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# USAID ENERGY POLICY PROGRAM

## MONTHLY PROGRESS REPORT

April 2015



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# USAID ENERGY POLICY PROGRAM

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©USAID Energy Policy Program  
House 4, Street 88, Sector G-6/3  
Ataturk Avenue, Islamabad, Pakistan  
Tel: +92 (51) 835 7072, Fax: +92 (51) 835 7071  
Email: [jhicks@ep-ep.com.pk](mailto:jhicks@ep-ep.com.pk)

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# ACRONYMS

AEAI	Advanced Engineering Associates International, Inc.
CFW	Corporate Finance Wing
CPPA	Central Power Purchasing Authority
DGPC	Director General Petroleum Concessions
DISCO	Distribution Company
EETPL	Elengy Terminal Pakistan, Ltd.
EMMP	Environmental Mitigation and Monitoring Plan
EPP	Energy Policy Program
FARA	Fixed Amount Reimbursement Agreement
FGE	Facts Global Energy
FSRU	Floating Storage and Regasification Unit
G2G	Government-to-Government
GENCO	Generation Company
GIS	Geographical Information System
GOP	Government of Pakistan
GSC	Grid Systems Construction
GSO	Grid Systems Operation
ISGS	Interstate Gas System
JPCL	Jamshoro Power Company Limited
kV	Kilovolts
LEAP	Long-Range Energy Alternatives Planning System
LNG	Liquefied Natural Gas
LSA	LNG Services Agreement
MPNR	Ministry of Petroleum and Natural Resources
MW	Megawatt
MWP	Ministry of Water and Power
NEPRA	National Electric Power Regulatory Authority
NPCC	National Power Control Center
NPCL	Northern Power Generation Company Limited
NTDC	National Transmission and Dispatch Company
PESCO	Peshawar Electricity Supply Company
PIL	Project Implementation Letter
PowerSIM	Power Sector Integrated Model
PPA	Power Purchase Agreement
PQA	Port Qasim Authority
PSO	Pakistan State Oil Company
SPA	Sales Purchase Agreement
USAID	United States Agency for International Development
USG	United States Government
WAPDA	Water and Power Development Authority
WFW	Watson Farley & Williams

# EXECUTIVE SUMMARY

The Energy Policy Program (EPP) continues to provide monitoring and implementation support for the seven Government-to-Government signature energy projects. During April, EPP met with Water and Power Development Authority to discuss the procurement of major equipment for units 5-6 of the Mangla Thermal Power Project, including turbines and generators, and funding arrangements for an additional four units. EPP's Environmental expert visited Muzaffargarh, Guddu, and Jamshoro Thermal Power Stations to ensure that the on-going rehabilitation work is in compliance with the Government of Pakistan and United States Government regulations as recommended in the approved Environmental Mitigation and Monitoring Plan (EMMP).

As of April 2015, \$152.19 million has been disbursed to the Government of Pakistan implementing partners, and 1013 MW have been added to Pakistan's national grid.

**Policy Support and Analysis.** EPP continued to work closely with Jamshoro Power Company Limited (JPCL) and the Ministry of Water and Power in development of the Power Purchase Agreement to be signed between the Central Power Purchasing Authority and JPCL and used as a prototype for other projects. EPP is continuing to work with the Ministry on the draft Electricity Act so that it more closely aligns with Pakistan's power sector and the Government's plans for market reform.

The EPP-developed Power Sector Integrated Model (PowerSIM) is being used at the Ministry of Water and Power to analyse the changes in the cost of generation by switching fuels. At the Ministry's request, EPP worked on development of a draft transmission license that would recognize the removal of the Central Power Purchasing Authority from the National Transmission and Despatch Company (NTDC).

The strategic planning team completed the final draft of Part I of the NTDC Strategic Business Plan 2016-2020 on April 19, and the draft was sent to the NTDC Board for review and discussion. The strategic objectives focus on the technical issues facing NTDC and the recommended actions to move forward to achieve the NTDC's long-term vision. The first five of these initiatives are to: enforce Grid Code compliance to achieve system reliability, reduce transmission line and equipment overloading, eliminate current shortfalls and limit the growth in shortfall of transmission network transfer capability, separate CPPA and restructuring of NTDC, and develop a renewable and alternative energy strategy.

EPP continued working with the Technical Staff of the Ministry of Planning and Development on development of the Local Area Network (LAN) at Energy Wing, Planning Commission. EPP also updated the daily power supply demand scenario and short fall in the NTDC system based on the daily data received from National Power Control Center (NPCC).

Assistance was provided to Corporate Finance Wing, Ministry of Finance in preparation of their proposals for the Committee to review the laws and working of the regulatory bodies and to formulate recommendations for their reforms.

EPP continued providing support to the Ministry of Petroleum and Natural Resources during the month for concluding the LNG Sales Purchase Agreement with Qatargas, including support to the GOP team in meetings with Qatargas in Doha on April 1-2. The GOP team was also supported in finalizing the Floating Storage and Regasification Unit sub-charter agreement.

**New Projects and Activities.** The Water and Power Development Authority (WAPDA) has received bids for construction of the Kaitu Weir feeder tunnel linking the Kaitu River to the Kurram Tangi Reservoir, two power houses with installed capacity of 18.4 MW, two irrigation canals (Spaira Raha and Sheratella), and associated structures; previous efforts to obtain bids failed due to the insecurity in the area. If the financial and technical bids are accepted by WAPDA, construction work could start before July 2015.

Based on the Golan Gol Project Due Diligence Report submitted by EPP in January 2015, USAID has indicated that \$36 million in WAPDA funding for civil works for the power house and power house equipment is available.

To date, 505.2 MW of transmission throughput capacity have been added to Peshawar Electricity Supply Company's (PESCO) network as a result of EPP's assistance. The capacitor bank has been commissioned at TALL 132kV grid station with the result that the throughput capacity has been enhanced by 12 MW and losses have been reduced by 2 MW. Four telescopic bucket trucks were delivered at the PESCO warehouse on April 28 and their registration process is underway.

Technical audits and final reports of all 45 PESCO grid stations have been compiled. Copies of the report and all backup data for the original 39 stations HAVE been provided to the NTDC Managing Director. The reports propose steps necessary for carrying out both preventive and corrective maintenance and also recommend infrastructure upgrades and augmentation. EPP completed the three executive exchange visits for NTDC on April 3, 2015; all participants were asked to prepare a white paper based on their findings from their United States visit, including action plans, developments, and future plans. The EPP's Live-Line Maintenance Batch II training for MEPCO and SEPCO is currently in process at NTDC Tarbela and anticipated to be completed in May. EPP completed the first of five refresher courses at IESCO on April 3 and started the second of the five refresher courses at PESCO on April 13.

# COMPONENT I: PROJECT MONITORING AND IMPLEMENTATION

The Energy Policy Program (EPP) continues to provide monitoring and implementation support for the seven Government-to-Government (G2G) signature energy projects. EPP met with Water and Power Development Authority (WAPDA) to discuss the procurement of major equipment for units 5-6 of the Mangla Thermal Power Project, including turbines and generators, funding arrangements for an additional four units, and impacts of the completion of units 5 and 6. EPP advised WAPDA to expedite the procurement of the new Mangla equipment under the project. On Tarbela Phase II, EPP provided United States Agency for International Development (USAID) with the details of WAPDA Tarbela Operation and Maintenance Account and the Special Assignment Account, which are the condition precedents set forth in Activity Agreement. Subsequent to the opening of these accounts, EPP is providing support to USAID in providing additional information from WAPDA regarding the accounts.

EPP's Environmental expert visited Muzaffargarh, Guddu, and Jamshoro Thermal Power Stations to ensure that the on-going rehabilitation work under THE Fixed Amount Reimbursable Agreement (FARA) is in compliance with the Government of Pakistan (GOP) and United States Government (USG) regulations as recommended in the approved Environmental Mitigation and Monitoring Plan (EMMP).

As of April, 2015, \$152.19 million has been disbursed to the GOP implementing partners, and 1013 MW have been added to Pakistan's national grid. Results achieved through the successful monitoring and implementation of government to government (G2G) projects are illustrated in Table I below:

Table I: Results Achieved through G2G Projects

Projects	USG Funding (\$ Million)	Disbursed (\$ Million)	Completion Date	MW Gains/Benefits	
				Target	Achieved (Apr 10, 2015)
Tarbela (Phase I)	16.50	14.25	12/31/15	128.0 MW	128.0 MW
Jamshoro	19.32	19.32	7/31/15	150.0 MW	270.0 MW
Guddu	19.12	18.91	7/31/15	75.0 MW	80.0 MW
Muzaffargarh	15.77	15.71	7/31/15	475.0 MW	500.0 MW
Gomal Zam	45.00	45.00	Completed	17.4 MW	17.4 MW
Satpara	26.00	26.00	Completed	17.6 MW	17.6 MW
Mangla	150.00	13.00	12/31/17	90 MW	In progress
Tarbela (Phase II)	25.00	PIL underway	12/31/16	20 MW	In progress
Total	316.71	152.19		973 MW	1,013 MW

## REHABILITATION OF TARBELA HYDROPOWER PLANT

EPP visited WAPDA House in Lahore in order to expedite the opening of the Assignment Account for Tarbela Phase II and was able to open the Tarbela Operation and Maintenance and Special Assignment Accounts with WAPDA; subsequently EPP provided the details of the accounts to USAID. Opening of these accounts are condition precedents set forth in Activity Agreement. EPP is

now providing support to USAID in obtaining additional information from WAPDA regarding the accounts.

## MANGLA DAM REHABILITATION PROJECT

EPP provided USAID the updated procurement status of major equipment, including turbines and generators for units 5 and 6, and also advised WAPDA regarding negotiating a fast track schedule with the vendor to complete the project by December 2017.

EPP visited Mangla Power Station and discussed the status of procurement of equipment. EPP advised WAPDA to expedite these procurements.

EPP's Environmental Expert also visited the power station to ensure that the works are in compliance with the GOP and USG regulations as recommended in the approved EMMP.



Turbine Generator of Unit 6 at Mangla Power Station

## MUZAFFARGARH THERMAL POWER STATION (MTPS) REHABILITATION PROJECT

EPP's Environmental expert visited Muzaffargarh Power Station to ensure that the on-going rehabilitation work under FARA is in compliance with the GOP and USG regulations as recommended in the approved EMMP.

EPP provided an update to USAID on the progress of remaining items at Muzaffargarh. These remaining items will add to the reliability of the power plant operations.



Muzaffargarh Thermal Power Station

## GUDDU THERMAL POWER STATION (GTPS) REHABILITATION PROJECT

EPP's Environmental expert visited Guddu Power Station to ensure that the on-going rehabilitation work under FARA is in compliance with the GOP and USG regulations as recommended in the approved EMMP. EPP also provided updates to USAID on the progress of remaining items at Guddu. These remaining items will add to the reliability of the power plant operations.

## JAMSHORO THERMAL POWER STATION (JTPS) REHABILITATION PROJECT

EPP's Environmental expert visited Jamshoro Power Station to ensure that the on-going rehabilitation work under FARA are in compliance with the GOP and USG regulations as recommended in the approved EMMP. EPP provided updates to USAID on the progress of remaining items at Jamshoro. These remaining items will add to the reliability of the power plant operations.

## COMPONENT 2: POLICY AND REFORM

### SUPPORT TO MINISTRY OF WATER AND POWER

During April, EPP met with senior management at Ministry of Water and Power (MWP) to discuss the on-going and proposed activities with the Ministry. The major activities undertaken by EPP during the month are given below:

Jamshoro Power Company Limited (JPCL) Power Purchase Agreement. EPP continues to work closely with JPCL and MWP in development of the Power Purchase Agreement (PPA) to be signed between Central Power Purchasing Authority (CPPA) and JPCL and used as a prototype for others. Complications have arisen as the technical documents and commercial documents that are to be used by the National Transmission and Despatch Company (NTDC) for important functions, e.g., wheeling, metering, interconnection, and dispatch and operations, do not currently exist and must be drafted. These had been referenced in the CPPA-G PPA only as NTDC standard operating procedures, but the World Bank now asks that they be provided as separate agreements. The PPA will be finalized and resubmitted to MWP/WB by the end April.

Electricity Act 2013. EPP is continuing working with the Ministry to correct the draft 2013 Electricity Act, which if enacted in the current state would have serious negative consequences. The document was taken verbatim from the Indian Electricity Act of 2003, which was developed for an entirely different sector. Moreover, in its current draft form it undermines the GOP plans for market reform. EPP will continue assisting MWP in updating the Act and making it more relevant to the Pakistan energy sector.

Policy Analysis. MWP has requested EPP to analyse the changes in cost of generation by switching fuels. The EPP developed Power Sector Integrated Model (PowerSIM) was used as the policy analysis tool in this task and is being used by GOP in scenario analysis of the power sector.

### SUPPORT TO NATIONAL TRANSMISSION AND DESPATCH COMPANY

NTDC Transmission License. At the request of MWP, EPP worked on development of a draft license that would recognize the removal of CPPA from NTDC. The document has been provided to the World Bank/IMF and accepted by the team as final.

NTDC Strategic Business Plan. The strategic planning team completed the final draft of Part I of the NTDC Strategic Plan 2016-2020 on April 19. This draft was sent to the Board for discussions with their counterparts. The Board of Directors Chairman has requested an appointment with the Secretary MWP to review the draft NTDC Strategic Plan.

The NTDC Strategic Plan has seven strategic objectives, and at the Chairman's request, the first five objectives were fully developed with proposed initiatives and performance measures. These strategic objectives focus on the technical issues facing NTDC and the recommended actions to move forward to achieve the NTDC's long-term vision. These initiatives include: (1) enforcing Grid Code compliance to achieve system reliability, (2) reducing transmission line and equipment overloading, developing a future interconnection strategy to reduce costs to customers, (3) eliminating current shortfalls and limit the growth in shortfall of transmission network transfer capability, (4) separation of CPPA and restructuring of NTDC, and (5) developing a renewable and alternative energy strategy.

The remaining two objectives focus on providing excellence in transmission and dispatch services and implementing commercial business and financial practices that will transform NTDC into a successful commercial entity with the ability to self-finance its operations and transmission expansion program.

## Support to Ministry of Planning and Development

EPP continued to provide advisory support to the Energy Wing throughout the month on a variety of tasks as requested by Member and Secretary. These tasks included:

**Implementation of E-Governance.** During the month, EPP continued working with the Technical Staff of Planning Commission for development of the Local Area Network (LAN) at Energy Wing, Planning Commission.

**Technical Assistance.** Through its seconded staff, EPP continued to provide general technical assistance, system and network administration to the offices of Member Energy and provided support for routine tasks. EPP also updated the daily power supply demand scenario and short fall in the NTDC system based on the daily data received from National Power Control Center (NPCC).

**Policy Analysis and Planning.** EPP assisted Member Energy in organizing a round-table conference on Geographical Information System (GIS) in Physical Planning, Resource Management, Governance and Business at the Planning Commission. The session was attended by a large number of high ranking officials, both from the private and public sector. EPP staff assisted Member Energy in preparing the presentation and conference report, which covered the background, outcome, and way forward to formulate a GIS policy. The working groups have been created and a follow-up meeting has been scheduled at the Planning Commission in the first week of May.

## SUPPORT TO MINISTRY OF FINANCE

- Assistance was provided to Corporate Finance Wing of Ministry of Finance in preparation of their proposals for the Committee constituted by the Cabinet Division to review the laws and working of the regulatory bodies and to formulate recommendations for their reforms.
- The tariff determination by National Electric Power Regulatory Authority (NEPRA) for the distribution companies for the financial year 2014-15 is being reviewed in consultation with Corporate Finance Wing and Economic Reforms Unit of Ministry of Finance to find out the impact of subsidy for the current financial years to be provided to distribution companies.
- Assistance was provided to Corporate Finance Wing of Ministry of Finance in preparation of their views and comments on the summary for the Economic Coordination Committee submitted by the Ministry of Water and Power proposing reduction in sales tax on high sulphur diesel (HSD) being used by five independent power producers.
- Corporate Finance Wing of Ministry of Finance was assisted in preparation of their views and comments on the proposal submitted by the Government of Punjab and Ministry of Water and Power to mitigate the risk in case of non-supply of RLNG to proposed new power plants to be established in the public sector.
- Corporate Finance Wing of Ministry of Finance was assisted in preparation of the proposals for financing of the South-North Gas Pipeline, which is proposed to be constructed by Sui Southern Gas Company Limited (SSGCL) and Sui Northern Gas Pipeline Limited (SNGPL) for supply of RLNG to existing plants and proposed power plants to be established in the public sector.
- Corporate Finance Wing of Ministry of Finance was assisted in preparation of a mechanism to streamline the payment of RLNG to be supplied by Pakistan State Oil Company (PSO) to power sector entities.

## SUPPORT TO MINISTRY OF PETROLEUM AND NATURAL RESOURCES

### Liquefied Natural Gas (LNG) Imports

#### LNG Procurement

- EPP continued providing support to the GOP team during the month for concluding the LNG Sales Purchase Agreement (SPA) with Qatargas. This included support to the GOP team in

meetings with Qatargas in Doha on April 1-2, following which another redraft of the LNG SPA was submitted by EPP.

- The GOP team was also supported in finalizing the Floating Storage and Regasification Unit (FSRU) sub-charter agreement between PSO and EETL, tripartite agreement among PSO, SSGC, and SNGPL inter-linked with Qatargas SPA, and LNG Services Agreement (LSA) waiver agreement among PSO, SSGC, and EETL to cover the terminal commissioning process vis-à-vis the provisions in the LSA, as well as for transporting four LNG cargoes from Qatar on an FOB basis in the interim period.
- EPP provided support to the GOP in exploring other G2G agreements for LNG procurement in addition to Qatargas.
- EPP provided input to the GOP for issuing tender for procuring short-term LNG cargoes on DES basis under the SPA.
- Work on finalizing the Port Qasim Authority (PQA) Direct Agreement under the LSA Conditions Subsequent continued during the month.

#### Support to Port Qasim Authority

- EPP participated in witnessing and verifying the FSRU Performance and Acceptance Tests, which were satisfactorily concluded on March 28, 2015. Unloading rate of the FSRU for ship-to-ship transfer will be conducted at a later date upon arrival of the LNG carrier to Port Qasim. SSGC issued the Certificate of Acceptance for LNG Services Infrastructure to EETL on March 29, 2015, enabling the project to achieve Commercial Operation.
- Regular overall project monitoring activities concluded upon commissioning of the terminal.
- EPP's LNG Advisors held a series of meetings with EETL to review issues arising out of various gap studies conducted for LNG terminal design and quality.
- EPP sponsored the four-day visit of the second batch of two PQA pilots to Doha to receive training on Q-Flex maneuvering from Qatargas.
- Work continued on closing of open items under the Action Register prepared by Qatargas. EPP and Director General, Operations, PQA participated in meetings with Qatargas in Doha on April 7-8 to discuss port-related items pertaining to the Qatargas SPA.
- EPP submitted a revised version of the standard operating procedures and Conditions of Use for LNG carriers calling at PQA for inclusion in PQA Port Regulations and Operations Manual of EETL, which was forwarded to PQA and EETL.
- Port Tariff prepared by EPP has been approved by PQA Board for one month effective April 16, 2015.
- EPP prepared the draft Security Plan for LNG vessels calling at Port Qasim and EETL, which was shared with PSO, PQA, and EETL. Security Risk Assessment by Qatar Gas is scheduled for first week of May 2015.

#### Shale Gas

- Work continued on Milestone 4-A and Milestone 5. Progress on Milestone 4-A and Milestone 5 was reviewed in various meetings with LMKR and KMR. The report on Milestone 4-A is being finalized and is expected by the end of April. The draft report on Milestone 5 is expected in the first week of May.
- Discussions are underway with the two short-listed bidders on proposals submitted against the Request for Proposal for shale gas policy and regulatory framework formulation.

#### Upstream Oil and Gas

- Advisory work on day-to-day issues of Director General Petroleum Concessions (DGPC) continued. Necessary advice was rendered on various regulatory, commercial, and legal issues.
- The selected Legal Expert has been engaged in the DGPC Implementation Unit following USAID approval.
- The process of finalization of Supplemental Agreements with exploration and production companies is underway. The progress on execution of Supplemental Agreements was also reviewed in meetings held with USAID during the month.

- DGPC and the EPP team held a meeting with the Ministry of Law officials on April 8 to discuss various options to extend or re-grant a particular mining lease without interrupting significant gas production.
- A presentation on draft standard operating procedures for DGPC office was made to DGPC on April 23. These procedures are being finalized on the basis of comments offered by DGPC staff. The input from Pakistan Petroleum Exploration and Production Companies Associated (PPEPCA) is also being obtained.
- A presentation on the technical study for standardization of oil and gas reserves was made to DGPC on April 23; it was decided to seek the input of PPEPCA on the matter.

## COMPONENT 3: NEW PROJECTS, PLANNING, AND DEVELOPMENT

### KURRAM TANGI/KAITU WEIR PROJECT

WAPDA has received bids for construction of the Kaitu Weir feeder tunnel linking the Kaitu River to the Kurram Tangi Reservoir, two power houses with installed capacity of 18.4 MW, two irrigation canals (Spaira Ragha and Sheratella), and associated structures; previous efforts to obtain bids failed during the past two years due to the insecurity prevailing in the area. The sole credible bid received is from the consortium led by Frontier Works Organization (FWO) and Descon. The bid was opened on March 25, 2015 under two-envelop process. The technical proposal was opened first and evaluated by WAPDA consultants, Mott MacDonald and by the Central Contract Cell of WAPDA. The Financial Proposal contained in the second envelop will be opened and evaluated based on the approval of technical proposal by WAPDA. The outcome is expected shortly and, if accepted, and there is agreement between WAPDA and contractor, construction work could start before July 2015.

WAPDA and USAID have held series of meetings during the current year at EPP offices to discuss the project to firm up the cost estimates and finalize the Activity Schedule and Milestone dates. WAPDA General Manager North and the Project Director for Kaitu Weir, supported by their Consultants from Mott MacDonald, briefed the Deputy Director, USAID/Peshawar Office, Program Director, USAID/Islamabad, USAID Mission (A) Environmental Officer, representative from USAID Finance Office, and others from USAID on March 3 to discuss the activities, status, and plans for the project. Many issues were discussed and information deliverables identified.

USAID is working with WAPDA to identify eligible costs of works and develop project construction schedules to draft a completion milestone and associated payment schedule for the proposed \$81 million USAID funding. A Planning Commission PC-I of the project amounting to \$126 million is already approved by GOP. It consist of \$81 million for Kaitu Weir and associated structures and irrigation command development to be financed out of a \$45 million loan under discussion by Economic Affairs Division with the Italian Government.

Various activities plans, construction schedules, and financial disbursement schedules for USAID funding against the project activity completion schedule remained under discussion with WAPDA. On finalization of construction schedules, an Activity Agreement will be ready for signature by USAID and WAPDA followed by a Project Implementation Letter (PIL) for possible USAID funding of the project.

### GOLEN GOL PROJECT

Based on the Golan Gol Project Due Diligence Report submitted by EPP in January 2015, USAID a has indicated that \$36 million in WAPDA funding for civil works for the power house and power house equipment is available. The total cost for these items is \$75.5 million; the Kuwait Fund is providing a loan of \$37 million for construction of the power plant but a short fall of almost \$38.5 million remains.

The Saudi fund is providing a soft loan of almost \$97 million for all the civil works and structures at Intake and Tunnel, while the OPEC Fund is lending \$30 million for transmission lines and grid stations. Still there is funding gap of \$71 million in overall project cost.

EPP continues to monitor the project activities and notes that owing to winter snows there was not much construction work at site. EPP teams visited for the second time at the project site and

Peshawar General Manager's office and have collected all required information for Due Diligence Step 2.

The Project is expected to be completed by June 2017 and provide 438 GWh of cheap energy to National Grid annually. Revenue from Golen Gol will be over \$33 million a year and this less expensive power will replace electricity production from thermal plants using imported fuel oil of about \$65 million per annum.

The project will meet the power demand of the Chitral district, stimulate local businesses, provide job opportunities to locals, and develop cottage industry in the remote areas. Golen Gol transmission line, which has capacity to carry almost 300 MVA of power, will not only replace the existing 33 kV transmission line connection that sends a mere 5 MW to Chitral but also facilitate dispersal of power from planned small and medium power projects located in Chitral to the National Grid. The construction of Golen Gol project will neither displace villagers nor adversely impact on environment.



Golen Gol Project, Chitral

## COMPONENT 4: NEW ACTIVITIES

### PESHAWAR ELECTRIC SUPPLY COMPANY

To date, 505.2 MW of transmission throughput capacity have been added to Peshawar Electricity Supply Company's (PESCO) network as a result of EPP's assistance.

**Capacitor Bank.** The capacitor bank has been commissioned at TALL 132kV grid station. The throughput capacity has been enhanced by 12 MW and losses have been reduced by 2 MW.

**Bucket Trucks.** Four telescopic bucket trucks were delivered at the PESCO warehouse on April 28 and the registration process is underway. These trucks will help PESCO in effective and efficient maintenance of their facilities.

**Power Transformer Program.** All 213 samples of transformer oil have been tested. The results show potential transformer damage, which increases the likelihood of an outage that can cause loss of customer loads. Many of PESCO's transformers require oil purification, and EPP is in the process of procuring two oil filtration plants for PESCO's operations and maintenance staff.

**Tower Repair.** All work completed except punch list.

**Transmission and Grids Equipment.** A Purchase Order has been awarded to M/s. Ikram Corporation for supply of transmission and grid equipment. Some of the tools (17/37) have already been delivered; the contractor is to deliver remaining equipment by end of May. Remaining items need Customs clearance for delivery by vendor.

### NATIONAL TRANSMISSION AND DESPATCH CENTRE

**Technical Audits.** Work is being done on the final report of six newly commissioned grid stations.

**NTDC System Studies.** The Purchase Order has been executed and work has begun on integration of intermittent renewable resources with the national grid; completion is expected at the end of June.

**Real Time Digital Simulator.** Advance payment has been made to the vendor production work started; the Factory Acceptance Test is expected in early June.

#### Auto-Transformer Program

- Factory Acceptance Tests of two JHSP 250 MVA, 220/132kV Auto-Transformers has successfully been carried out and they are being shipped. Delivery is expected by mid-June
- The Fire Protection System has been shipped by M/s. Xuming with delivery expected by end of May.
- Circuit Breakers, conductor, connectors and other ancillaries are likely to be delivered by the end of June.

**Hardware and Software for NTDC Design Department.** The vendor has delivered all hardware for NTDC's Design Department. Software and training for NTDC's Design Department is in process from April 20, 2015 till June 10, 2015.

**IT Hardware for NTDC IT.** The hardware has been delivered and installed successfully at NTDC IT department. It ensures capacity building of the NTDC IT department and will make their communication system efficient, productive, and reliable.

**Advisory Services to NPCC.** EPP experts are working with NPCC authorities on integrating generating units with the new SCADA system. There are lack of maintenance issues with lines and equipment that proper operation by NPCC will not be able to overcome.

## LIVE-LINE MAINTENANCE

- Live-Line refresher course for PESCO linemen started on April 13, 2015. The course and training sessions end on May 8, 2015.
- Live-Line refresher course for IESCO linemen was completed on April 3, 2015.
- The live-line training for 20 linemen from SEPCO and MEPCO started on February 2, 2015 and will be completed on May 8, 2015.

# PROGRAM SUPPORT ACTIVITIES

## CAPACITY BUILDING

**NTDC Exchange.** The EPP completed the three executive exchange visits for NTDC on April 3, 2015. The EPP requested all participants to prepare a white paper based on their findings from their United States visit, including action plans, developments, and future plans.

**Live-Line Maintenance.** The EPP's Live-Line Maintenance Batch II training for MEPCO and SEPCO is currently in process at NTDC Tarbela and anticipated to be completed in May. EPP completed the first of five refresher courses at IESCO on April 3 and started the second of the five refresher courses at PESCO on April 13. All Live-Line Maintenance programs will be completed by October 2015.

**GENCO O&M Training.** The EPP conducted a second round of focus group discussions on April 22 at Jamshoro Power Generation Company Ltd. to monitor the progress made on the assignments and challenges. Participants highlighted the improvements made in the heat-rate testing with respect to shift improvements and timely generation of trouble reports, cooling tower efficiency, and efficient procedures.

**NTDC Design Center.** The EPP started Design Center training on April 20 at NTDC, Lahore in five different courses with 45 participants taking Microsoft Project Management, 29 participants taking Bentley, 14 participants taking ARC GIS, 39 participants taking Power Line Module, and 25 participants taking the AutoCAD course.

**LNG Business Management Certificate.** The EPP is planning to start LNG Business Management Certificate training; the program will host 14 participants from OGRA, SSGCL, and PQA in Kuala Lumpur in June. The EPP is currently in the process of collecting paper work for third country training visa requirements. The program will focus on improving SSGCL, PQA, and OGRA's commercial capacity related to LNG imports.

## GENDER ACTIVITIES

**Assessment and Strategy.** EPP coordinated with USAID/Pakistan's gender specialist and the Energy Office's Assistant COR regarding the gender strategy and assessment. EPP will receive edits and from USAID and meet in-person for next steps prior to the planned public forum.

**Increased Female Participation.** The EPP currently has 18% female participation rate across all training up from 4% in January 2014.

## MONITORING & EVALUATION

**Work Plan.** USAID approved EPP's revised work plan for FY2015.

**PakInfo Reporting.** EPP submitted PakInfo entries for Q2-FY2015 on April 30.

**Confidential information redacted**

# PROCUREMENT AND PURCHASE ORDERS

Item	Achieved or Completed	Targets LOP	% Completion
Procurement contracts (\$ million)	31.56	36.71	85.97

In the month of April 2015, EPP Procurement Department completed and issued Purchase Orders amounting above \$641,071. The following procurement activities were also undertaken:

- Successful completion of Factory Acceptance Test of conductors and connectors for 250MVA autotransformers at Austria;
- Final Inspection of four bucket trucks for PESCO;
- Successful completion of Factory Acceptance Test of bus-disconnectors, surge protectors, and arrestors.

## Purchase Orders Issued during the Reporting Period (April 2015)

1. Purchase order issued for supply and delivery of four crane mounted trucks. Amount \$438,348. (PESCO).
2. Purchase order issued for supply and delivery of grounding sets and PPEs. Amount \$65,000. (PESCO).
3. Solar Irradiation Data: Contract modification done. Amount \$37,000. (NTDC).
4. Purchase order issued for internet bandwidth for AEAI Peshawar office and PESCO Control Room for April-October 2015. Amount \$7,122. (Administration)
5. Purchase order issued for Inland Transit Insurance for fire protection system, 250MVA auto-transformer and 31 circuit breakers. Amount \$6,027. (NTDC).
6. Purchase order issued for supply and delivery of Laptop HP Envy TS-15-Q006TX. Amount \$1,704. (Administration).
7. Sub-contract awarded for Consulting Services for Legal Expert Implementation Unit. Amount \$63,360. (DGPC).
8. Purchase order issued for supply and delivery of three HP Envy 15-k012tx Laptops. Amount \$4,185. (Administration)
9. Supply of Internet Bandwidth Connect 1000-12MB and 600-6MB for AEAI Islamabad office, two guest houses, and Energy Wing Islamabad. Amount \$18,235. (Administration).

# PROGRESS IN NUMBERS

Table 3 below provides the EPP indicators, targets, and achievements for April 2015. Table 4 presents EPP Indicators by component for April 2015.

Table 3: EPP Indicators and Achievement for April 2015

Indicator	Unit	LOP Target	Achieved in April 2015	Total Achieved as of April 2015	LOP % Achieved as of April 2015
I.a: GWh of energy sold	GWh	7880	98	9,182	117%
I.1.a: Number of beneficiaries with improved energy services due to United States Government assistance	Individuals	13,624,226	179,172	15,847,956	116%
I.1.b: GWh of energy availability	GWh	7880	98	9,182	117%
I.1.c: MW available to meet power sector demand as a result of USG assistance	MW	1,303	14	1,518.2	117%
I.1.1.a: MW of electrical power added or saved as a result of USG improvements	MW	875	2	1,027.2	117%
I.1.1.b: Efficiency of thermal power plant tests completed	No.	3	0	2	67%
I.1.1.c: Number of USG supported installations and operations and maintenance improvements	No.	181	6	156	86%
I.1.1.d: Number of transmission bottlenecks resolved	No.	121	2	118	98%
I.1.4.a: Public and private funds leveraged by the USG for energy infrastructure projects	U.S. \$	193.5 million	0	58.5 Million	30%
I.2.1.a: Number of key policies and regulations in various stages	No.	12	1	27	225%
I.2.2.a: Number of policies following international best practices	No.	6	0	3	50%
I.2.2.b: Number of board recommendations following international best practices	No.	4	0	0	0%
I.2.3.a: Number of best practice-driven systems created, improved, and implemented	No.	10	0	6	60%
I.2.4.b: Number of public forums resulting from USG assistance in which government officials and citizens interact	No.	12	0	5	42%

Table 4: EPP Indicators by Component April 2015

Indicator	Unit	Component	LOP Target	Achieved in April 2015	Total Achieved as of April 2015	LOP % Achieved as of April 2015
I.1.a: Number of beneficiaries with improved energy services due to United States Government assistance	Individuals	Total	13,624,226	179,172	15,847,956	116%
		I-Generation	7,993,106	0	9,382,406	117%
		IV-Transmission Throughput Capacity	5,477,544	153,576	6,283,818	115%
		IV – Transmission Added/Saved	153,576	25,596	181,732	118%
I.1.b: GWh of energy availability	GWh	I & IV	7880	98.112	9,182.1	117%
		I-Generation	4,796	0	5,642.29	118%
		IV-Transmission Throughput Capacity	2999.4	84.096	3,440.926	115%
		IV – Transmission Added/Saved	84	14.016	99.506	118%
I.1.c: MW available to meet power sector demand as a result of USG assistance	MW	I & IV	1,303	14	1,518.2	117%
		I-Generation	863	0	1,013	117%
		IV-Transmission Throughput Capacity	428	12	491	115%
		IV – Transmission Added/Saved	12	2	14.2	118%
I.1.1a: MW of electrical power added or saved as a result of USG improvements	MW	I & IV	875	2	1027.2	117%
		I-Generation	863	0	1,013	117%
		IV – Transmission Added/Saved	12	2	14.2	118%

# ANNEXES

# ANNEX I: SUCCESS STORY - POWER STATION REHABILITATION ADDING 90 MEGAWATTS

Mangla Hydroelectric Power Station, located in the Mirpur District of Azad Kashmir, was designed to produce 1,000 megawatts of electricity from its 10 generating units. However, as a result of nearly 50 years' of wear and tear on equipment that was initially installed in 1967, the plant has been able to produce only 980 megawatts of energy.

Partnering with the government of Pakistan, USAID through the Energy Policy Program (EPP) is rehabilitating the Mangla Power Station. Two out of 10 units are being upgraded with new generating equipment.

Rehabilitating the Mangla Power Project will mitigate Pakistan's energy shortage by adding 90 megawatts to the national grid through the refurbishment and upgrading of units 5 and 6 at the power plant. The generation capacity will increase from 80 to 135 megawatts for unit 5 and from 100 to 135 megawatts for unit 6, bringing the new total to 1070 megawatts. When the Project is fully complete, the plant will be producing 1310 megawatts of power. The Project is also supplying 169 MVA capacity power transformers, as well as supplying, installing, and refurbishing mechanical and electrical equipment, and conducting the necessary civil works.

Increasing available energy supplies is inextricably linked to Pakistan's economic development. Demand for energy increases roughly eight percent per year with extended blackouts throughout the day. USAID works with the government of Pakistan to support high impact projects in new construction and existing energy plant rehabilitation. The Mangla project implementation letter was signed by WAPDA and USAID on March 6, 2014, and \$3 million has been disbursed so far for the Project. Mangla's environmental mitigation and monitoring plan has also been approved.

By upgrading units 5 and 6, Mangla's revenues from electricity sales are expected to be approximately \$60 million per year. The refurbished power plant will produce an additional 90 megawatts a year of capacity, which is enough to supply electricity to an additional 833,580 people. New, modern equipment will ensure the availability of spare parts for preventive maintenance, and it will improve the reliability and availability of this power plant for the next 40 years.

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By upgrading units 5 and 6, Mangla's revenue from electricity sales are expected to be approximately \$60 million per year. The refurbished power plant will produce an additional a 90 megawatts a year of capacity, which is enough to supply electricity to an additional 833,580 people.

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Spillways of Mangla Dam, Mangla



Mangla Power Station

# ANNEX II: SUCCESS STORY - NEW EQUIPMENT IN MARDAN IMPROVES ELECTRICITY DELIVERY

Power outages and load shedding have become severe in Pakistan in recent years. The electrical power distribution system in Pakistan is decades old with equipment that is nearing the end of its usable life. An important component of the electricity distribution system is the capacitors which are electrical or electronic components that store electrical energy. In summer, when demand for electricity increases, capacitor banks give more capacity for electricity to be transferred and reduces losses.

The capacitor bank at the Mardan Grid Station, serving the Mardan area in Khyber Pakhtunkhwa Province, had been out of order since 2007 due to shortage of cells reducing the amount of reliable electrical power available to residents and businesses in the Mardan area.

USAID worked on rehabilitating the capacitor bank would reduce up to two megawatts in losses, which would mean 2 additional megawatts of electricity would be available for citizens and businesses to use.

In February 2015, USAID/Energy Policy Program repaired and replaced the capacitor banks at the Mardan Grid Station, modified the old 60 megavolt ampere reactive (Mvar) bank to 48 Mvar capacitor, tested the protection and related control systems and energized the capacitor banks. These groups of capacitors are typically used to counteract power networks. They also play a crucial role in maintaining system voltage within the desired limits. Essential power grid updates like those at Mardan ensure that safety standards continue to be met, power is delivered consistently, and that the system is managed efficiently.

“With the installation of the new capacitors, power lags have been reduced, maintaining a smooth flow of electricity in the power supply,” said Saleem Shah, Senior Engineer at NTDC, Peshawar. “Capacitors have given a relief to the transformers and improved voltage and power factor.” He added that customers are now provided with more regular and reliable electricity. And this, in turn, means more revenue is produced to pay the costs of providing electricity.

Small, medium, and large-scale businesses need a reliable supply of electricity to be successful. A secure supply of electricity is crucial to economic growth — and a bright future for all of Pakistan’s people.

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Saleem Shah, Senior Engineer at NTDC, Peshawar says, “With the installation of the new capacitors, power lags have been reduced, maintaining a smooth flow of electricity in the power supply”.

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84 Mvar capacitor bank at Mardan Grid Station

# ANNEX III: LIST OF KEY MEETINGS

Annex Table 5: List of Key Meetings Conducted in April 2015

Meeting with	Date	Location	Purpose	Outcome/Result
<b>Component 1: Project Monitoring &amp; Implementation</b>				
Member Power WAPDA	April 5,6	WAPDA House Lahore	Expedite the account opening of Tarbela Phase II	WAPDA opened an assignment account for Tarbela Phase II and met the conditions precedents set forth in Activity Agreement.
Chief Engineer/Project Director	April 22	Mangla Power Station	To discuss the progress on Mangla procurement turbines, generators unit 5 and 6, EOT crane, power transformers and inlet valve seals.	WAPDA was advised to expedite the procurement of turbines, generators unit 5 and 6 on fast track schedule.
<b>Component 2: Policy and Reform</b>				
USAID	April 15	AEAI Office	Rationalization of gas pricing regime	<ul style="list-style-type: none"> <li>Status of Supplemental Agreements for conversion of policies was presented.</li> <li>AEAI to provide a proposal for rationalization of gas pricing regime for the producers.</li> </ul>
Strategic Planning Group	April 2	Avari Hotel, Lahore	6th Strategic Planning Group meeting; the development of NDC Strategic Plan.	<ol style="list-style-type: none"> <li>Discussion and comments on the second draft Strategic Plan</li> <li>KPI recommendations for the Strategic Plan</li> </ol>
Zargham Eshaq Khan, JS Power Finance, Ministry of Water & Power	April 2, 15, 17 & 21	Ministry of Water & Power	Regular meetings regarding progress on all the documents and input from Ministry's side.	Comments and suggestions were discussed and incorporated accordingly.

Meeting with	Date	Location	Purpose	Outcome/Result
Board Planning Committee	April 2	NTDC Conference Room 211, WAPDA	Discuss with BOD planning Committee the latest version of the NTDC Strategic Plan. Attendees:	<p>BOD Planning Committee is responsible for changes to the content of the Strategic Plan. Result:</p> <ul style="list-style-type: none"> <li>Request for Renewable Energy Objective</li> <li>Outline of NTDC to be the Center for all Transmission Planning</li> <li>Chairman request for data from Planning Dept. for NTDC Strategic Plan</li> <li>Meeting Agenda set for April 11 Special BOD meeting on Strategic Plan</li> </ul>
SUPARCO, Survey of Pakistan, Geological Survey of Pakistan, Institute of Space Technology, Pak. Bureau of Statistics and others	April 7	Auditorium, Planning Commission, P-Block, Islamabad	GIS in Physical Planning, Resource Management, Governance And Business: The Need For A National GIS Policy And Infrastructure	Formulation of Working Groups for preparations of National GIS Policy, Capacity Building and Reducing obstacles in Spatial Data sharing with end users. Second meeting scheduled for May 6, 2015
NTDC Board	April 11	Islamabad Club	Special NTDC Board of Directors meeting to review latest draft of NTDC Strategic Plan, dated April 7, 2015	<ul style="list-style-type: none"> <li>BOD provided comments on all initiatives included in Objectives 1 thru 5;</li> <li>BOD comments allows the Strategic Plan to begin final steps for Approval;</li> <li>Chairman to discuss Strategic Plan with MWP;</li> <li>Strategic Plan with MWP comments will be presented to BOD for approval on next BOD meeting;</li> <li>Part I of NTDC Strategic Plan completed.</li> </ul>
Stakeholder Meeting: <ol style="list-style-type: none"> <li>Ministry of Water &amp; Power</li> <li>World Bank</li> <li>USAID Power Distribution Program</li> <li>JICA</li> </ol>	April 14	World Bank Office, Islamabad	Discuss & finalize the Package of documents for fulfilling the IMF conditions	Comments from all stakeholders were incorporated into the relevant documents.

Meeting with	Date	Location	Purpose	Outcome/Result
Arthur C. Sedestrom, Chief of Party, Power Distribution Program	April 17	PDP, Islamabad	Discussions regarding the envisioned Market Structure for Power Procurement	It was agreed that more work would be required on development of the Market Rules.
CPPA Settlements and Finance	April 23	CPPA Conference Room 133, WAPDA	Discuss with CPPA staff: <ul style="list-style-type: none"> <li>Status of outstanding data request</li> <li>Latest Draft of BTA Agreement</li> <li>NTDC resources used by CPPA</li> <li>Daily interaction and information exchange with NPCC</li> </ul>	<ul style="list-style-type: none"> <li>Plan for responding to outstanding data request</li> <li>Potential issues with BTA by CPPA</li> <li>CPPA to review BTA and provide comments</li> <li>Identified potential issues with data exchange between CPPA-G and NPCC</li> <li>Understanding of the power liabilities and responsible party</li> </ul>
Dr. Khaqan Najeeb, DG Economic Reforms Unit, Ministry of Finance	April 23	Ministry of Finance, Islamabad	Discussions on the timelines of the package of documents to be finalized for separation of CPPA from NTDC	Decisions were conducted on the timings of the documents.
NTDC Planning Department	April 24	Planning Dept. Conference Room PIA Building	Discussion with Planning Staff on: <ul style="list-style-type: none"> <li>Status of outstanding data request</li> <li>Transmission Network transfer capacity shortfall</li> <li>Projects to eliminate transfer capacity shortfall and network overloading</li> <li>Expanded Planning Dept. Responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>Understanding of the source of MWs transfer capability shortfall</li> <li>Agreement on modification of data request for major transmission line projects</li> <li>Understanding of adding the 132 kV network into the NTDC network</li> <li>Agreed to a future meeting with Planning Department to discuss all of their comments to Strategic Plan and walk through of the total Plan</li> </ul>
NTDC Planning Department	April 29	Planning Dept. Conference Room PIA Building	NTDC Planning Department requested meeting to review proposed responses to the DADA request	To review the proposed data request responses for accuracy and completeness
NTDC Projects Group	April 29	NTDC GM Project Office	Follow up on Chairman Vaqar e-mail on ADB funding for projects	Obtain an understanding of the delays in the projects and actions to accelerate the ADB project approval and start of project or possibility lose ADB funding.

Meeting with	Date	Location	Purpose	Outcome/Result
Strategic Planning Group	April 2	Avari Hotel, Lahore	6th Strategic Planning Group meeting; the development of NDC Strategic Plan.	<ol style="list-style-type: none"> <li>1. Discussion and comments on the second draft Strategic Plan</li> <li>2. KPI recommendations for the Strategic Plan</li> </ol>
Zargham Eshaq Khan, JS Power Finance, Ministry of Water & Power	April 2, 15, 17 & 21	Ministry of Water & Power	Regular meetings regarding progress on all the documents and input from Ministry's side.	Comments and suggestions were discussed and incorporated accordingly.
Board Planning Committee	April 2	NTDC Conference Room 211, WAPDA	Discuss with BOD Planning Committee the latest version of the NTDC Strategic Plan	<p>BOD Planning Committee is responsible for changes to the content of the Strategic Plan. Result:</p> <ul style="list-style-type: none"> <li>• Request for Renewable Energy Objective</li> <li>• Outline of NTDC to be the Center for all Transmission Planning</li> <li>• Chairman request for data from Planning Dept. for NTDC Strategic Plan</li> <li>• Meeting Agenda set for April 11 Special BOD meeting</li> </ul>
SUPARCO, Survey of Pakistan, Geological Survey of Pakistan, Institute of Space Technology, Pak. Bureau of Statistics and others	April 7	Auditorium, Planning Commission, P-Block, Islamabad	GIS in Physical Planning, Resource Management, Governance And Business: The Need For A National GIS Policy And Infrastructure	Formulation of Working Groups for preparations of National GIS Policy, Capacity Building and Reducing obstacles in Spatial Data sharing with end users. 2 <sup>nd</sup> meeting scheduled for May 6, 2015
NTDC Board	April 11	Islamabad Club	Special NTDC Board of Directors meeting to review latest draft of NTDC Strategic Plan, dated April 7, 2015	<ul style="list-style-type: none"> <li>• BOD provided comments on all initiatives included in Objectives 1 thru 5;</li> <li>• BOD comments allows the SP to begin final steps for Approval</li> <li>• Chairman to discuss Strategic Plan with MWP;</li> <li>• Strategic Plan with MWP comments will be presented to BOD for approval on next BOD meeting.</li> <li>• Part I of NTDC Strategic Plan completed</li> </ul>

Meeting with	Date	Location	Purpose	Outcome/Result
Stakeholder Meeting: 1. Ministry of Water & Power 2. World Bank 3. USAID Power Distribution Program 4. JICA	April 14	World Bank Office, Islamabad	Discuss & finalize the package of documents for fulfilling the IMF conditions.	Comments from all stakeholders were incorporated into the relevant documents.
<b>Component 4: New Activities</b>				
Chief Engineer (EHV-II) NTDC	April 9	Lahore	Discuss issues regarding Due Diligence Step 2 of power dispersal from wind power plants at Jhampir	All the issues were discussed. CE EHV helped in rectifying the issues. Moreover, he agreed to execute the activities to be done on NTDC end.
GM Planning NTDC	April 10	Lahore	Discuss the feasibility of proposed route for construction of Muzaffarabad in-out section.	The route was proposed by Grid Systems Construction (GSC) Department for construction of Muzaffarabad in-out to avoid the right of ways. The same proposal was discussed with Planning Department to check if it is feasible with respect to load flow. Few issues were pointed out to be catered and another proposal was given by Planning Department
USAID -- Andrei Barannik (Regional Environmental Advisor)	April 15	Lahore	Draft report of Rapid Environmental Assessment for power dispersal from wind power plants at Jhampir was reviewed by USAID Regional Environmental Advisor, who explained the short comings of the report	All the issues highlighted by Mr. Andrei will be incorporated in revised draft.
GM GSC NTDC	April 22	Lahore	The proposal of Planning Department was discussed with GM GSC and Design Department for construction of Muzaffarabad in-out section	It was pointed out by GM GSC and Mr. Amir from Design that the proposal of planning department is not appropriate due to design constraints. AEAI have to find another way to get it done.
Member BOD (Board of Directors) NTDC	April 30	Lahore	To discuss the false tripping of 500/220 kV transmission lines and equipment; Updates on study of intermittent renewables were discussed	A meeting has planned with all concerning parties on May 4, 2015

[www.ep-ep.com.pk](http://www.ep-ep.com.pk)  
[info@ep-ep.com.pk](mailto:info@ep-ep.com.pk)