD. MMBOE OFFSHORE	ONSHORE
1.0	On Dec Comm.	
1.0	10	5
1.5	15	10
3.0	25	15
5.0	50	20

Production bonus on concession basis.
$ 0.5 Million on commencement of commercial production.
$ 1.0 Million at 30 MMBOE.
$ 1.5 Million at 60 MMBOE.
$ 3.0 Million at 80 MMBOE.
$ 5.0 Million at 100 MMBOE.

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PROPOSED PETROLEUM POLICY ANALYSIS
NON ASSOCIATED ONSHORE GAS FIELD EXAMPLE

	EXISTING POLICY SEPTEMBER 1993		PROPOSED POLICY ZONE I	PROPOSED POLICY ZONE II	PROPOSED POLICY ZONE III
RESERVES	500 BCF	100 BCF	500 BCF	500 BCF	100 BCF
AV. WELL COST, $MM (UNESCALATED)	13	0.5	13	13	0.5
OPERATOR'S ECONOMICS					
Capital, $MM	136	29	160	149	29
NCF, $MM	315	43	742	556	51
NPV at 15%, $MM	11	6	60	38	8
ROI, %	18	22	27	24	25
GOP PARTICIPATION ECONOMICS					
Capital, $MM	43	3	12	24	3
NCF, $MM	232	36	103	176	32
NPV at 15%, $MM	27	11	12	20	10
ROI, %	> 100	> 100	> 100	> 100	> 100
TOTAL PROJECT OPERATING INCOME, $MM (OPERATOR + GOP)	1177	158	1677	1502	167
GOVT. TAKE, $MM					
Royalty & Bonuses	213	21	280	254	24
From Operator, Taxes	270	35	496	411	40
From National Company, Taxes	147	23	56	105	20
GOP Participation NCF	232	36	103	176	32
Total Govt Take	862	115	935	946	116
Govt. Take as % of Operating Income	73	73	56	63	69
Govt. Take as % of Operator's NCF	153	130	105	120	125

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ANNEXURE : 5.2

LIST OF TOWN TO BE PROVIDED GAS

SERIAL NUMBER	NAME OF TOWNS	SERIAL NUMBER	NAME OF TOWNS
		25.	KOT ADU
	PUNJAB		
		26.	KAHUTA
1.	KHANPUR PHASE-1	27.	HAZRO
2.	AHMEDPUR EAST	28.	EMINABAD
3.	KOT MOMIN	29.	LALIAN
4.	JHANG	30.	KHAN BELA
5.	DAUD KHEL	31.	DANDOT
6.	PHULARWAN	32.	MIANI
7.	SHAHKOT, SHEIKHUPURA	33	SHADIWAL
8.	BHAUN	34.	GHOR GHUSTI
9.	ZAHIRPIR	35.	SARAI SIDHU
10.	JAMKE CHEEMA	36.	BHAIRA
11.	HAFIZABAD	37.	BHALWAL
12.	JHELUM	38.	FAROOQABAD (CHORKANA)
13.	KHARIAN	39.	JALALPUR JATTAN
14.	LALAMUSA	40.	AJANDAL ATTOCK
15.	SARAI ALAMGIR		
			N.W.F.P
16.	SAMA SATTAH		
17.	CHAOA SAIDAN SHAH	41.	SAKHAKOT
18.	MALIKWAL	42.	DARGAI
19.	KHURIANWALA	43.	SHERGARH
20.	QADIRPUR RAWAN	44.	KOHAT
21.	DHAUNKAL	45.	BATKHELA
22.	AHMADPUR LAMMA	46.	UTMANZAI
23.	LADEWALA, WARRIACH	47.	HATHIAN
24.	GUJAR KHAN	48.	GHAZI - TERBELA - TOPI - GIK - SWABI.

LIST OF TOWN TO BE PROVIDED GAS

SERIAL NUMBER	NAME OF TOWNS	SERIAL NUMBER	NAME OF TOWNS
		20.	ABDU
	SINDH	21.	JOHI
1.	NAUSHERO FEROZ	22.	THUL
2.	PADIDAN	23.	THERI
3.	KHURA (Subject to laying of Gambat S.M.)	24.	BABARIOI
		25.	MEHRABPUR
4.	TANDO MOHD KHAN	26.	SHAHDADKOT
5.	MATLI	27.	KAMBAR
6.	LAKHI		
7.	HINGORJA		BALOCHISTAN
8.	THARRI MIRWAH		
9.	GARELLO	28.	PISHIN
10.	ODEROLAL	29.	YARU
11.	MADEJI	30.	KUCHLAGH
12.	SETHARJA	31.	MASTUNG
13.	SARHARI	32.	LEHRI
14.	SOBHO DERO	33.	HUB TOWN & HUB NADI
15.	BAGARJI		
16.	KHADRO		
17.	SINJHORO		
18.	KUMB		
19.	CHAK		

ANNEXURE : 5.3

TRANSPORTATION OF OIL

(Figs. in Million Tons)

	1987-88	1992-93	1997-98
WHITE OIL	3.7	8.1	10.9
- PARCO Pipeline	2.7	3.4	4.2
- Railways	0.6	0.9	1.2
- Road	3.1	7.2	9.7
BLACK OIL	3.3	4.6	7.7
- Pipeline	0.9	1.4	2.4
- Railways	0.9	1.2	2.0
- Road	1.5	2.0	3.3

Source : OCAC

ANNEXURE 5.4
FUEL SECTOR INVESTMENT PROGRAMME
(MAIN PROJECTS)

1.	**OIL & GAS EXPLORATION & PRODUCTION**	
-	Dhodak Development Project	1994
-	Tando Adam Development Project	1994
-	Sadkal Development Project	1994
-	Missa Keswal Development Project	1995
-	Fimkasser Development Project	1995
-	Nandpur Development Project	1995
-	Uch Development Project	1996
-	Pirkoh Development Project	1996
-	Development of Oil & Gas Resources	1998
-	Exploration & Development	-
2.	**REFINERIES**	
-	NRL Revamp	1996
-	PRL Revamp	1996
-	Hydrocracker	1997
-	Iran - Pak Refinery	1999
-	PARCO Refinery	1999
3.	**OIL PIPELINES**	
-	Port-Qasim Hab Pipeline	1996
-	Pipri - Jamshoro (Pipeline)	1997
-	PARCO pipeline (extension) to Lahore	1996
-	Karachi - Multan (2nd pipeline)	1998
-	PQA - Korangi (Khalifa point pipeline)	1998
4.	**OIL STORAGES**	
-	Commercial Storage (220,000 Tons)	1998
-	Commercial Storage (180,000 Tons)	1998
-	Strategic Storage (900,000 Tons)	2000
5.	**GAS TRANSMISSION & DISTRIBUTION**	
-	42 KM Quetta Transmission Pipeline Capacity Expansion Project (Phase I)	1994

-	187 KM Quetta Transmission Pipeline Capacity Expansion Project (Phase II)	-
-	60 KM Gas Transmission Line Dhodak Project	1994
-	SSGPL System Expansion and Rehabilitation Project	
	i) Existing System (61 KM)	1994
	ii) 408 KM Gas Transmission Line Kanadanwari Project	1995
-	IBBP Capacity Expansion (Phase II & III)	1995
-	166.85 KM Gas Transmission Line Qadirpur Project	1996
-	Distribution System Expansion Unit A	1996
-	Gas Distribution Project New Towns Master Plan (Sindh)	1996
-	Gas Distribution Project New Towns Master Plan (Balochistan)	1996
-	626 KM Gas Transmission Line Project-VI (Phase II)	1997
6.	**COAL**	
-	PMDC Equity in LCDC for 0.75 MTPY Mine for Units 1 - 6	1997
-	Lakhra Compact Block	1998
-	Thar Coalfield-Regional Infra Development	1998
-	Mechanization of Existing Mines	1998

ANNEXURE 7.1
PROJECTIONS OF CATEGORY-WISE MANPOWER DEMAND (EMPLOYMENT) IN THE ENERGY SECTOR IN PAKISTAN

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
DEGREE HOLDERS											
Chemical Engineers	522	539	569	593	615	638	661	684	706	728	750
Chemists	176	200	229	258	286	317	341	363	394	418	446
Civil/Structural Engineers	1411	1614	1736	1691	1706	1608	1542	1550	1510	1418	1335
Computer Scientists	18	18	18	18	18	17	17	17	17	17	17
Economists	6	7	8	10	12	16	15	15	16	16	16
Electrical Engineers	5294	5558	5750	5900	6127	6153	6099	6152	6226	6220	6240
Electronics Engineers	149	164	189	205	224	245	256	266	275	279	288
Environmental Engineers	70	83	95	107	119	131	143	154	166	177	188
Geologists	896	934	974	995	1014	1028	1045	1065	1080	1091	1101
Mechanical Engineers	1637	1747	1807	1765	1794	1793	1785	1798	1809	1790	1779
Mining Engineers	206	216	252	287	321	354	386	417	476	530	582
Nuclear Engineers	3	6	7	10	13	16	16	15	19	17	17
Petroleum Engineers	534	627	718	805	889	974	1055	1137	1214	1293	1368
Other Engineers	1274	1281	1286	1263	1266	1271	1268	1264	1273	1276	1279
Total Degree Holdrs	12195	12994	13637	13906	14402	14559	14698	14898	15180	15269	15406
Technicians	474	524	677	709	749	821	860	888	930	965	985
Chemical/Chemists	10492	9227	14719	17961	8175	14525	14250	17493	18053	14802	12628
Civil	448	449	449	450	450	452	452	454	454	456	457
Computer	10215	11807	15783	16111	22473	16487	12225	12741	13392	12029	10167
Draftsman/Surveyors	369	485	507	525	540	554	566	583	609	631	649
Drafting	146510	161653	185559	186717	223650	192563	169451	173997	179165	173694	165025
Electrical	920	926	933	938	942	947	947	950	952	951	951
Electronics	57941	72143	88741	82378	119836	90914	66340	65042	69930	67770	60111
Mechanical	18752	18196	21699	22364	21408	16940	15149	17224	17885	15573	13507
Welding	10549	11209	11849	10814	10873	11413	11987	12786	13292	13194	13058
Other Technicians											
Technicians	256670	286619	340916	338967	419098	345615	292228	302157	314661	300055	277538

Source: An Energy Sector Manpower Assessment (Energy Wing, Planning & Development), Oct 1991

ANNEXURE 8.1
SUMMARY OF RECOMMENDED ENERGY SECTOR INVESTMENTS
(1993–98)

All Figures are in Million of Rupees

SR. NO.	DESCRIPTION	PUBLIC SECTOR			PRIVATE SECTOR			TOTAL		
		T	F	L	T	F	L	T	F	L
A.	**POWER***									
1.	Generation									
	– WAPDA	99,788	59,827	39,961	–	–	–	99,788	59,827	39,961
	– KESC	4,519	2,496	2,023	–	–	–	4,519	2,496	2,023
	– Private Sector	–	–	–	101,727	86,327	15,400	101,727	86,327	15,400
	Sub–total	104,307	62,323	41,984	101,727	86,327	15,400	206,034	148,650	57,384
2.	EHV Transmission & Grid Station									
	– WAPDA	33,631	17,711	15,920	–	–	–	33,631	17,711	15,920
	– KESC	1,006	518	488	–	–	–	1,006	518	488
	Sub–total	34,637	18,229	16,408	–	–	–	34,637	18,229	16,408
3.	Secondary Transmission & Grid Station									
	– WAPDA	18,763	7,583	11,180	–	–	–	18,763	7,583	11,180
	– KESC	17,089	6,612	10,477	–	–	–	17,089	6,612	10,477
	Sub–total	35,852	14,195	21,657	–	–	–	35,852	14,195	21,657
4.	Distribution & ELR									
	– WAPDA	4,000	755	3,245	–	–	–	4,000	755	3,245
	– KESC	7,789	1,020	6,769	–	–	–	7,789	1,020	6,769
	Sub–total	11,789	1,775	10,014	–	–	–	11,789	1,775	10,014
5.	DSM & Operational Efficiency Programmes									
	– WAPDA	13,257	7,149	6,108	–	–	–	13,257	7,149	6,108
	– KESC	1,981	1,068	913	–	–	–	1,981	1,068	913
	Sub–total	15,238	8,217	7,021	–	–	–	15,238	8,217	7,021
6.	Rural Electrification									
	– WAPDA	15,905	3,182	12,723	–	–	–	15,905	3,182	12,723
	– KESC	–	–	–	–	–	–	–	–	–
	Sub–total	15,905	3,182	12,723	–	–	–	15,905	3,182	12,723
	TOTAL POWER	**217,728**	**107,921**	**109,807**	**101,727**	**86,327**	**15,400**	**319,455**	**194,248**	**125,207**

*(Excluding Nuclear)

All Figures are in Million of Rupees

SR. NO.	DESCRIPTION	PUBLIC SECTOR			PRIVATE SECTOR			TOTAL		
		T	F	L	T	F	L	T	F	L
B.	**OIL & GAS**									
1.	Exploration & Development									
	– OGDC	33,687	20,866	12,821	–	–	–	33,687	20,866	12,621
	– DG (PC)	3,230	2,380	850	35,000	24,500	10,500	38,230	26,880	11,350
	Sub–total	36,917	23,246	13,671	35,000	24,500	10,500	71,917	47,746	24,171
2.	Refineries									
	– New Refineries	14,880	4,760	10,120	56,420	47,940	8,480	71,300	52,700	18,600
	– Revamp of existing Refineries	900	491	409	2,450	1,260	1,190	3,350	1,751	1,599
	Sub–total	15,780	5,251	10,529	58,870	49,200	9,670	74,650	54,451	20,199
3.	Oil & Pipelines & Storage									
	– Pipelines	9,790	3,410	6,380	27,660	12,220	15,440	37,450	15,630	21,820
	– Storage	27,970	7,205	20,765	1,930	585	1,345	29,900	7,790	22,110
	Sub–total	37,760	10,615	27,145	29,590	12,805	16,785	67,350	23,420	43,930
4.	Gas Transmission and Distribution									
	– SNGPL	7,157	1,713	5,444	20,494	4,702	15,792	27,651	6,415	21,236
	– SSGPL	9,850	3,140	6,710	5,380	1,020	4,360	15,230	4,160	11,070
	– Gas Import	–	–	–	130,000	47,000	83,000	130,000	47,000	83,000
	Sub–Total:	17,007	4,853	12,154	155,874	52,722	103,152	172,881	57,575	115,306
	TOTAL OIL & GAS:	**107,464**	**43,965**	**63,499**	**279,334**	**139,227**	**140,107**	**386,798**	**183,192**	**203,606**
C.	**COAL**									
	– GSP (Exploration/Surveys)	2,216	665	1,551	–	–	–	2,216	665	1,551
	– PMDC (Mine Development)	2,540	580	1,960	–	–	–	2,540	580	1,960
	Sub–Total:	4,756	1,245	3,511	0	0	0	4,756	1,245	3,511
	TOTAL COAL	**4,756**	**1,245**	**3,511**	**0**	**0**	**0**	**4,756**	**1,245**	**3,511**
	GRAND TOTAL	**329,948**	**153,131**	**176,817**	**381,061**	**225,554**	**155,507**	**711,009**	**378,685**	**332,324**