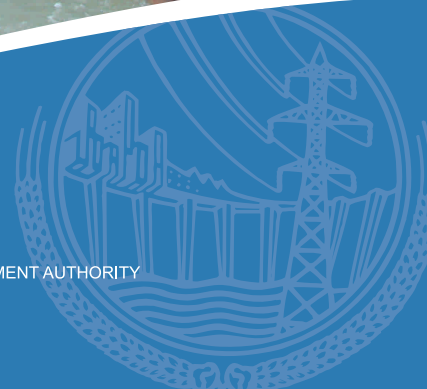


بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

WAPDA
Annual Report 2008 - 09



PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY



CONTENTS

Authority

Organization	03
Acknowledgement	04
Foreward	06
An Overview	07
Performance at a Glance	08
Wapda Charter	11
Authority Fund	11

Water Wing

Water Development	15
Indus Basin Settlement Plan	18
Tarbela Dam	23
Ghazi Barotha Hydropower Project	27
Chashma Hydel Power Station	30
Mangla Dam Raising Project	32
Diamer Basha Dam Project	37
Planning and Design	42
Neelum Jhelum Hydroelectric Project	59
Water Divisions	65
Water Central	65
Water South	68
Water North	76
Water Northern Areas	78
Hub Dam Project	81

Power Wing

Power Generation (Hydel)	85
--------------------------	----

Finance and Administration

Public Sector Development Programme	91
Financial Review	95
Administrative Support	98
Balance Sheets	114

ORGANIZATION CHART

Authority

as on June 30, 2009



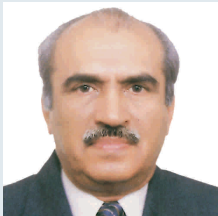
Shakil Durrani
Chairman



Fazal Ahmad Khan
Member (Power)



Ch. Abdul Qadeer
Member (Finance)



Syed Raghیب Abbas Shah
Member (Water)



Muhammad Imtiaz Tajwar
Secretary Wapda

Member & M.D. (Water)

GM (Coord & Mon) Water

GM (Planning & Dev)

GM (Technical Services)

GM (Hydro Planning)

CEO/GM (Diamer Basha Dam)

GM (Neelum Jhelum)

GM (Central) Water

GM (Projects) South

GM (Projects) North

GM (M&S)

GM (Tarbela/GBHP)

GM (Finance) Water

GM (Northern Areas)

Advisor (CCC)

Consultant (Mega Dams)

Advisor (CCC/WAPDA)

Member & M.D. (Power)

GM (Hydel)

GM (Finance) Power

GM (Training)

CE/Principal

WAPDA Engg: Academy Faisalabad

Member Finance

MD (Admn)

Secretary WAPDA

PSO to Chairman WAPDA

GM (CCC)

GM (Finance) Power

Chief Auditor

DG (CM) W

DG (S&GA)

DG (Finance) B&C

DG (MS)

DG (Insurance)

Director (Public Relations)

ACKNOWLEDGEMENT

Annual Report of Water and Power Development Authority (WAPDA) for the year 2008-09 has been prepared for submission to the Government of Pakistan in terms of Section 21 (1) of the WAPDA Act, 1958. In order to give a comprehensive picture of in hand activities of WAPDA, a detailed description of development of Hydro Power Projects, Vision 2025 being undertaken on behalf of the Government of Pakistan and a chapter on Water Resources is also included whereas a chapter on Indus Basin Settlement Plan, executed by the Authority on behalf of Government of Pakistan incorporated. The Water and Power Development Authority (WAPDA) is vigorously carrying out feasibility studies and engineering designs for various hydropower projects with accumulative generation capacity of more than 25000 MW. Most of these studies are at an advance stage of completion. After the completion of these projects the installed capacity would rise to around 42000 MW by the end of the year 2020. Government of Pakistan decided to construct 5 multipurpose storages in the country during next 10-12 years. Diamer Basha Dam Project will be undertaken in the first phase. President of Pakistan performed the groundbreaking ceremony of the project.

The Authority has been pleased to place on record its appreciation of the commendable services rendered by its officers, staff and the consultants to achieve the targeted progress relating to undertaking projects enabling it to fulfill its obligations. Besides, Authority also deeply appreciates the cooperation and assistance, provided by various organizations and other agencies of Provincial Governments and Federal Departments without which it would not have been possible to meet with the required progress mentioned in this report. During the year under review, management continued to focus on the following major policy initiatives:

Improvement in Operational Efficiency

WAPDA Hydel Power Stations produced 27,363 million KWh net energy during the FY 2008-09 which is 33.42% of the total Hydel-Thermal Generation Mix of the Power System. The up keep of generating units was properly focused upon to ensure high availability and reliability of cheap hydropower. However, the hydrological conditions were not as favourable as in the previous years.

WAPDA has also taken in hand rehabilitation of its old existing Hydel Power Stations to ensure more reliable and sustainable operation of these cheap sources of power generation. Rehabilitation of 22 MW Jabban Hydroelectric Power Station has been started which at present is in contract award stage.

Rehabilitation of Mangla and Warsak Hydel Power Stations is also under active consideration and WAPDA is planning to hire consultancy services to carry out feasibility studies of the proposed schemes. Similarly, rehabilitation of 1.1 MW Renala Hydel Power Station to increase its capacity to 4.0 MW is also being studied. Besides the rehabilitation of Tarbela Power Station is also under active consideration.

Revival of WAPDA as a Development Organization It is indeed gratifying that WAPDA has undertaken Vision-2025 Programme comprising a comprehensive integrated Water Resources and Hydro Power Development Programme, which will boost up the economy of Pakistan. This has also revived WAPDA's primary developmental role as laid down in WAPDA's charter of duties.

In the first phase of the programme work was started on three canals, five dams and four hydropower projects. Construction works on these projects are in their advance stages of completion.

Studies on Kohala (1100 MW), Dasu (4320 MW), Bunji (7100 MW), Lawi (70 MW), Spat Gah (567 MW), Palas Valley (621 MW), Keyal Khwar (122 MW), Basha (28 MW) and Phandar (80 MW) hydropower projects are in progress. WAPDA will soon start working on Studies of Thakot and Patan (each 2800 MW) hydropower projects.

The construction of Neelum Jhelum (969 MW) hydropower project has commenced and excavation of tunnels is in progress, whereas construction activities on Golen Gol Hydropower Project (106 MW) are taking a start.

To meet water demands of large agriculture sector of Pakistan, WAPDA is working on various Water Sector Projects which include Raising of Mangla Dam (additional 2.88 MAF Storage and 120 MW electricity), Gomal Zam Dam (0.892 MAF live storage and 17.4 MW), Satpara Dam (0.51 MAF live storage and 17.3 MW), Kurram Tangi Dam (0.90 MAF live storage and 83.4 MW), Mirani Dam (0.152 MAF live storage) has been inaugurated in November 2006 and is in operation, Sabakzai Dam (0.0147 MAF live storage) has also been inaugurated in September 2007 and is in operation. Irrigation projects of Rainee Canal (Phase-I), Kachhi Canal (Phase-I) and Greater Thal Canal (Phase-I) are under implementation. WAPDA is working under most difficult conditions at Gomal Zam Dam situated in South Waziristan but with a mission to complete this project against all odds as Public Service to Pakistan.

On the power side Allai Khwar, Khan Khwar, Duber Khwar and Jinnah Hydropower projects are under implementation.

WAPDA has also taken initiative of drainage projects. RBOD-I covering area of Shikarpur, Dadu and Larkana in Sindh Province will provide outfall facilities to the existing and proposed drainage project to improve environmental and water conditions in Manchar and Hamal Lakes and water for the rehabilitation of existing drainage system, increasing agriculture production in an area of 542,500 acres. The works include RBOD Indus Link, RBOD Extension up to Miro Khan Zero Point, Rehabilitation of Rato Dero, Miro Khan and Shahdadkot and Remodelling of MNVD while RBOD-III covering the area of Nasirabad, Jaffarabad Districts of Balochistan and Jacobabad, Larkana Districts of Sindh has to provide the direly needed effluent disposal facilities for existing and proposed drainage projects. The work would increase crop production of agricultural land wasted due to ponds of water, increase in cropping intensity and environment condition will improve over gross commanded area of 7,02,548 acres.

To meet with the future requirements, WAPDA is working on studies of various projects; namely Akhori Dam (600 MW & 6.0 MAF live storage)-Munda Dam (740 MW & 0.67 MAF live storage)-Sukleji Dam (160 KW & 34000 AF live storage)-Basol Dam, Salari Dam, Tank Zam Dam, Kot Fateh and Chashma Right Bank Canal (Lift Cum Gravity).

In addition to this, WAPDA has planned to construct 32 small/medium dams in the country to help the provinces in introducing the Most Modern High efficiency irrigation techniques. In the first phase, 12 small/medium dams will be constructed wherein MOU has been signed between Government of Pakistan and China Exim Bank to provide an assistance of \$ 700 million for this sector.

Process of tendering for construction of 12 small/medium size dams like Hingol Dam, Naulong Dam, Winder Dam, Garuk Dam, Pelar Dam, Nai Gaj Dam, Darwat Dam, Sita Dam, Bara Dam, Darban Zam Dam, Ghabir Dam, and Papin Dam have been initiated to store 2.5 MAF of water for irrigation development of 0.635 MA Land. The feasibility studies on Diamer Basha Dam have been completed and process of pre-qualification of contractors for construction of the Dam has been initiated. The construction would start in the year 2010.

Besides WAPDA has signed four projects for seeking Carbon Credits, namely Dubair khwar, Allai Khwar, Golen Gol and Jinnah Hydropower Projects which are already under implementation. These projects will be ranked first in the

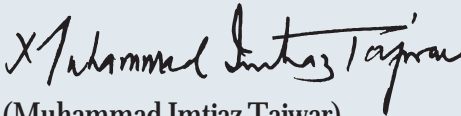
country to make efforts for reduction in Global warming, besides setting an example for others.

In addition to this, special studies/research has been initiated to check on Glacial Melting due to Global warming and future strategy to store/conservate the additional water likely to accrue from melting of Glacier.

Thar Coal Reserves are the second largest in the world. WAPDA has highlighted the importance of cheap power generation through coal and in this regard a study was initiated to provide water in Thar Coal area for meeting the development needs.

WAPDA is working on the feasibility studies of several projects as mentioned above in both the fields of hydropower and water sector, so that Government of Pakistan can have a convenient choice pick up projects for implementation depending upon the requirement, finance viability and the time in which the project is required to be online. WAPDA is doing studies on the potential of storing water in underground shells during Floods/Hill Torrents. In addition to this, WAPDA has made tremendous achievements in Sports Sector by winning 137 Medals (Gold, Bronze and Silver) in National Games.

WAPDA earnest endeavours are reflective of the commitment to support the national economy and poverty alleviation through improved Hydel-Thermal Mix of power generation, provision of electricity at affordable rates and above all perspective planning and timely execution of projects to meet water and power demands of growing population, agriculture and industry.


(Muhammad Imtiaz Tajwar)
Secretary WAPDA

FOREWORD

Public Relations Division takes pride in presenting the 51st issue of Annual Report of Water & Power Development Authority (WAPDA). This Annual Report for the fiscal year 2008-09 is in line with the requirement of a statutory postulate of the WAPDA Act 1958.

Since restructured, Water, Finance and residual Power Wings have been effectively performing their chartered duties. WAPDA has made credible progress on various water and power sector projects in hand during the fiscal year 2008-09, as reflected in this document. The creditable achievements of the Authority have profound reflection on implications for economic as well as social fabric of the country.

Authenticity and reliable account have been the key factors in documenting the achievements of the Authority during the year under report. Keeping the enormous scope and range of the activities in view, a number of tables, charts and illustrations have been incorporated to present the view at a glance. For brevity and clarity, editorial material has been confined where deemed necessary.

The Public Relations Division wishes to place on record its appreciation for the efforts put in by all those without whose active participation and cooperation, compilation and release of this report would have not been possible. Every effort has been made to produce a comprehensive and a valuable document for the benefit of the policy-makers, the researchers and all those associated with the allied disciplines. Valued comments of the beneficiaries and the readers, in general, are considered to be the best gauge to assess the degree of success in accomplishing this report. The Editorial Board, therefore, eagerly awaits suggestions for improvement.



(Muhammad Abid Rana)
Executive Editor

WAPDA in 2008 - 09

OVERVIEW

An overview of the performance of WAPDA including its operational and developmental activities during the year ending June 30, 2009 is as under:

Water Wing

The projects completed by Water Wing under the Indus Basin Settlement Plan and those with WAPDA for operation and maintenance purpose kept functioning satisfactorily.

Irrigation releases from three reservoirs - Tarbela, Mangla and Chashma -registered constant trend. In aggregate, 18.49 million acre feet of water was released from these reservoirs corresponding to irrigation indents, in the fiscal year 2008-09.

The work initiated in the preceding years for water resource development gained momentum. Under "the Water Resources and Hydropower Development Programme – Vision 2025", work on Mangla Dam Raising Project, Gomal Zam Dam, Satpara Dam, Greater Thal Canal, Raineer Canal and Kachhi Canal continued, while construction work on two drainage projects, namely RBOD-1 and RBOD-III progressed satisfactorily. Mirani Dam and Sabakzai Dam, which achieved substantial completion in 2006 and 2007 respectively, are in operation.

Preparatory works to initiate construction of Dimer-Basha Dam, the largest- ever project in the history of Pakistan, also continued.

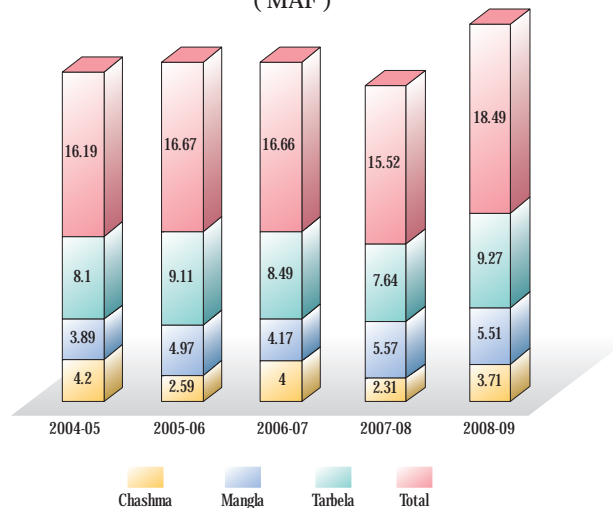
Power Wing

Operation and maintenance of the existing hydropower stations was carried out efficiently during the year 2008-09. WAPDA Hydel Power Stations generated as many as 27,363 Gwh during the year under report.

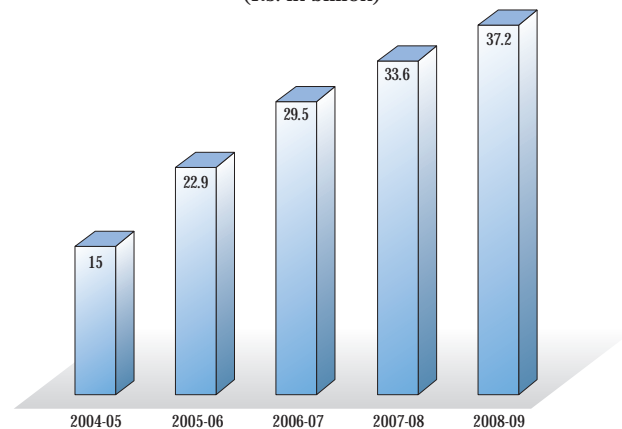
The implementation work on five hydropower projects, including three high – head hydropower schemes, namely Khan Khwar, Duber Khwar and Allai Khwar, Jinnah Hydropower Project and Neelum-Jehlum Hydroelectric Power Project remained in progress. In addition, 4500-MW Diamer-Basha Dam and 106-MW Golan Goal Hydropower Project are ready for construction. WAPDA also carried out feasibility studies and detailed engineering designs of various hydropower projects with cumulative generation capacity of more than 20,000 MW including 1100-MW Kohala, 4320-MW Dasu, 7100-MW Bunji etc.

Besides planning and constructing new hydropower projects, rehabilitation of Jabban Hydropower Station has also been undertaken. WAPDA is also planning to take up rehabilitation of Warsak, Mangla, Renala and Tarbela power houses for their reliable operation.

Water Releases from Wapda Reservoirs
(MAF)



PSDP / ADP Allocations
(Rs. in billion)



PERFORMANCE AT A GLANCE 2008 - 09

SECTOR	SUBJECT	2008 - 2009
Public Sector Development Programme (PSDP/ADP) (Million Rs.)	Power	21,936.00
	Water	15,285.25
	Total	37,221.25
POWER	Installed Generating Capacity (MW) Hydel (Including 30 MW from private sector)	6,444
	TOTAL (WAPDA)	6,444
	Generation (GWHs) WAPDA Hydel	27,363
WATER	Water Releases from Reservoirs (Million Acre Feet)	
	Tarbela	9.27
	Mangla	5.51
	Chashma	3.71
	Total	18.49
	Completed Scarps/Drainage Project (No)	70
	Area covered (Million Acres)	18.3

THE AUTHORITY

Wapda Charter
Human Resources
Authority Fund



AUTHORITY

WAPDA Charter

The Pakistan Water and Power Development Authority (WAPDA) was established through an act of parliament in February 1958 for integrated and rapid development and maintenance of water and power resources of the Country. This includes controlling soil salinity and water logging to rehabilitate the affected land in order to strengthen the predominantly agricultural economy of the country.

As per the charter, amended in March 1959 to transfer the existing electricity departments from the federating units to it, WAPDA has been assigned the duties of investigation, planning and execution of projects and schemes for:

- 1 Generation, Transmission and distribution of power,
- 1 Irrigation, water supply and drainage,
- 1 Prevention of water logging and reclamation of saline land,
- 1 Flood control and
- 1 Inland navigation.

Under the later on developments, vis-à-vis the “Energy Policy 1994”, setting up of thermal power generation projects was shifted to the private sector. Similarly, as a result of restructuring of the Power Wing, the utility part was corporatised into independent companies. This shift from convergence to divergence gave birth to 13 entities to operate in different zones. These are National Transmission and Dispatch Company (NTDC), four thermal power generation companies (GENCOs) and eight distribution companies (DISCOs). The present status of these companies is of corporate public limited entities under the Umbrella of EPCO, ultimately to go privatized as planned. The residual Power Wing is therefore now responsible for major hydro-electric power projects and schemes in operation.

Human Resources

The Authority comprises of a Chairman and three members, each heading Water, Power and Finance Wing.

The Members oversee the affairs of their respective wings through General Managers for the streamlined operations in their respective areas.

During past 51 years of its operations, WAPDA has developed its human resource as a reservoir of knowledge, competence and expertise through training and experience gained at the accomplished projects and remaining associated with diversified development activities. These include professionals, specialists, scientists, economists, administrators, accountants

and skilled workers for planning, building, managing and operating various projects.

Water Wing

Member (Water) controls the water wing which is divided into North, Central, South and Northern Areas zones. These zones cover, in general, North West Frontier Province (NWFP), Punjab, Sindh and Balochistan and Northern Areas respectively. The activity of water wing involves execution of surface and sub-surface water development and drainage-Salinity Control and Reclamation Projects (SCARPs). Chief Engineers and Project Directors at various levels are responsible for effective and timely implementation of Water Wing Projects.

Power Wing

Member (Power) controls the Power Wing, through General Managers and Chief Engineers in the field of hydro-electric power, coordination and WAPDA Power Privatization Organization.

WAPDA has an elaborate setup headed by a General Manager for training of its officers and officials at different levels covering all the wings of the organization.

Finance

Member (Finance) is responsible for the functioning of the departments of Finance, Internal Audit and Budget and Accounts headed by Chief Auditor (Internal Audit) and Director General Finance (B&C). He also exercises administrative control over General Manager (Central Contracts Cell), Director General (Taxes) and Director Public Relations.

Managing Director (Admn) is vested with the responsibility for overall administration and services.

Secretary WAPDA in addition to looking after day-to-day affairs of the Secretariat, prepares minutes of the Authority's meetings, maintains records of its decisions and issues its directives and coordinates among the three Wings besides monitoring and implementation of Authority's decisions.

Authority Fund

The Authority Fund consists of the following:

- 1 Loans and grants obtained from the federal and provincial governments
- 1 Sale proceeds of WAPDA Bonds
- 1 Loans obtained by the Authority with general sanctions of the government

- 1 Foreign aids and loans obtained from the IBRD, ADB and other international loan giving agencies on such terms and conditions as may be approved by the government
- 1 Sale of power
- 1 All other sums received by the Authority

Since FY 1974-75, the Federal Government is meeting the budgetary requirements of accelerated programme of SCARP and, from FY 1976-77, for smooth execution of the projects, the Government of Pakistan also assumed the responsibility of funding Surface Water Projects.

The annual allocation for Water Development Schemes comprising Surface Water Development Projects like Chashma Right Bank Canal Project and Pat Feeder Canal Project, Drainage and Reclamation projects as well as National Drainage Programme are earmarked in Public Sector Development Programme (PSDP) as interest bearing loans and advances from the Federal Government. The funds are made available to WAPDA as grant for financing General Investigation Schemes to provide research based future planning for exploring the best use of water and fight against twin menace of water logging and salinity.

The Ministry of Water and Power provides funds from its current expenditure budget, for continuous and recurring nature research schemes such as Mona Reclamation and Experimental Project, Lower Indus Management (LIM), Hydrology & Research (H & R) and Perspective Planning Organisation (PPO), while operation and maintenance of Khanpur and Hub Dam projects is carried out through interest free loans of Finance Division.

Funds for other schemes belonging to provinces are provided by the respective governments to WAPDA which acts as the executing agency on their behalf. Under an arrangement,

approved by the Federal Government, Water Development Projects completed by WAPDA, after initial run for one year, are transferred to respective provincial governments for their operation and maintenance. Schemes under National Drainage Program (NDP) are being executed by respective Provincial Irrigation and Drainage Authority (PIDA) except inter provincial schemes or schemes under participating agreement with PIDA by WAPDA. These schemes will also be maintained by the respective provinces through financing out of their own kitty. The federal government provides Cash Development Loans (CDL) for drainage projects while grant funds through foreign loans and cash development loans in rupees. However, with effect from July 1, 1988, WAPDA's Development Programme is earmarked for dams (storages) canals and engineering studies through Public Sector Development Program (PSDP). The debt servicing liability in respect of power schemes is that of WAPDA which is also responsible for discharging its debt liability in respect of expenditure incurred on electrification of SCARP tubewells installed by it. In FY 1987-88, the federal government permitted WAPDA to float WAPDA Bonds for Public subscription. Profit on all issues is being paid to the bond holders regularly.

Further, for various hydro electric power projects in NWFP; ie. Khan Khwar (72 MW), Allai Khwar (121 MW) and Duber Khwar (130 MW); WAPDA required considerable finances. Since WAPDA's First Sukuk Issue proved to be a great success, it was decided that another sum of Rs.8.00 Billion be raised through Sukuk. Therefore a company named "WAPDA Second Sukuk Company Limited" was established as WAPDA's wholly owned subsidiary to act as Special Purpose Vehicle (SPV). The company was incorporated on 4th June 2007. This provided comfort for raising funds for the completion/development of Khwar Hydro Electric Projects of WAPDA.