E2 CONSULTING

Energy and Environment Management Consultants

Interactive Consulting
Integrated Solutions

COMPANY PROFILE

Doc. Ref: E2C-Company Profile

Date: August 17, 2017

E2 Consulting
Flat 9, First Floor, VIP Plaza,
I-8 Markaz, Islamabad 44000, Pakistan
Phone: +92 51 4862481-2
www.E2Consulting.com.pk

CONTENTS

1. COMPANY PROFILE

E2 CONSULTING is an energy and environment management consultancy firm offering broad range of corporate, technical and commercial advisory services related to policy, market reforms, regulatory affairs, transaction advisory, commercial, financial, economic analyses and technical design and operations to the clients in power and energy (Oil and Gas) sector in Pakistan and other regional countries. **E2 CONSULTING** helps the management of energy companies in establishing and turning around businesses through knowledge based decisions regarding the selection of technologies, developing optimal business and operational models, identifying investment opportunities, project financing, risk assessment and mitigation, and provides project management for turn key infrastructure development.

E2 CONSULTING is specialized in delivering multidisciplinary assignments requiring integration of engineering, commercial, financial, economic, regulatory and legal inputs for formulating as well as advising on energy policies, market and institutional reforms and development of water, power and energy infrastructure projects.

E2 CONSULTING follows a work approach based on its slogan "interactive consulting, integrated solutions". **E2 CONSULTING** promotes a culture of interactive consulting by involving clients at all stages of projects to arrive at mutually understandable and acceptable solutions.
E2 CONSULTING believes in exploring integrated solutions by meticulously analyzing all possible aspects of the problems, duly considering the interrelationship and interdependence of the key components, commodities and stakeholders involved, and carrying out detailed analysis to arrive at technically robust, economically optimal and financially and environmentally sustainable implementation decisions and infrastructure development options.

Our services cover the following sectors:

- Power and Renewable Energy
- Oil and Gas
- Climate Change and Environment

1.1 E2 CONSULTING'S MAJOR AREAS OF EXPERTISE

E2 CONSULTING offers wide range of services pertaining to policies, energy markets, regulatory affairs, feasibility analysis, corporate and strategic planning, technical and commercial operations, investment decisions, financing solutions and infrastructure development options.

E2 CONSULTING is formed recently but its key staff and associates have over 25 years of experience in the power and energy markets in Pakistan serving high profile clients that include government, policy and regulatory institutions, energy utilities, international financing institutions (IFIs), multilateral and bilateral donor agencies and leading private sector industries and business associations.

Based on its in-house resources as well as through access to a network of international and local experts, and its relationship with international energy consulting firms, **E2 CONSULTING** focusses on providing techno-economic, financial and commercial counsel to government, financial institutions, regulatory agencies, and the power and energy sector clients on a wide range of industry and utility functions. The services cover functions including but not limited to feasibility analysis, investment planning, corporate and business planning, institutional development and capacity building, market and risk assessment, project financing, energy

pricing and tariffs, design and engineering, and research and development (R&D) activities to improve operational and functional efficiencies of energy businesses.

1.1.1 Power and Renewable Energy

E2 CONSULTING services' spectrum in the power and renewable energy sector spans around energy markets, regulatory affairs, feasibility analysis, technical and commercial operations, investment decisions, financing solutions and due diligence of infrastructure development options for generation, transmission, distribution businesses and renewable energy projects. The services broadly cover the following areas:

- Power policies, market reforms and restructuring
- Institutional capacity building, developing organizational structures, management reporting and operating procedures
- Commercial and transaction advisory services
    - Contracts: Agreement negotiations and dispute resolution
    - Asset management; mergers/acquisitions; and privatization
    - Power/Electricity trading: cross border energy trade; energy imports; and competitive market operations
    - Electricity pricing:
        - IPP Tariff: Power Purchase Price (PPP); Energy Purchase Price;
        - Transmission charge and power wheeling
        - Distribution margin
    - Production and revenue simulation modeling: Cost of service; subsidies; consumer tariffs; revenue assessment; financial performance analysis; circular debt modeling
    - Economic and financial analysis of projects
- Regulatory affairs: licencing, tariffs, performance standards; regulatory rules & regulations and application procedures for licences and tariff petitions and interventions
- Power system planning:
    - Generation and power system planning;
    - Power demand forecasting;
    - Power and energy balances;
    - Power plant dispatch simulations;
    - Integrated economic least cost system expansion planning; and
    - Demand side management (DSM)
- Technical and engineering analysis
- Project feasibility analysis
- Project management services

1.1.2 Oil and Gas

E2 CONSULTING offers services in the oil and gas sector pertaining to regulatory affairs, feasibility analysis, technical and commercial operations, investment decisions, financing solutions and developing energy infrastructure projects. The services include the following areas:

- Energy policies; market reforms; restructuring and deregulation
- Upstream and midstream oil and gas/petroleum economic and financial assessment
    - Petroleum concession agreements
    - Petroleum production sharing agreements
    - Midstream refinery, pipelines, fuel transportation analysis
- Commercial and transaction advisory services
    - Asset management; and mergers/acquisitions
    - Energy trading: cross border energy trade, and energy imports
    - Energy pricing:
        - Upstream gas and oil pricing formulas;
        - consumer price buildup formulas for petroleum products, duties and taxes structure in consumer prices
    - Production/supply cost and revenue simulation modeling: Cost of service; subsidies; consumer tariffs; revenue assessment; financial performance analysis; consumer prices for natural gas and petroleum commodities
    - Economic and financial analysis of projects
- Regulatory affairs: licencing, tariffs, performance standards; regulatory rules & regulations and application procedures for licences and tariff petitions and interventions Procedures; and energy prices;
- Energy planning:
    - Integrated energy demand forecasting; econometric and end-use approaches
    - Supply-demand analysis;
    - Fuel substitution and interchangeability; and
    - Integrated energy planning; economic planning
    - Energy efficiency and demand side management
- Hydraulic analysis of natural gas networks and oil pipelines
- Project feasibility analysis
- Project management services

1.1.3 Climate Change and Environment

E2 CONSULTING focusses on environmental impacts and emissions assessments for the energy infrastructure projects and the built environment. Key consultants are involved in climate

change activities and have experience of preparing documentation and developing projects under clean development mechanism including:

- Environmental and emissions assessments from power and industrial facilities;
- Clean energy and renewable energy policies, initiatives, assessment, and planning; and
- Climate change programs and project development under Clean Development Mechanism (CDM): preparation of documents; and holding public hearings for CDM projects
- Environmental programs assessment, design, planning, implementation and management

1.2 E2 CONSULTING'S SERVICES

E2 CONSULTING offers broad range of services to its energy sector clients. The services focus on helping the management of energy utilities and companies in making business decisions for governance, investment, divestment, financing, competition, commodity pricing, and carrying out research and development (R&D) activities for arriving at optimal and sustainable operations. **E2 CONSULTING** serves its clients in the following areas:

- Energy Policies and Market Reforms
- Commercial and Transaction Advisory Services
- Energy Trading
- Regulatory Affairs
- Power and Energy Systems Planning
- Technical and Engineering Analysis
- Project Management and Implementation Services
- Energy Systems Modeling
- Environment, Clean Energy and Climate Change Programs

1.2.1 Energy Policies and Market Reforms

Responding to the energy supply shortages in the eighties, the Government of Pakistan started the restructuring process for energy sector in 1991 for introducing corporate governance and market mechanisms through a combination of regulation, deregulation, and competition in various market segments aiming long-term sustainability of the energy supply chain in the country in a cost-effective manner and to enhance consumer satisfaction. **E2 consulting's** founding resources became involved right in the beginning of the process and have worked throughout the subsequent stages to date, making major contributions in majority of the efforts and initiatives through policies and market reforms.

E2 CONSULTING's key resources helped government and regulatory agencies in formulating and refining power and energy policies and strategies through stakeholder consultation, market search, surveys, and interaction with industry players. They acquired extensive experience in designing and implementing market reforms through quantitative and qualitative assessments of the goals and objectives of government policies, devising implementation strategies and procedures under the prevailing and projected market conditions, constraints, liabilities, and competition.

- Power and Energy Policies
- Market Reforms, Deregulation and Competition

Power and Energy Policies

Working for government, donor agencies and private sector clients, the key resources have been involved in advising clients in formulating and interpreting power and energy policies and strategies through research and analysis for attracting private sector investment and facilitating public private partnerships for energy infrastructure and market development:

- Research, analysis and advice on power and energy policies; assessment of incentive package and risks profile; and review on legal and institutional framework for policy implementation;
- Analysis and advice on government policies on rationalization of energy prices, government subsidies, cross sectoral subsidies and utility/consumer tariffs; and
- Analysis on financial deficit and circular debt management

Market Reforms, Deregulation and Competition

Working for both public sector and private sector entities, the key resources have been advising clients in designing and implementing market reforms, and introducing regulation, deregulation and competition in the power, oil and gas markets. The services cover the following areas:

- Market reforms for improving the operational and commercial performance of energy sector entities/utilities/energy service companies (ESCO);
- Introducing regulation, deregulation and promoting competition in the electricity/energy markets in line with government policies and reform objectives

1.2.2 Commercial and Transaction Advisory Services

E2 CONSULTING's resources have diverse experience of commercial and transaction advisory services for the energy businesses. The services involve technical and commercial due diligence, assets evaluation and management, risk assessment, contract management and dispute resolution for parties involved in farming in or farming out under the market transactions.

E2 CONSULTING consultants are well familiar with the industry practices especially the Asian Development Bank (ADB) and the World Bank guidelines on project economic and financial analysis, financial due diligence and financial management assessment of project execution entities, and project preparation/financing documentation.

- Privatization, Financial and Business Transaction Advisory Services
- Economic & Financial Analysis
- Markets and Risk Assessment
- Assets and Contract Management

Privatization, Financial and Business Transaction Advisory Services

- Technical, commercial and financial advisory services to public and private sector clients on privatization of public energy utilities, business acquisitions/mergers focusing on energy infrastructure projects;
- Business planning for energy companies for value addition;

- Strategic reviews for business decisions on divestment, farming in and farming out of stakes;
- Technical and commercial due diligence of the energy businesses and public utilities; and
- Technical and commercial evaluation of energy infrastructure assets

Economic & Financial Analysis

- Integrated operational and financial modeling for electricity/power and energy projects/sectors;
- Production cost simulations for power, oil and gas commodities;
- Costing analysis of projects/utility operations;
- Power and energy products/commodity pricing and value chain analysis;
- Cost of service analysis of power and energy products;
- Economic evaluation of energy commodities, projects and utility plans;
- Financial evaluation of projects and utility infrastructure development plans; and
- Sensitivity assessment

Markets and Risk Assessment

- Energy Market Assessments; trends, opportunities, market and commercial risks, technology obsolescence
- Strength, weakness, opportunities and threats (SWOT) Analysis for business decisions
- Risk Assessment for energy business; quantitative and qualitative risk assessment and mitigation strategies and measures

Assets and Contract Management

Commercial advice to private sector clients including:

- Merger/acquisition of assets;
- Contract negotiations; Power Purchase Agreements (PPA); Energy Purchase Agreements (EPA)
- Dispute resolution;
- Asset management;
- Technical and commercial due diligence of energy operations/entities/utilities; and
- Financial management assessment of project executing entities for project financing by IFIs and donor agencies

1.2.3 Energy Trading

E2 CONSULTING offers technical, economic and commercial assistance on electricity and energy trading under the competitive regimes for resources produced domestically as well as imported through transmission/ transportation lines and other means in the regulated and deregulated markets:

Cross Border Energy Trading

- Technical, economic, financial and commercial advice to government and public sector entities on cross border electricity/power/energy trading projects; contract review and support in contract negotiations
- Regional energy interconnection projects and options for electricity/power and natural gas/LNG; and
- Electric Power/Gas/LNG import projects

Power Trading

E2 CONSULTING offers advice on power trading options analysis, power exchanges mechanisms and operations, market competition, and market rules, opportunities for investors, electricity suppliers and purchasers.

1.2.4 Regulatory Affairs

Ever since the introduction of regulatory bodies in the country since late nineties, the key resources of **E2 CONSULTING** have been deeply involved in evolution of regulatory affairs of the power and energy utilities. On one side, the resources have advised government on the regulatory policies and strategies, designing and implementing market reforms and restructuring and helped regulatory bodies evolve regulations and standards. On the other side, however, the major focus has been on representing industry and consumers in the regulatory hearings in safeguarding their commercial and economic interests through quantification of the impacts of utilities performances and inefficiencies on consumer tariffs and customer satisfaction and by recommending actions and measures for improvement in utilities performances and financial health to bring electricity to consumers at the most economical prices and adequate standards.

Advice and assistance to public and private sector clients on regulatory affairs in the electricity/power and energy sectors include:

- Rules, Regulations and Procedures
- Licencing
- Electricity/Power and Energy Pricing, and Utility/Consumer Tariffs
- Performance Standards

Rules, Regulations and Procedures

E2 CONSULTING offers services to energy utilities and private sector clients on the regulatory processes, rules, regulations and procedures for regulated businesses. Consultants have made representations regularly in the regulatory hearings and consultations and raised comments and awareness about the implications of rules and regulations and regulatory processes introduced by energy regulators.

Licencing

E2 CONSULTING is fully equipped to prepare, follow-up and make representations in the electricity/power/natural gas utility licencing processes by the energy regulators. The services offered are:

- electricity generation licences;

- transmission licence; distribution licences;
- natural gas transmission and distribution licences

Electricity/Power and Energy Pricing, and Utility/Consumer Tariffs

E2 CONSULTING's key resources are pioneer in the preparations and follow-up and making representations in the consumer tariff determination process by regulators. The key resources have vast exposure into preparing tariff petitions using the internationally acceptable regulatory practices and methodologies at the regulatory bodies. In fact, the resources were involved in submission of first consumer-based tariff petition for industrial customer at National Electric Power Regulatory Authority (NEPRA) and made consumer representations in the first regulatory hearings for both NEPRA and OGRA. The resources also have participated in consultative processes conducted by regulators for evolving the upfront and cost plus tariffs proposals for power generation, renewable energy and transmission and distribution projects.

- Electricity/Power/Renewable Energy (RE) and commercial energy commodity (natural gas, LNG, petroleum products) pricing in regulated and deregulated markets;
- Electricity/Power Generation Tariff; Power Purchase Price (PPP) for Independent Power Producers (ipps) for oil, gas and coal based thermal power projects;
- Energy purchase price (EPP) for Hydroelectric(Hydel) power projects and renewable energy (RE) projects (Wind, Solar);
- Electricity/Power Transmission Charge; Power wheeling Charge for transmission services;
- Electricity/Power Distribution Margin; Power distribution margin for distribution services;
- Electricity/Gas Utility/Consumer Tariffs; p reparation and follow-up of tariff petitions and consumers' interventions during the regulatory hearings on electricity and natural gas consumer tariff; and
- Cost of service of power and energy (natural gas/LNG and petroleum products)

Performance Standards

As part of the regulatory process, **E2 CONSULTING's** resources have contributed extensively in establishing and implementing performance standards for power and natural gas utilities. Using the quantitative approach where possible combined with qualitative assessment, analysis have been presented to demonstrate the impacts of operational and financial inefficiencies on unfavorable consumer prices and poor customer satisfaction. The R&D activities offered in utility performance include*:*

- Electricity/natural gas utility standards;
- Advice on Grid Code
- Advice on Distribution Code
- Advice on Commercial Code
- Performance analysis and assessment, key performance indicator (KPI) analysis;
- Impact assessment of technical and commercial losses in electricity markets;
- Unaccounted for gas (UFG) in the natural gas market; and

- Technical and commercial solutions for reduction of losses and UFG in the electricity and gas market respectively

1.2.5 Power and Energy Systems Planning

E2 CONSULTING has extensive experience of power and energy system planning based on integrated resource planning and economic least cost expansion planning using state of the art models and software packages for electricity, natural gas and petroleum products.

E2 CONSULTING is fully equipped to carry out the complete planning cycle that begins with demand forecasting, screening of supply resources and options, assessment of resource availability, moving on to development of system expansion plans based on economic least cost approach using demand and resource characteristics while catering to the technical, financial and environmental constraints of the options employed and finally developing technically and financially optimized and environmentally sustainable plan for the systems. Planning services also covers the impact assessment of performance and efficiency improvement of the industry and utility functions along the supply chain of electricity and energy commodities. The planning services cover:

- Power system engineering and master planning;
- Production cost simulation modeling and analysis;
- Strategic planning for energy resource procurement;
- Consumer demand analysis;
- Electricity demand forecasting;
- Demand side management (DSM) analysis
- Economic, financial and environmental evaluation of infrastructure projects such as hydel/hydroelectric and thermal power generation projects; renewable energy projects;
- Economic least-cost generation expansion planning;
- Marginal cost studies;
- Integrated resource planning;
- Petroleum and energy demand and supply forecasts;
- Power/energy balances;
- Power plant dispatch simulations;
- Gas transmission system hydraulic analysis; energy management; energy efficiency and conservation planning;
- Smart-grid planning and implementation;
- Energy transformation

1.2.6 Technical and Engineering Analysis

E2 CONSULTING provides technology and engineering solutions to its clients. The solutions range from introducing innovative technologies, efficiency enhancement measures, feasibility analysis, engineering design, performance analysis, research and development (R&D) activities, and project management and implementation services:

- Feasibility analysis of power, renewable energy, clean energy and energy infrastructure projects;
- Comparative assessment of renewable and alternative energy options;
- Front-end Engineering and Design (FEED) for infrastructure projects;
- Design and engineering of power projects;
- Performance audit/evaluation of utilities and plants;
- Technical audit of generation and distribution sector;
- Reliability assessment of power systems;
- Operational & maintenance (O&M) analysis;
- Energy efficiency and conservation assessment and measures; and
- Energy transformation.

1.2.7 Project Management and Implementation Services

Key resources of **E2 CONSULTING** have over 25 years of experience of project management and implementation services. The management services include:

- Institutional capacity building services;
- Project planning and monitoring services;
- Program management for donor agencies;
- Project implementation services for generation, transmission, distribution and renewable energy (RE) projects; and
- Performance assessment and monitoring of energy service companies

1.2.8 Energy Systems Modeling

Using the integrated approach, **E2 CONSULTING** undertakes complex computer simulation modeling using MS Excel for preparation of short, medium and long term projections/forecasts as part of the R&D activities covering vast horizons of technical and commercial operations of electricity and energy (natural gas and petroleum products) utilities and commercial entities, including:

- Energy Demand Forecasting
- Production Cost Simulation Modeling
- Independent Power Producers' (IPP) Power Purchase Price (PPP) Modeling
- Economic and Financial Modeling
- Operational Modeling

Energy Demand Forecasting

- Power (MW) and energy (GWh) demand analysis for various consumption categories;
- Long-term Power (MW) and energy (GWh) demand forecasting/projections using econometric/end-use/hybrid approaches;

- Natural gas, coal and petroleum products demand analysis for various consumption categories;
- Long-term energy demand forecasting/projections for natural gas, coal and petroleum products using econometric/end-use/hybrid approaches; and
- Inter-fuel substitutability analysis

Production Cost Simulation Modeling

- Production cost simulation modeling for electricity supply chain including whole sale generation cost based on economic dispatch, transmission and end-consumer and accounting for energy supply and demand balance;
- Economic Value Analysis Modeling for electricity usage based on opportunity/replacement cost approach;
- Economic Cost of Unserved Energy; Economic Cost of Electricity Load Shedding;
- Value Chain Analysis Modeling for electricity supply;
- Production cost simulation modeling for energy (natural gas, coal and petroleum products) supply chain and accounting for energy supply and demand balance;
- Economic Value Analysis Modeling using opportunity/replacement cost approach for natural gas, coal and petroleum products;
- Economic Cost of Unserved Energy; economic cost of fuel shortages based on scarcity and inter-fuel substitutability; and
- Value Chain Analysis Modeling for natural gas, coal and petroleum products

Independent Power Producers' (IPP) Power Purchase Price (PPP) Modeling

- Preparation of IPP power purchase Price (PPP) to recover the investment, operational and maintenance cost and return on investment over the contracted life of the IP assets for hydroelectric, thermal (oil, gas and coal based) and renewable energy (Wind and Solar) projects; and
- Service Charge Analysis modeling for energy service companies such as transmission, distribution and sales networks.

Economic and Financial Modeling

- Business plan modeling for assessing the viability of long term investment decisions, company strategies, performance improvement and other management objectives and goals;
- Economic Analysis Modeling (Discounted Cashflows, Net Present Value (NPV), Cost Benefit Ratio, Economic Internal Rate of Return (EIRR/IRR), Pay Back Period, and Life Cycle Average Cost Analysis (LCAC), Levelized Cost);
- Financial Analysis Modeling (Financial Internal Rate of Return (FIRR), supply costs, average supply cost, net business incomes and profits);
- Financial and Commercial Forecasts/Projections Modeling to assess the impacts of policy and market reforms, privatization of entities, efficiency improvement measures, technological innovations, pricing rationalization, and pricing interventions, reforms and change in market design;

- Petroleum Concession and Production Sharing simulation modeling to assess the economic and financial viability for the development of oil and gas assets

Operational Modeling

- Plant Despatch simulations using economic dispatch for power generation plants;
- Power (MW) and Energy (GWh) Balance Simulations;
- Supply-Demand balance simulations for energy products (natural gas, coal and petroleum products);
- Integrated operations and financial models for utilities/energy companies for long term business planning; and
- Integrated operations and financial models for utilities/energy companies for policy, reforms, investment, privatization, commercial transactions and innovations decisions

1.2.9 Environment, Clean Energy and Climate Change Programs

E2 CONSULTING's environmental services provide resolution to environmental issues related to energy infrastructure projects and built environment for environmental remediation, regulatory compliance, and development of projects under Clean Development Mechanism (CDM).

- Environmental and emissions assessments from power and industrial facilities;
- EIA and ESIA of energy infrastructure projects;
- EIA and ESIA of industrial and urban development projects;
- Clean energy and renewable energy policies, initiatives, assessment, and planning; and
- Climate change programs and project development under CDM

1.3 MAJOR ENTITIES SERVED BY E2 CONSULTING'S KEY RESOURCES

E2 CONSULTING's key consultants have served the following major client in diverse range of services:

1.	International Financing Institutions (IFIs), Multilateral and Bilateral Donors	The Asian Development Bank (ADB) The World Bank (WB) Global Environment Facility (GEF) United States Agency for International Development (USAID) Pakistan Chapter, USA
2.	Government/Public Sector Entities	Public Works Authority (ASHGHAL), Qatar Ministry of Water and Power, Pakistan Ministry of Petroleum and Natural Resources, Pakistan Pakistan Electric Power Company (PEPCO), Pakistan Private Power and Infrastructure Board (PPIB), Pakistan The Oil and Gas Regulatory Authority (OGRA), Pakistan National Transmission and Despatch Company (NTDC), Pakistan The Pakistan Commissioner for Indus Waters (PCIW), Pakistan Interstate Gas Systems Limited (ISGSL), Pakistan Allama Iqbal Open University (AIOU), Islamabad, Pakistan
3.	International Consulting and Development Organizations	Tetra Tech, Inc., USA Advanced Engineering Associates International (AEAI), Inc., USA International Resource Group (IRG), Inc., USA PA Consulting Government Services, UK

		PricewaterhouseCoopers LLP, London, UK ABN Amro Bank, The Netherlands Tethyan Copper Company, Australia Environmental Resource Management (ERM), Korea
4.	Private Consulting and Development Organizations	Saudi Aramco, Kingdom of Saudi Arabia Qatar Petroleum, Qatar Parsons International, Qatar Hagler Bailly Pakistan Limited, Pakistan Engro Chemicals Pakistan Limited, Pakistan Hub Power Company, Pakistan AES Lalpir Pakistan & AES PakGen Pakistan TNB Liberty Power Limited, Pakistan DHA Cogen Limited, Pakistan JS Private Equity, Pakistan All Pakistan Textile Mills Association, Pakistan OMV (Pakistan) Exploration GmbH, Pakistan MOL Pakistan Oil and Gas Company, BV, Pakistan BP Pakistan Exploration & Production, Pakistan BHP Billiton Petroleum, Australia Petronas Carigali Pakistan, Pakistan Premier-Kufpec Pakistan BV, Pakistan Al-Tuwairqi Steel Mills Limited, Pakistan AM Power Company Limited, Pakistan Pakistan PTA Private Limited, Pakistan Pakistan GasPort Limited, Associated Group, Pakistan

1.4 E2 CONSULTING CONTACT DETAILS

Manzar Naeem Qurshi
Chief Executive

E2 CONSULTING
Office Phone: +92 51 486 2481-2
Cell: +92 300 856 0712 (Whatsapp, Viber)
Skype: manzar.qureshi

mqureshi@E2Consulting.com.pk, Info@E2Consulting.com.pk
www.E2Consulting.com.pk

2. KEY RESOURCES

2.1 MANZAR NAEEM QURESHI

Energy/Power Sector Expert

Mr. Qureshi has over 26 years of professional experience as a management consultant in power, energy and infrastructure sectors related to engineering, project management, project development and utility operations in public and private sector, as well as working with multilateral and bilateral donor agencies and financial institutions. He demonstrated strong knowledge, leadership and coordination skills in integrating engineering, commercial, financial, economic, regulatory and legal inputs for formulating and advising on energy policies, market and institutional reforms and development of water, power and energy infrastructure projects. His expertise covers energy systems and resource planning, reliability assessment, corporate and business management, strategic and business planning, regulatory affairs, asset management, feasibility analysis, and project management and implementation services. Mr Qureshi has made principal contributions in a number of assignments on strategic and master planning, power and energy system operations, performance analysis and monitoring, regulatory affairs including licencing and utility tariffs (upstream and downstream), economic and financial analysis/modeling, and improvement of utility performance in power, oil and gas sectors. He has thorough understanding of the energy efficiency, environmental impacts and environmental mitigation measures associated with development and operation of infrastructure projects.

Mr Qureshi is registered with ADB as an independent consultant (CMS # **024036).** He is familiar with the Asian Development Bank (ADB) and the World Bank guidelines on project economic and financial analysis, financial management assessment of project execution entities, and project preparation/financing documentation. He is also well versed with the Intergovernmental Panel on Climate Change (IPCC) guidelines for calculation of greenhouse gas emissions from industrial and power plants and project preparation methodologies under Clean Development Mechanism (CDM).

He carries strong interpersonal skills and experience of working in multicultural environment. His skills and expertise span across following diverse areas:

Experience Profile

Strong Technical and Analytical Skills for Planning and Management of Power/Energy Sector and Utilities

Mr Qureshi possesses strong management, technical and analytical skills in advising and recommending measures for improving performance of utilities and sector management:

Policy, Market Reforms, Institutional Development and Regulatory Analysis: Research, analysis and advice to government, donor agencies and private sector clients on power and energy policies and regulatory affairs in the power and energy sectors including; energy market reforms; market restructuring, competition, privatization, merger/acquisition of energy infrastructure projects; institutional development and capacity building; utility licencing; energy pricing; utility/consumer tariffs; utility performance standards; preparation and follow-up of

tariff petitions and interventions during the regulatory hearings on electricity and natural gas consumer tariff; and cost of service of power and energy products.

Energy Pricing, Utility Tariffs, Economic & Financial Analysis: Utility tariffs (generation, transmission, distribution, consumer prices); integrated operational and financial modeling for power and energy projects/sectors; production cost simulations for power, oil and gas commodities; costing analysis of projects/utility operations; power and energy products/commodity pricing and value chain analysis; cost of service analysis of power and energy products; economic evaluation of energy commodities, projects and utility plans; financial evaluation of projects and utility infrastructure development plans.

Corporate, Commercial and Contract Management: IPP/Energy purchase **c**ontract analysis; risk coverage, Dispute resolution; Power and energy infrastructure asset management; corporate business planning; technical and commercial negotiation support to government and utilities on cross border power and energy trade projects; technical due diligence of generation; transmission and distribution projects; business operations design and implementation, preparation of operating procedures and guidelines; feasibility analysis of renewable and alternative energy projects; gas and fuel supply option analysis; and information services; program design and management for implementation of energy efficiency and conservation projects/measures; technical and financial advisory services for energy infrastructure projects.

Power and Energy System Planning: Power system engineering and master planning; production cost simulation modeling and analysis; strategic planning for energy resource procurement; consumer demand analysis; electricity demand forecasting; evaluation of infrastructure projects such as hydel and thermal power generation projects; renewable energy projects; economic least-cost generation expansion planning; generation reserve margin assessment, marginal cost studies; integrated resource planning; petroleum and energy demand and supply forecasts; Power/energy balances; Power plant dispatch simulations; gas transmission system hydraulic analysis; energy management; energy efficiency and conservation planning; Demand Side Management (DSM); Smart Grid planning and implementation; energy transformation.

Technical and Engineering Analysis: Feasibility analysis of power, renewable energy, clean energy and energy infrastructure projects; Front-end Engineering and Design (FEED) for infrastructure projects; design and engineering of power projects; bid evaluation; performance audit/evaluation of utilities and plants; reliability assessment of power systems; operational & maintenance (O&M) analysis; technical audit of generation and distribution sector; energy efficiency and conservation assessment and measures; energy transformation; comparative assessment of renewable and alternative energy options.

Environment, Clean Energy and Climate Change Programs: Environmental and emissions assessments from power and industrial facilities; EIA and ESIA of energy infrastructure projects; Clean energy and renewable energy initiatives, assessment, policy formulation, and planning; participation in climate change programs and project development under Clean Development Mechanism (CDM).

Corporate and Project Management Skills

In senior managerial positions, Mr Qureshi has been responsible for business development, capacity building, corporate management, project management and execution services, and quality assurance in design and construction projects in the power, oil, and gas sector. Consulting support was provided to a wide range of clients including various ministries of the government of Pakistan, multilateral agencies and bilateral donor agencies and IFIs, multinational corporate companies, and private sector entrepreneur.

Multi-Disciplinary Knowledge Supporting Government and Donor Agencies

Mr Qureshi has played key role in the studies and carried out extensive techno-commercial analysis for decision makers such as government and donor agencies helping the country in introducing corporate good governance, improving the operational efficiencies through introduction of best practices and steering the sustainable growth in energy sector. These studies pertain to areas of market reforms, restructuring, privatization, deregulation, liberalization and competition, policy and regulatory affairs, tariffs, institutional development, institutional capacity assessment, institutional capacity building, contract analysis both for in-country and cross-border power and energy trade.

Cross-sectoral Exposure in Energy and Environment Sectors

Mr Qureshi has extensive cross-sectoral exposure of providing technical, management, and commercial advisory services in the power, oil and gas, renewable and alternative energy, environmental and climate change sectors.

Positions Held

- Chief Executive, E2 Consultants, Islamabad, July 2016 to date
- Principal Engineer/Project Manager, PARSONS, Doha, Qatar: August 2014 – June 2016
- Divisional Manager, Energy Programs, Hagler Bailly Pakistan: 2003 - 2014 (lead energy practice of the company for 11 years)
- Managing Partner and Director, Enerman: 1998-2003 (5 years)
- Junior Engineer/Assistant Director, Planning (Power), Water and Power Development Authority (WAPDA): 1991-1998 (8 years)

Education

B.Sc. Electrical Engineering from University of Engineering & Technology, Lahore, Pakistan in 1990

M.Sc. Electrical Engineering from University of Engineering & Technology, Lahore, Pakistan in 2001

Additional Trainings

- Project Management and Environment, Safety, Health and Risk (ESHARP) Management certified by PARSONS- 2016
- Utility Economic & Financial Analysis Workshop - NPP Project, 1992-96
- Engineering Economics Course - NPP Project, 1992-96
- BC Hydro Utility Attachment, Vancouver, CANADA - NPP Project, 1992-96
- Six-month technical training in the areas of distribution, generation, and transmission at WAPDA Engineering Academy, Faisalabad, Pakistan, 1992
- Six-month training in Basic Management at WAPDA Academy, Tarbela, Pakistan, 1991
- Power Planning and Project Approval Process - NPP Project, 1992-96
- Demand Side Management Methods - NPP Project, 1992-96

Honors and Professional Affiliations

Professional Engineer (PE): Member of the Pakistan Engineering Council (PEC Reg. #: Elect-8587), Pakistan

Major Clients Served

1.	International Financing Institutions (IFIs), Multilateral and Bilateral Donors	The Asian Development Bank (ADB)
		The World Bank (WB)
		Global Environment Facility (GEF)
		United States Agency for International Development (USAID) Pakistan Chapter, USA
2.	Government/Public Sector Entities	Public Works Authority (ASHGHAL), Qatar
		Ministry of Water and Power, Pakistan
		Ministry of Petroleum and Natural Resources, Pakistan
		Pakistan Electric Power Company (PEPCO), Pakistan
		Private Power and Infrastructure Board (PPIB), Pakistan
		The Oil and Gas Regulatory Authority (OGRA), Pakistan
		The Pakistan Commissioner for Indus Waters (PCIW), Pakistan
		National Transmission and Despatch Company, Pakistan
		Interstate Gas Systems Limited (ISGSL), Pakistan
3.	International Consulting and Development Organizations	Tetra Tech, Inc., USA
		Advanced Engineering Associates International (AEAI), Inc., USA
		International Resource Group (IRG), Inc., USA
		PA Consulting Government Services, UK
		PricewaterhouseCoopers LLP, London, UK
		ABN Amro Bank, The Netherlands
		Tethyan Copper Company, Australia
		Environmental Resource Management (ERM), Korea
4.	Private Consulting and Development Organizations	Saudi Aramco, Kingdom of Saudi Arabia
		Qatar Petroleum, Qatar
		Engro Chemicals Pakistan Limited, Pakistan
		Hub Power Company, Pakistan
		AES Lalpir Pakistan & AES PakGen Pakistan
		TNB Liberty Power Limited, Pakistan
		DHA Cogen Limited, Pakistan
		JS Private Equity, Pakistan
		All Pakistan Textile Mills Association, Pakistan

OMV (Pakistan) Exploration GmbH, Pakistan

MOL Pakistan Oil and Gas Company, BV

BP Pakistan Exploration & Production

BHP Billiton Petroleum, Australia

Petronas Carigali Pakistan

Premier-Kufpec Pakistan BV

Al-Tuwairqi Steel Mills Limited, Pakistan

AM Power Company Limited, Pakistan

Pakistan PTA Private Limited, Pakistan

Pakistan GasPort Limited, Associated Group, Pakistan

Country Experience

Pakistan, Qatar

Computer Experience

Mr Qureshi is proficient in the use of a variety of computer applications, including MS Office programs and has developed Excel spreadsheet based models for power and energy demand forecasts, power and energy balance, power despatch model, tariff models for IPPs, energy production cost simulation models, cost of service and consumer pricing models for electricity and gas sectors, and a number of economic and financial models to evaluate investments in infrastructure projects.

Languages

Mr Qureshi has excellent speaking and writing skills in English and Urdu, and is fluent in Punjabi as well.

Personal Information

- Date of Birth: March 14, 1966
- Married with three children
- Cell: +92 0300 856 0712
- Phone: +92 51 44 36163
- Skype: manzar.qureshi
- Residential Address: House 316, Street 101, I-8/4, Islamabad, Pakistan
- E2 CONSULTING, Energy and Environment Management Consultants,
  Flat 9, First Floor, VIP Plaza, I-8 Markaz, Islamabad, 44000, Pakistan
  Phone: +92 51 4862481-2
  Email: mqureshi@E2Consulting.com.pk
  Web: www.E2Consulting.com.pk

References

Available on request

Experience Detail

Mr Qureshi has over 26 years of professional experience of Pakistan's energy sector that includes over 18 years of working as a management consultant in leading roles. The detail of Mr Qureshi's professional experience by employer is attached hereunder.

E2 Consulting, Islamabad, Pakistan: June 2016-Present

Mr Qureshi is the Chief Executive officer of the company aimed to provide energy and environment management consultancy services to client. In his capacity as a power and energy sector specialist dealing with a wide range of technical, commercial, economic and financial management services to its clients.

- Mari Petroleum Company Limited (MPCL), one of the largest petroleum exploration and production companies in Pakistan, was working on developing a gas-fired combined cycle gas turbine (CCGT) power project as an IPP[1] on Build, Own, and Operate (BOO) basis to be located near Dharki (Sindh) or Sadiqabad (Punjab) in Pakistan. The project was planned to be fueled with low calorific value gas (about 460-480 BTU[2]/SCF) to be supplied from MPCL's Lower Goru B Reservoir. Mr Qureshi carried out the independent review and technical evaluation of four bids received for owner's engineer services to carryout project's pre-feasibility study, feasibility study, project development up to financial close, design review and project management services and construction management, supervision and warranty period services. Mari Petroleum Company Limited (MPCL), Pakistan, 2017.
- National Transmission and Despatch Company (NTDC) conducted System Impact Assessment (SIA) for evacuation of power from various hydroelectric power projects (HPP) along the Indus River in the Kohistan Area of Khyber Pakhtunkhwa (5400 MW Dasu HPP, 496 MW Lower Spatgah, 665 MW Lower Palas Valley, 2300 MW Patan and 4000 MW Thakot) on Indus River a total cumulative capacity of 12861 MW. Transmission lines for power evacuation from Dasu and other HPPs had severe corridor constraints prompting detailed techno-economic comparison for selection of the optimal option. The three options considered for implementation included 500 kV and 765 kV HVAC and ±600 KV HVDC. Mr Qureshi carried out the economic comparison of the options using the international best practice methodologies for National Transmission and Despatch Company (NTDC), Pakistan, 2017.
- In order to improve Pakistan's power transmission infrastructure and management, Asian Development Bank (ADB) funded projects worth US$ 1.0 billion. The objective of the proposed multitranche financing facility (MFF) is to improve Pakistan's power transmission infrastructure and management. To achieve this objective, the investment program consists of staged physical investments in the high-voltage transmission system, including the rehabilitation, augmentation and expansion of transmission lines, substations and supporting infrastructure under a multi tranche financing facility (MFF), the Power Transmission Enhancement Investment Program II for the National Transmission and Despatch Company (NTDC). The physical investments aimed at increasing high-voltage transmission capacity to meet growing demand, improve transmission efficiency and energy security, and evacuate additional sources of power through the rehabilitation, augmentation and expansion of transmission lines, substations and supporting infrastructure. Nonphysical investments focused on

[1] Independent Power Producer
[2] British Thermal Unit

increasing the financial management, regulatory relations and procurement capacity of the transmission system of NTDC. The nonphysical investments also catered to increase in institutional efficiency, cost recovery, competition, transparency and good governance within the sector. Mr Qureshi provided power sector overview, financial management assessment of the Executing Agency (NTDC), feasibility study and the economic and financial analysis of the sub-projects and contributed relevant sections of the ADB RRP report for National Transmission and Despatch Company (NTDC), Pakistan, 2017.

Parsons International Limited, Doha, Qatar: August 2014-June 2016

Mr Manzar Naeem Qureshi is Principal Engineer/Project Manager, in the Parsons Environment & Infrastructure (PE&I) Division. He was responsible to manage the projects and business development for the newly formed oil and gas practice of the company in Qatar. Mr Qureshi managed and contributed to the following key Oil and Gas sector projects:

- Contributed as the project QA/QC specialist in the core team for construction supervision and engineer's representative on a QR 900 million infrastructure development project 'Refurbishing & Upgrading Works for Various Pumping Stations - Phase 6, 7 & 8'. In addition, supervised and monitored project closeout activities for contractors and Ashghal (executing agency). Public Works Authority, Qatar, 2015-16
- Under the International Convention for the Prevention of Pollution from Ships, also known as MARPOL 73/78, Qatar is planning to implement adequate reception facilities for Annex-I (oil) wastes generated from ships arriving at ports. Qatar Petroleum, the government's designated agency to implement the MARPOL project, has engaged PARSONS to develop a Front-End-Engineering Design (FEED) for this facility that will, in turn, be implemented through an Engineering- Procurement-Installation and Commissioning (EPIC) contract. Mr Qureshi managed a multidisciplinary team of engineers and other support staff working on the MARPOL project. While managing the project activities, his roles included coordinating between various project discipline leads, interfaces and stakeholders; monitoring of project execution plan and ensuring timely completion of all activities; interaction with QP management team on project deliverables and associated problem resolutions, preparing progress reports and follow-up on the QP comments and directions on project submittals. Qatar Petroleum, Qatar. 2014

Hagler Bailly Pakistan, Islamabad: October 2003- August 2014

Mr Manzar Naeem Qureshi was Divisional Manager, Energy Programs at Hagler Bailly Pakistan overseeing the power, oil and gas, and renewable energy practice of the company. As head of the energy division, he advised government, IFIs, multilateral and bilateral donor agencies, and corporate clients both from public and private sector by helping them in decisions making processes regarding policies, reforms, governance, regulatory, institutional reorganization and capacity building, investment and business development options, long term strategic and business planning, economic and financial assessment, and project feasibility analysis.
Mr Qureshi supervised and contributed in the following key power and energy sector projects:

- Mr Qureshi supervised an independent evaluation of the Load Data Improvement (LDI) Project funded by the United States Agency for International Development (USAID) under the five-year long $230 million Pakistan Power Distribution program. The LDI project entailed the installation of automatic meter reading (AMR) devices on all 132 kV and 11 kV power lines in the country to monitor, in near-real time, load and power

quality data on all distribution feeders to improve the management of power dispatch, network dynamics, power quality, service delivery, and reduce the incidence of forced outages. Mr Qureshj provided a comprehensive quantitative and qualitative technical, financial and economic assessment of the direct and indirect benefits accruing from the LDI facility on electricity supply to end consumers, utility operations and financial performance, power sector reform process, and the national economy. The significance and role that LDI-enabled actions could play in improving power sector policies, management, planning and investment decisions were also identified. The report was presented by USAID to the Ministry of Water and Power, Government of Pakistan as well as the US Congress. International Resources Group (IRG), Pakistan and United States Agency for International Development (USAID), Islamabad, 2014.

- The Government of Pakistan, with technical and financial assistance from the Asian Development Bank (ADB) under its Pakistan Power Distribution Enhancement Investment Program (PDEIP) multitranche financing facility (MFF), undertook to implement Advanced Metering Infrastructure (AMI) in two distribution companies (DISCOs) serving the Lahore and Islamabad service territories, respectively to improve the financial viability and reliability of the power distribution system in Pakistan. The proposed investment program's objective was to introduce AMI and gradually expand it to cover all DISCOs in Pakistan, as a necessary precursor to implementing smart grids in the country. Mr Qureshi carried out economic and financial due diligence and prepared PC-I document for government's approvals. The project's aims included reducing distribution losses and improving system performance metrics and revenue collection, improving load control and network management, automated recording of consumption data and demand profiles, and modernizing the existing electricity metering and billing system. **Project financing was approved and implementation is now underway at both LESCO and IESCO.** Asian Development Bank, Manila, 2014.
- Mr Qureshi supervised a study on the integration of liquefied natural gas (LNG) imports into the natural gas transmission networks of Sui Southern Gas Company Limited (SSGCL) and Sui Northern Gas Pipelines Limited (SNGPL). The study consisted of a hydraulic analysis of the SSGCL and SNGPL gas transmission networks and assessed the need for network augmentation. Mr Qureshi prepared estimates for capital costs for necessary transmission systems augmentation to absorb 800 to 1,000 MMSCFD of regasified LNG injected into the gas network at Port Qasim, Karachi. Finally, the study evaluated alternatives for maintaining the Wobbe Index in line with natural gas network operating specifications. The Associated Group, 2014.
- In association with Tetra Tech Inc. of USA, Mr Qureshi led a three-day training workshop on Utility Regulations for Saudi Aramco. Saudi Aramco the state-owned oil company of the Kingdom of Saudi Arabia, is a fully integrated, global petroleum and chemicals enterprise and has emerged a world leader in hydrocarbons exploration, production, refining, distribution, shipping and marketing. The workshop was attended by 24 officials from different management disciplines of the Company. The workshop aimed at introducing the power sector reforms and focused on developing understanding of the objectives, scope and implementation procedures of electricity regulations in the newly established regulatory regime through setting Electricity and Cogeneration Regulatory Authority (ACRA) by the Kingdom. Mr Qureshi delivered presentation on policies, strategies, and operations, institutional structure of power sector; traditional utility structures; role of regulator; basics of utility regulation; power market models; tariff-setting principles and methodology; transmission use of service charge regulations. Saudi Aramco, Kingdom of Saudi Aranbia, 2013.

- On the request of government of Pakistan, USAID funded a study through Advanced Engineering Associates International (AEAI), USA, to develop an integrated power sector financial model to analyzing the intended effects of various policy reform options and to enable government to formulate policies that are quickly implementable; have high-impact, and bring positive benefits to power sector, government and consumers of electricity in Pakistan. The analytical model was designed to provide an assessment to: 1) quantify benefits of potential actions and corrective measures; 2) provide for multiple scenario forecasting; 3) allow comparative assessment of policy options; 4) provide indicators of tangible positive impacts on the energy sector, the economy, and on society; 5) provide inputs for other modeling tools; and 6) provide clear results for use by policy reform decision makers to eliminate the long standing power sector deficits and resulting circular debt that was estimated to reach the level of US Dollar 6 billion by end of FY2013. Advanced Engineering Associates International (AEAI), Inc., 2013.
- TNB Liberty Power Limited (TNB LPL), an independent power producer (IPP) owns and operates a gas fired 235 MW combined cycle thermal power generation plant set up under the 1994 Power Policy in Pakistan. TNB Liberty Power has been incurring substantial financial losses on account of a mismatch in indexation of fuel prices specified in its Gas Sales Agreement (GSA) with SNGPL and Power Purchase Agreement (PPA) with WAPDA Private Power Organization (WPPO) since its commissioning. Mr Qureshi carried out an independent audit of TNB Liberty Power Limited to identify and resolve issues relating to mismatch between GSA and PPA fuel prices. The audit evaluated the financial impact of fuel price mismatch (FPM) on the annual profits of TNB LPL, identified options for removal of FPM, assess the impacts of removal of FPM on various stakeholders due to variations in gas prices or power purchase price and recommended an optimum option based on financial, legal and regulatory considerations. The Report was presented to Ministries of Water and Power, Petroleum and Natural Resources, Private Power and Infrastructure Board, and WPPO for resolution of the FPM related issues. **The issue was resolved in the light of recommendation made in the audit report.** TNB Liberty Power Limited, 2013.
- The ADB was the lead financier to raise debt of nearly US$ 2 billion for the new 2x600 MW coal fired units at Jamshoro Power Company Limited (JPCL) to be developed with total capital investment of UD$2.7 billion. Mr Qureshi worked out the power purchase price for the power purchaser, 'Central Power Purchasing Agency', for the new 2x600 MW coal fired units at JPCL in line with NEPRA guidelines and tariff determination procedures for coal fired plants in the country. Mr Qureshi also carried out the economic and financial analysis of the coal fired project and financial management assessment of the project's executing agency (JPCL) for the purpose of approval of financing from the ADB Board of Directors and for the PC-I of the project for government approvals. **The project's PC-I and financing are now approved and the project is under implementation.** Asian Development Bank, Manila, 2013.
- The ADB carried out an Energy Sector Assessment for Pakistan as part of the due diligence for the Pakistan Power Sector Rehabilitation Project (PSRP). The scope of services included a review of existing sector studies; identifying and filling in gaps in available information; analyzing government sector development policies, strategies, regulations, and investment plans; assessing energy markets and economics; diagnosing key sector development issues; and proposing strategy and action guidelines for initiating sustainable, long-term development of the country's energy sector. The analysis was based on recommendations contained in the Friends of Democratic Pakistan's Energy Task Force Report and the Energy Efficiency Road Map developed

under the ADB's Pakistan Energy Efficiency Investment Program multi-tranche financing facility (MFF). As part of the assessment, Mr Qureshi contributed to the state of energy sector including a situation review analysis, government policies and status of power sector reforms, governance and financial management issues confronting the sector, and outlining the impact of IMF conditionalities on performance of power sector. Asian Development Bank, Manila, 2012-13.

- Under a technical assistance grant to the Government of Pakistan, the World Bank hired the consortium of Tetra Tech, Inc. and Hagler Bailly Pakistan to conduct a prefeasibility study to examine options for the import of 500 MW of electricity to the Lahore region in Pakistan by setting up a transmission interconnection between Pakistan and India's power systems. The study aimed to assess the preliminary feasibility of available technical options and to identify strategic issues and/or important risks associated with the proposed interconnection and electricity trade. Mr Qureshi carried out the key tasks of the study that include: the supply demand assessment of the two countries for the projected exportable surplus on Indian side and power shortages on Pakistan side to determine the optimum electricity trade volume between the two countries; identification of technical options that include HVDC Back-to-Back for asynchronous operation of the two grids; selection of two best ranked options based on economic, financial, commercial and environmental assessments; review of power market structure and legal framework for electricity trading between the two countries; review of trading models in the region and design of a suitable trading model for India-Pakistan electricity trade. The World Bank Permanent Mission, Islamabad, 2012-2013.
- The Pakistan Commissioner for Indus Waters (PCIW) filed an arbitration case at the Court of Arbitration constituted in accordance with the Indus Waters Treaty 1960 by the International Court of Arbitration at Hague, the Netherlands, against the construction of 330 MW Kishenganga Hydroelectric Project (KHEP) by India on Kishenganga/Neelum river in Indian-administered Kashmir. Pakistan filed the case on the premise that (1) India's construction of KHEP will place a resource essential to Pakistan's existence under the control of India and the integrity of the Indus Water Treaty regime will be undermined, and (2) the timing, volume and location of deliveries of water into Pakistan from tributaries of the Indus are certain to be affected by KEHP, leading to substantial adverse impacts upon Pakistan's Neelum-Jhelum Hydroelectric Project (N-JHEP) which is under construction at Nauseri, downstream of the KHEP. Mr Qureshi calculated the economic impact of the projected reduction in energy generation from the under-construction N-JHEP resulting from the water diverted by KHEP on the cost of generation and increase in electricity tariff for consumers in Pakistan. The impact assessment was carried out through a detailed dispatch analysis of the generation system in Pakistan and took in to account the seasonality of electricity demand, hydroelectric and thermal plant capabilities, thermal efficiencies, plant availability, and prices of alternative fuel resources. Mr Qureshi attended the arbitration hearings at the International Court of Arbitration, Hague, the Netherlands, from August 16-27, 2012 to assist the PCIW team during the hearings. The Pakistan Commissioner for Indus Waters, 2012.
- Afghanistan, the Kyrgyz Republic, Pakistan, and Tajikistan have been pursuing the development of electricity trading arrangements and the establishment of a Central Asia-South Asia Regional Electricity Market (CASAREM). The proposed cross border transmission line project will be a dedicated link essentially aimed at supplying surplus power of around 1000-1300 MW from the Kyrgyz Republic and Tajikistan to Pakistan via Afghanistan. The CASA-1000 Project is estimated to cost $1 billion and consist of 750

Km long 500 kV HVDC and HVAC Transmission lines and 500 kV AC/DC and DC/AC converter/inverter stations. Under the USAID South Asia Regional Initiative for Energy (USAID Sari/Energy) provided technical assistance to Government of Pakistan to help GoP negotiate the project parameters and agreements with other participating countries and stakeholders. As the commercial advisor and member of Pakistan Working Group, Mr Qureshi is providing advice on energy import prices that include transmission charges, transit fees and power purchase price, project structure, delivery point(s), and project agreements for the cross border energy transaction. He participated in the Joint Country Working Group (JCWP) Meetings held in Dushanbe in November 2011, Almaty in January and April 2012, and Dubai in May 2021 as well as monthly JCWG meetings held through video conference from Pakistan until September 2012 in connection with preparatory activities for CASA-1000 Project. In earlier phases, the assignment included review and preparation of comments on the Project's feasibility study for the; the project structure agreement term sheets including Concession Agreement Termsheet, Power Purchase Agreement Termsheet, Facilities Lease Termsheet, Transmission Services Agreement Termsheet, and Account Bank Agreement Termsheet; IFC Infraventure Joint Development Agreement; project risk matrix; review of project cost estimates and transmission tariff; prepared comments and briefing papers and reports for MoWP, attended CASA-1000 meetings, provided coordination services with other team members and Pakistan counterparts, and capacity building of counterpart entities. **The project agreements are now signed and project is fast moving towards implementation phase**. Tetra Tech Inc. USA (USAID SARI/Energy), 2009-12.

- On the request of government of Pakistan, USAID funded a study through Advanced Engineering Associates International (AEAI), USA, to assess the financial and economic value of natural gas for specific sectors of the Pakistani economy. Major objectives of the study were to optimally allocate and price this important and increasingly scarce fuel without unnecessarily compromising the country's economic development identify and prioritize sectors where gas supplies could generate the highest economic returns for the country. Mr Qureshi lead an assessment of the financial and economic value of natural gas in the power, industrial, fertilizer and transport sectors and contributed in assessment of the same in the residential and commercial sectors. The study helped the Government in formulating policies to help manage existing gas shortages and provided bases for a review of the existing gas allocation policy, and for rationalizing the prices of gas through prudent fiscal and management measures. Advanced Engineering Associates International (AEAI), Inc., 2010-2011

- Advanced Engineering Associates International (AEAI), Inc., carried out technical performance and energy audits of power plants operated by Pakistan's state-owned generating companies (GENCOs) to assess the present operating conditions and efficiencies of the generation units. The plants included the 850 MW Jamshoro, 1,655 MW Guddu, and 1,350 MW Muzaffargarh thermal power stations in central Pakistan. Mr Qureshi supervised the study, which included onsite measurements of plant operating parameters at different load factors as well as laboratory analysis of the heavy fuel oil used, to determine baseline conditions and establish existing performance benchmarks for evaluating actual efficiency gains and operational improvements achieved after the subsequent implementation of a planned GENCO Repair and Maintenance Plan to be funded under Fixed Amount Reimbursement Agreements (FARAs) by the United States Agency for International Development (USAID) for the Government of Pakistan. The audit study assessed current output capabilities, heat rates, and thermal efficiencies, and annual availability or plant factor of each power

station's generation units. The report also highlighted major causes of performance deterioration at these plants and assessed the potential for using high-viscosity fuel oil to reduce the plants' generation costs. Advanced Engineering Associates International (AEAI), Inc., 2010-2011

- The ADB conducted a third-party audit of the underlying basis and prudency of procurement terms and procedures for rental power plants (RPPs) being considered to meet short-term power generation deficits on Pakistan's national grid on the request of GoP. As senior energy sector specialist, Mr Qureshi was engaged by the ADB to carry out the requisite study and was responsible for the analysis and preparation of the ADB report, to evaluate and recommend options for increasing power supply in the short-term (18 months), including rental power and rehabilitation of existing power plants, to assist the government in its short-term power sector planning. The report reviewed the short-term demand and supply gap, power plant utilization and affordability of customers through increase in customer tariffs under various supply options and power demand growth scenarios. The study also reviewed the modalities and procedures followed in the procurement and contracting of rental power plants in terms of financial prudence, transparency, and compliance with relevant international best practice. Asian Development Bank Manila, 2009-10

- In early 2009, the Government of Pakistan initiated anti-insurgency operations in parts of militancy-affected areas of Federally Administered Tribal Areas (FATA) and Khyber-Pakhtunkhwa (KP) province in the northwest of the country. This resulted in significant internal migration of communities from the embattled areas. The government formally requested its development partners, i.e., the World Bank, the Asian Development Bank (ADB), the United Nations (UN), and European Union (EU), to initiate and lead a 'Post Crisis Needs Assessment (PCNA) of KP and FATA' to help turn the tide in the conflict zone and build upon initial humanitarian and recovery assistance to develop sustainable long-term development and peace in the region. As senior energy sector specialist, Mr Qureshi carried out the detailed PCNA study of the areas' energy requirements. The PCNA included assessment of energy needs, infrastructure, and related income generation and employment opportunities in the short term (6 month), medium term (30 month) and long term (8-10 years). The assessment focused mainly on electricity and natural gas, carrying out due diligence on on-going development plans of energy utilities to determine their adequacy and gaps with respect to energy service levels in the rest of the country. The study also evaluated potential supply options for rural electrification and supply of electricity to remote locations through small-scale renewable energy, such as mini and micro hydro plants and solar photovoltaic systems, to relieve pressure on the national grid. THe study report comprised the energy section of the final PCNA study presented to the Government of Pakistan by the ADB and World Bank. Asian Development Bank Manila, 2010

- As deputy team leader of the consulting consortium led by Mercados EMI of Spain, worked on the establishment and commencement of the Central Power Purchasing agency (CPPA), and formulated the recommendation for the distribution of functions and institutional structure for the various functions involved in the trading and settlement of electricity, including the role of the CPPA and the National Transmission and Dispatch Company (NTDC) and other related entities. The responsibilities also include assessment of financial flows between the power sector entities, revision and finalization of commercial code and standard agreements with the market participants, preparation of trading sector procedures, suggestions for organizational structure and operational guidelines, and initial training to the CPPA staff on trading sector

procedures. As deputy team leader, was also responsible for coordination with government and other stakeholders. **The proposed independent CPPA is now fully functional since 2015**. Asian Development Bank, Manila, 2007-08

- Supervised a Least Cost Generation Expansion Plan for the power sector for the World Bank, Pakistan Resident Mission. The study included the long term assessment of the energy supply and demand balance in the country for electricity, natural gas, petroleum and coal sectors under different scenario options of generation capacity additions, fuel availability and constraints, energy prices, energy imports, and climate change options. The options and scenarios were compared on the bases of NPV, LRMC, and carbon emissions for each case to select the least cost solution for the country. Study also analyzed the impacts of energy bill on the balance of payments and power sector investment to GDP ratio under the alternative scenarios. The World Bank, Pakistan Resident Mission, 2009.
- Under the ADB TA for preparation of Pakistan's Sustainable Energy Efficiency Development (SEED) Program participated in preparation of a comprehensive national program for mainstreaming energy efficiency in all sectors of Pakistan's rapidly growing economy in order to help the nation reduce its energy deficit and improve competitiveness in the global marketplace. He made major contributions in designing of a baseline domestic lighting survey of a total of 3,250 households across the eight Ex-WAPDA DISCOs and KESC to gauge consumer awareness for CFLs and general electricity consumption habits in the country. The survey design was compatible with the CDM Methodology AMS II – J that is designed for similar CFL distribution programs. In addition, contributed to development of CFL distribution program and associated costs for the 8 DISCOs and the technical, economic and financial impact analysis for consumers, DISCOs, government and other stakeholders. Assisted in preparation of procurement specifications. Also supervised preparation PC-I for CFL procurement and distribution by the DISCOs for approval from government. Also prepared subprojects on power plant replacement options for GENCOs, compressor replacement and installation of power generation at decompression facilities and replacement and upgradation program for domestic gas appliances in accordance with ADB standards and guidelines to be financed under the SEED Investment Program under a proposed ADB Multitranche Financing Facility. As part of the Report and Recommendations of the President (RRP) conducted the financial and management assessment of PEPCO, KESC and other implementation agencies. Asian Development Bank, Manila, 2008-2009
- Under a Technical Assistance of the ADB, provided technical support to Sarhad Hydro Development Organization (SHYDO) in evaluation of technical and financial bids received for appointment of the Management Consultants of the three hydro power projects (Daral Khawar-36.6 MW, Renolia-11.5 MW and Machai-2.6 MW) and the SHYDO Office Building in accordance with ADB guidelines and procedures for bids evaluation. The projects were financed under the ADB's multitranche financing facility (MFF) to finance the Renewable Energy Sector Development Investment Program (REDSIP) tranche I. Asian Development Bank, Manila, 2008
- Under a Technical Assistance of the ADB, prepared the ADB project appraisal documents for 36 MW Shigarthang, Skardu and 4 MW Thach, Chilas hydroelectric power projects for approval of financing under the tranche II of the ADB's REDSIP multitranche financing facility. The projects are being executed by the Northern Areas Water and Power Development Department (NAWPD). The appraisal documents were prepared in accordance with the ADB guidelines and standards and included: (i) a financial

management assessment for the executing agency (NAWPD); (ii) the detailed cost estimates (using ADB format) for each project; (iii) a summary financial analysis of each project; and (iv) a summary economic analysis of each project. Asian Development Bank, Manila, 2008.

- Star Hydro Power Ltd (SHP) planned to develop the 150 MW Patrind Hydropower Project, a run-of-the-river hydroelectric plant on Kunhar River in Azad Jammu Kashmir. Environmental Resource Management Korea (ERM) was contracted by Star Hydro Power to provide advisory services for financing of the project under the Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC). Acted as the local focal person for ERM, provided consulting services to ERM and SHP in this regard, including project site evaluation, compilation of relevant power generation data, and assistance in determination of national baseline greenhouse gas emissions, as well as conducted meetings with the Designated National Authority (DNA) and stakeholders' for consultations, as required by CDM. ERM Korea Co. Ltd, 2010.
- Under a Technical Assistance of the ADB's Carbon Market Initiative (CMI), helped ADB assess concepts, emissions baselines, financial viability, additionality, and technical soundness of Clean Development Mechanism (CDM)-eligible projects in Pakistan. The TA was designed to build a pipeline of clean energy projects eligible for the CDM and Bank financing and to enhance corresponding technical capacity of project developers and sponsors in the host countries. The scope included screening of potential clean energy projects from the Bank's Pakistan portfolio and assess their CDM potential; prepare a CDM Assessment Reports (CARs); identify and develop appropriate greenhouse gas (GHG) baseline evaluation and monitoring methodologies; prepare Project Design Documents (PDDs) and other application requirements for submission to the CDM Executive Board, including project concept notes for potential certified emissions reduction (CER) buyers; provide support during the CDM validation process; liaise with relevant government agencies to secure host country approval; and assist in capacity building, as required, of project developers. Asian Development Bank, Manila, 2007-2008.
- Under the Technical Assistance of the ADB helped obtain carbon financing from the Clean Development Mechanism (CDM) under the ADB's Pakistan Renewable Energy Development (RED) Project, which initially consisted of several small hydro schemes in the Punjab and Northwest Frontier provinces identified during ADB's earlier project preparatory technical assistance to the country. Tasks including the identification and development of an appropriate greenhouse gas (GHG) baseline evaluation and monitoring methodology, preparation of a Project Design Document (PDD) and other application requirements for submission to the CDM Executive Board, including a project concept note for potential certified emissions reduction (CER) buyers, support during the CDM validation process, liaising with relevant government agencies to secure host country approval, and capacity building assistance, as required, to the project developers. Asian Development Bank, 2006-2008.
- Supervised a study to develop a long-term assessment of the energy supply and demand balance in the country focusing on identification of areas in which investment opportunities are likely to emerge in the medium term. The study involved updating of the long term energy demand and supply forecasts prepared earlier by HBP to account for changes in energy prices, outlook on economic growth, and revisions in power utility plans for installation of power generation capacity. The study took in to considerations the alternative resource development and demand management scenarios and power

plant dispatch to assess the energy generation and fuel consumption by power plants, and power shortages resulting from utility plans. Impacts on the balance of payments of the country on account of energy imports under alternative scenarios were evaluated. Specific opportunities for investments in the power sector to meet the energy requirements of the country were identified and prioritized. DHA Cogen Limited, 2008

- Conducted a comparative assessment of long-term fuel options for a 362 MW combined cycle power plant for PIE-AMPower Company at Punjab Industrial Estate, Sundar. Options considered included natural gas, high sulfur fuel oil, low sulfur fuel oil, and high speed diesel, which were evaluated on the basis of the delivered prices of fuel, fuel availability, associated infrastructure requirements, and implications of each fuel option on the plant's capital, operational, and environmental costs in order to select the most economical alternative fuel to natural gas. The study analyzed total generation costs for each alternative option and for combinations of natural gas and alternative fuels to recommend the most economical combination for firing the plant, and formed the basis for subsequent tariff negotiations with the regulator based on the selected primary and secondary fuels. AM Power Company Ltd., Lahore, 2008.
- Provided operational support to the office of the Energy Advisor to the Prime Minister, Government of Pakistan under an ADB Technical Assistance. The responsibilities include the formulation and implementation of a medium to long term strategy for Pakistan energy sector. Major tasks undertaken were review of electricity and gas demand and supply analysis conducted by utilities, availability of gas to various sectors of economy, energy sector policy analysis, and coordination with government and other power and energy sector stakeholders for Asian Development Bank, Manila during 2005-2007.
- Conducted a market due diligence study prior to the ownership transaction of the 157 MW Fauji Kabirwala Power Plant set up as an independent power producer (IPP) in Pakistan. The study assessed the electricity sector and power industry structure, electricity demand growth, IPP country experience, relevant legal, regulatory and governance aspects, financial viability of local IPPs, and other issues related to IPP operations and asset management. PA Consulting Government Services, 2007
- Updated the feasibility study for a 14 MW hydel project located at Jing in the AJK. The study focused on the update of the cost estimates for the project, revising the tariff for electricity generation and filing for a Letter of Support (LoS) with the AJK government for Sambu Construction Company, Islamabad, 2007
- Carried out a preliminary viability assessment of a 224 MW combined-cycle gas turbine (CCGT) power project, proposed by Engro Chemical Pakistan and fueled by permeate gas from the Qadirpur gas field operated by the Oil and Gas Development Corporation (OGDC), in central Pakistan. The Scope included the review of the project proposal with respect to marketability of generated power, technology and site selection, availability and cost of fuel, tariffs offered by power purchasers, and the necessary regulatory consents for Premier-Kufpec Pakistan. 2006
- Carried out a power market study to assess the competitive position of the 134 MW Saba Power Company (Pvt.) Ltd. within the Pakistani electricity system in view of the projected power demand and dispatch of its power plant. The study paid special attention to the commercial aspects of the company’s existing tariff with the Water and Power Development Authority (WAPDA) under the company’s long-term Power Purchase Agreement with WAPDA for the ABN Amro Bank, Netherlands, 2005

- Conducted a scoping study for Tethyan Copper Company–an Australian mining firm focused on exploring the gold and copper deposits at Saindak and Reko Diq in Pakistan's Balochistan province– for a captive power plant at their copper extraction site. The assignment included a review of the small plants operating in Pakistan along with their capital and operating cost benchmarks. In addition, it involved an assessment of the options available for supplying power to the client's site from the local power utility, including an assessment of both price and reliability. Additionally, the possibility of importing power from nearby Iran via the existing transmission network was also evaluated. Tethyan Copper Company, 2005
- As part of a consortium led by the Economic Consulting Associates of UK, worked on Institutional Capacity Building of National Transmission and Dispatch Company to facilitate the establishment of a competitive power market in the country. The aim of the project was to review the Government's energy sector policy for power sector restructuring, power system developments, and the functions of the National Transmission and Dispatch Company Limited (NTDC) as per its licence of 31 December 2002, and assist NTDC to fulfill its licence requirements. As local partner in the consortium, he was also responsible for coordination with government and other stakeholders. Asian Development Bank, Manila 2004.
- Conducted Ex-post economic and financial evaluation of the 1,450 MW Ghazi Barotha Hydropower Project (GBHP) on the basis of the actual costs and construction schedule to see whether the investment in the Project as built was consistent with the least-cost generation expansion plan for the WAPDA system and to assess the economic viability of the stand-alone project in terms of economic and financial rates of return and cost-benefit ratio for the World Bank, 2004
- Conducted a brief multi-fuel competitiveness study to evaluate the least-cost power generation options in Pakistan to assess the relative competitiveness of various power generation technology options based on size, technology, fuel, location, and other generic operating characteristics for Engro Chemicals Pakistan Limited, 2004
- In association with Norplan, carried out a performance review of the Northern Area Public Works Department's Hydro Electric Workshop and made recommendations to enhance the overall efficiency and effectiveness of the workshop's operation for the Royal Norwegian Embassy, Islamabad, 2004
- Filed a Review Motion with NEPRA in respect of Small Power Producer's (SPPs) Tariff determination made by NEPRA on behalf of 10 SPPs, 2004.
- Provided consulting support for the submission and processing of the distribution license applications to NEPRA for the distribution facilities of Genertech Pakistan Limited, 2004.
- Supervised the technical and economic analysis of a study to evaluate and recommend measures for the safe transportation of newly discovered crude oil from Tall Block in Pakistan's Northwest Frontier Province (NWFP) to Attock Refinery Limited in Rawalpindi. The study included due diligence on the in-house reviews of short- and long-term safety measures considered by MOL, and assessed possible methods for the transportation of oil, prepared cost estimates for the construction of a new bridge en route at Khushalgarh, and conducted economic and risk analysis of the fuel transportation options studied. MOL Pakistan Oil and Gas Company, BV, 2007-08.

- As part of a PricewaterhouseCoopers led consortium, provided financial advisory services for a large pipeline project for gas supply to the country from Iran. Services included assessment of long-term country demand for natural gas under alternative economic growth scenarios, a range of prices for imported gas, and varying international market price forecasts for crude oil and coal. A sectoral analysis based on elasticity of demand with respect to income and energy prices was carried out, within the constraints of national energy priorities and security considerations for PricewaterhouseCoopers LLP, London, UK. 2005.
- Carried out an economic evaluation of the proposed multi-billion dollar 2000 MMscfd Iran-Pakistan natural gas pipeline. The study took into consideration the investments required for the pipeline and evaluated potential savings resulting from replacement of alternative fuel options for Pakistan for Interstate Gas Systems Limited. 2007.
- In a consulting consortium led by Energy Solutions International, UK, developed a system optimization strategy for the existing gas transmission infrastructure of SNGPL with a focus on improving flow patterns and capacity of existing infrastructure for the transport of gas from fields to demand centers, and reduction of operating costs associated with gas transmission operation. The study included identification of deficiencies in the existing system, and technical and economic analysis of alternative configurations for operation and expansion of the transmission system. Sui Northern Gas Pipeline Limited, 2007-2008.
- Principally conducted a study of current trends in the midstream and downstream oil and gas sector in terms of demand, supply, infrastructure, financial health, and emerging trends in market fundamentals in Pakistan that also included feedback from the industry on the implementation of regulatory regime as well as recommendations to improve the efficiency of the oil and gas industry for the Oil and Gas Regulatory Authority (OGRA), 2004.
- Carried out a study to review the current oil and gas producer pricing structure in Pakistan and recommend appropriate revisions in the pricing formulae for present and future oil and gas production. Prepared the model to undertake the quantitative and economic analyses of the recommended revisions, and their financial impact to all the stakeholders, ie, the government, the production industry, and the consumers for Oil and Gas Development Company Limited (OGDCL), Pakistan, 2005.
- Conducted a study involving a detailed analysis of the capacities of the Sui Northern Gas Pipelines Limited (SNGPL) and the Sui Southern Gas Company (SSGC) transmission networks for the year 2011, taking into consideration the gas demand supply projections, current transmission expansion plans, potential gas imports through LNG and cross country pipelines. The study also included an update on the natural gas demand and supply situation in Pakistan with special emphasis to the demand of gas in power sector that required power demand and supply analysis. The study included the assessment of long term electricity demand forecast, assessment of generation expansion plan under the unconstrained gas availability for power sector and based on realistic hydro and coal based generation capacity development, power plant dispatch analysis under economic dispatch criteria, plant-wise fuel consumption, and total fuel consumption of power sector. OMV (Pakistan) Exploration GmbH, Islamabad, 2005.
- Supervised the study for the commercialization of natural gas and oil/condensate supplies from for the development of the offshore Indus Block M project in Pakistan. The main tasks included supply and demand analysis for gas and condensate in the

country, natural gas infrastructure hydraulic analysis to ascertain infrastructure requirements for transport of gas, identification of tie-in points for injection of gas in the national gas network, marketing options for condensate, movement of oil and condensate to respective markets, and site selection for gas/oil/condensate processing facilities. Eni Pakistan Limited, 2010.

- Carried out a detailed study for the market assessment of gas, liquefied petroleum gas (LPG) and condensate in Pakistan for the Mehar Oil and Gas Field Development Project. The services included supply and demand analysis for gas and condensate, petroleum products, infrastructure requirements for supply of gas and other petroleum products from the Mehar Block to respective markets, gas quality analysis at critical points in the gas delivery system, marketing and transport options for condensate. The study included the assessment of long term electricity demand forecast, assessment of generation expansion plan under the unconstrained gas availability for power sector and based on realistic hydro and coal based generation capacity development, power plant dispatch analysis under economic dispatch criteria, plant-wise fuel consumption, and total fuel consumption of power sector. Petronas Carigali Pakistan, 2007.
- Participated in a technical and commercial due diligence, for acquisition purposes, of a Pakistan-based LPG marketing and distribution company. The scope of the assessment included a commercial evaluation of company's operational assets, LPG supply contracts and quotas, distribution agreements, and inventory and environmental management practices. On the technical side, the due diligence involved evaluation of associated LPG facilities, expansion potential for increased LPG handling, company cost and market pricing structures, and safety and quality assurance procedures used by the company. JS Private Equity, 2007
- Prepared the gas price projections for the period 2007-2015 and negotiation strategy with the Government of Pakistan for a 1.2 MT steel plant located in the Bin Qasim Industrial Area near Karachi. Al-Tuwairqi Steel Mills Limited (TSML), 2007.
- Prepared price forecasts of electricity, natural gas, fuel oil and high-speed diesel (HSD) for large industrial consumers for the period 2007-2020 to help in evaluation of options for a captive power generation facility to be installed at its industrial facility of a large petrochemical facility located in the Bin Qasim Industrial Area near Karachi. In the assessment, natural gas and electricity prices were worked out under different crude oil price scenarios and took into consideration basic commodity prices, transmission and distribution costs, duties, taxes, and other applicable market markups. Pakistan PTA Private Limited, 2007
- Participated in a joint study with BHP Billiton Petroleum to review the status of the IPI and investigate the prospects of the proposed project in the light of prevailing international political and economic climate. The study specifically looked at the positions of various stake holders adopted over the course of IPI project and emerging options for each of them with respect to the project and its alternatives. BHP Billiton Petroleum, Australia, 2006
- Provided assistance in preparation of SOQ for the Hub Power Company Limited (HUBCO)– a prospective bidder for the Sui Southern Gas Company Limited (SSGC)– for submission to the Privatization Commission for prequalification purposes. Hub Power Company Limited, 2006
- Carried out a detailed study to assess natural gas supply, demand, and pricing patterns in the context of proposed imports of gas at a delivery point in southern Pakistan.

Prepared the model to analyze the natural gas supply and demand situation and impact of LNG and imports through trans-country pipeline to bridge the demand supply gap for the country in general and the Karachi market in particular. The analysis also included the impact of imported gas on consumer gas prices and the market value-chain for gas and alternative fuels. The study included the assessment of long term electricity demand forecast, assessment of generation expansion plan under the unconstrained gas availability for power sector and based on realistic hydro and coal based generation capacity development, power plant dispatch analysis under economic dispatch criteria, plant-wise fuel consumption, and total fuel consumption of power sector. British Petroleum (BP) Pakistan Exploration and Production, Inc., 2005

- Provided assistance to the Private Power Infrastructure Board (PPIB—GoP's one-window operation for setting up the new IPPs) in estimating appropriate commitment charges and their detailed application for dedicating gas supplies for proposed power plants while linking the commitment of gas supplies to the foreclosure of the projects. 2005
- Prepared a market update for natural gas sales in the country, including the SSGC and SNGPL utilities, with special emphasis on the commercialization of 200 MMscfd of newly discovered gas in the SSGC system. Long-term gas surplus and shortfall in the country for the period FY2004 to FY2020 was assessed, as well as short-term developments in the SSGC and SNGPL gas markets during FY2005-FY2007. The market situation was analyzed by taking into account the existing commercial obligations of various fields for the supply of gas to the utilities. The study included the assessment of long term electricity demand forecast, assessment of generation expansion plan under the unconstrained gas availability for power sector and based on realistic hydro and coal based generation capacity development, power plant dispatch analysis under economic dispatch criteria, plant-wise fuel consumption, and total fuel consumption of power sector. BP Pakistan Exploration & Production. 2004
- Assisted in a study for formulating a development strategy with private sector involvement in developing Pakistan's natural gas infrastructure. Scope included to conduct long-term gas demand and supply analysis and prepare an infrastructure development plan, including hydraulic analyses of the transmission network, a techno-economic evaluation of the options considered—including the need for strategic gas storage for meeting seasonal demand peaks—and a framework for private sector participation in the development plan for the World Bank. 2003 (support role).
- Carried out a comparative analysis to help the government of Pakistan in the assessment and ranking of the gas import options from three sources on the basis of a uniform and objective criteria, and in developing a negotiation strategy for selection of the most viable and economic option or options for the Ministry of Petroleum and Natural Resources, 2004
- Prepared an excel-based Offshore Production Sharing Model under the rules and regulations outlined in the Petroleum Exploration and Production Policy-2001 for ENI Pakistan, 2004.
- Carried out a detailed gas market analysis for commercialization of 150 Mmscfd additional Zamzama Gas to evaluate the gas supply-demand balance in the SNGPL, SSGC, and independent systems over the FY2004-2020 period. The study included the assessment of long term electricity demand forecast, assessment of generation expansion plan under the unconstrained gas availability for power sector and based on

realistic hydro and coal based generation capacity development, power plant dispatch analysis under economic dispatch criteria, plant-wise fuel consumption, and total fuel consumption of power sector. Premier-Kufpec Pakistan BV, 2004.

- Carried out a detailed gas market analysis for commercialization of 200 Mmscfd Badin II Gas to evaluate the gas supply-demand balance in the SNGPL, SSGC, and independent systems over the FY2004-2020 period. The study included the assessment of long term electricity demand forecast, assessment of generation expansion plan under the unconstrained gas availability for power sector and based on realistic hydro and coal based generation capacity development, power plant dispatch analysis under economic dispatch criteria, plant-wise fuel consumption, and total fuel consumption of power sector. BP Pakistan Exploration & Production Inc, 2004.

Enerman Group of Companies, Islamabad: 1998-2003

Enerman (Pvt.) Limited,

Integrated Solutions Services (Pvt) Limited,

Enerman Group Advisory Services)

As Managing Partner and Director, Mr Qureshi managed and supervised numerous projects in both the electric power and natural gas sectors. He was extensively involved in the regulatory process of both the power and gas sectors and has represented industrial consumers through tariff petitions, intervention in tariff hearings and representation before the power and gas regulatory authorities' licensing process as well as made representations on hearings on rules and regulations. He has also undertaken a large number of assignments on policy advice to public and private sector clients in the areas of power and gas demand forecasting, generation planning, utility tariffs, power system planning, design and engineering, project economic and financial assessment, integrated resource planning, privatization, restructuring and utility regulation in the power and energy sector. Some of the key projects that Mr Qureshi supervised included:

- Ministry of Water and Power and WAPDA Working Group: Primarily responsible for the development of a complete disaggregated financial model of the WAPDA Power Wing operations, broken into one National Transmission and Dispatch Company (NTDC), eight distribution companies, and three generation companies, to assess the financial implications of the Restructuring Plan of WAPDA Power Wing.
- WAPDA Distribution System Reliability: Carried out an extensive study to work out the reliability of the WAPDA distribution system and developed procedures to determine the reliability indices from basis operational units to overall WAPDA distribution system level, as part of his thesis for his master's degree in electrical engineering. M.Sc. Thesis *"Reliability Assessment of Power Distribution System in Pakistan"*, 2001
- Consulting services to HUBCO during Generation License Hearings: Provided consulting support to the Hub Power Company to protect the interests of the Hub Power Company Limited (HUBCO) during the processing of generation license applications by National Electric Power Regulatory Authority. Hub Power Company 2003
- Consulting services to AES Lalpir & AES PakGen Pakistan: Provided consulting support to AES Lalpir and AES Pak Gen to protect the interests of AES Lalpir and AES Pak Gen during the processing of generation license applications by National Electric Power Regulatory Authority. He participated in a conference held by NEPRA to determine the terms and conditions of the National Transmission and Dispatch Company's (NTDC) license and the

rights and obligations of the NTDC in the new restructured regime. AES Pakistan Limited, 2003.

- Consulting services to SPPs for Distribution License: Provided consulting support to four small power producers (SPPs)—Sitara Energy Limited, Sapphire Power Generation Limited, Gulistan Power Generation Limited and Genertech Pakistan Limited—for the submission and processing of their distribution license applications to NEPRA.
- Consulting services to Private Electric Power Producers' Association (proposed) and SPPs: Provided consulting support to the proposed Private Electric Power Producers' Association and 21 individual SPPs in Karachi to protect their interest in Pakistan's new regulatory regime being implemented by NEPRA. This included the preparation, submission, and follow-up of generation license applications as well as representing SPP interests in distribution company license hearings. Private Electric Power Producers' Association, 2000-2003
- Commercialization of Wind Power Potential in Pakistan: Contributed his expertise to conduct a GEF-funded feasibility study to install a 15-MW wind power station at Pasni. Mr Qureshi led the study on financing structure and tariff design for sale to WAPDA in order for the project to be developed by the private sector. His responsibilities included regional power demand and supply analysis and forecasts in Pasni and adjoining areas, a power demand analysis, development of a plant dispatch mechanism among all the power generation facilities in the area in the context of wind power generation and alternative comparison, and an assessment of another allied power infrastructure development plan.
- Power plant expansion and dispatch model: Developed a power plant expansion and dispatch model to estimate the projected gas demand of power plants by working out the capacity additions required to meet the projected demand and plant scheduling for energy generation, along with fuel requirements of thermal power plants on a monthly basis. Enerman Group
- Integrated energy model: Developed an integrated energy model to estimate the projected demand for gas and petroleum products, substitution trend, total energy demand of the country and to assess the import of energy after accounting for indigenous supply of different energy products. Enerman Group
- Provided consulting service to the Nagori Dairy and Cattle Farms Association in the Nagori Area (Karachi) for change of tariff category for the dairy and cattle farms from commercial to agricultural tariff in the KESC (presently K-electric) franchised region: Provided technical, financial, and regulatory services in establishing the justification for change in customer category.
- Consulting services to Pakistan PTA Limited for a Tariff Petition: Provided technical, financial, and regulatory services in developing a cost of service-based tariff petition for Pakistan PTA Limited.
- Support to ICI Pakistan for tariff petition: Prepared, represented, and coordinated ICI Pakistan's 220-kV-based tariff petition and rebate petition for its PTA business filed at NEPRA, based on the cost of service methodology. He developed a cost-of-service model to determine differences in cost between a 220 kV connection and 132-kV service connection in the KESC system. The tariff petition was decided by NEPRA in favor of ICI Pakistan by constituting B5 tariff category in the KESC for consumers connected at 220 kV.

- Interventions on behalf of organizations at NEPRA rate-case hearings: Prepared and presented interventions on behalf of the All Pakistan Textile Mills Association, Overseas Investors, Chamber of Commerce and Industry, at the NEPRA rate case hearing of WAPDA and KESC petitions in 2002. The presentation analyzed the operational and investment efficiencies of the power utilities and their conformity to regulatory standards prescribed by NEPRA.
- Interventions on behalf of ICI at hearing of SNGPL petitions, 2002: Prepared and presented interventions on behalf of ICI Pakistan Limited at the OGRA rate case hearing of SNGPL petitions in 2002. The presentation analyzed the operational and investment efficiencies of the gas utilities and government take from gas revenue.
- Electricity Consumption Survey for Textile Industry: Carried out an industrial survey in collaboration with All Pakistan Textile Mills Association to determine the electricity consumption behavior of the textile industry in Pakistan.
- Pakistan Energy Outlook: As Energy Analyst, Prepared sections of the Enerman Group's subscription-based publication relating to demand and supply of all energy products, including power, gas, fuel oil, and other petroleum products, and financial viability of energy utilities
- Gas Fuel Oil Substitution: Worked with Premier and Shell Pakistan BV to analyze gas-fuel oil substitution possibilities and competitive fuel and stranded assets analysis
- Financial models of WAPDA and KESC: Developed financial models to analyze the financial viability of power utilities under the tariffs options, investment plan, fuel prices, and excess inter-company debt between power utilities and other state-owned enterprises (fuel suppliers).
- Financial analysis of state-owned enterprises in Pakistan: Developed financial models of the SNGPL, the SSGCL, PSO, and other energy utilities as part of and exercise for former Union Texas Pakistan (now BP Pakistan Exploration & Production Inc.) and to analyze the impact of excess inter-company debt between state-owned enterprises in Pakistan. The study also included an analysis of Pakistan's ability to pay to foreign E&P companies by assessing its trade balance and GDP growth.
- Integrated Energy Demand and Supply Model: Developed a demand- supply projection model covering petroleum products and refining capacity as well as other energy sources in Pakistan, accounting for substitution trends and supply constraints to assess the long term growth and trends in the demand and supply of energy products in Pakistan's energy market.
- Energy Resource Development Study for Premier Kufpec Pakistan Limited: Led a study to estimate the size and timing of the development of new gas-fired generation facilities in the country based on Enerman power demand forecasts, and other alternative resource development assumptions. Mr Qureshi also analyzed power and gas infrastructure requirements for the optimal location of the new combined-cycle power plants.
- Dumbar Marketing Study for Premier Kufpec Pakistan (Pvt.) Limited Pakistan: Led a study to assess the generation capacity additions during the 2003-2010 period potentially on natural gas fuel, demarcate locations for power plants in Sindh and Punjab, analyze their interconnection options with the national grid vs. pipeline options at various locations, in relation to the establishment of a 600-MW combined-cycle power house in order to utilize gas from the Dumbar gas field in Sindh.

- Pre-feasibility Study of a 600 Km long, 500 MMSCFD Gas Pipeline from Dadu to Multan for Premier-Shell Pakistan (BV): Worked on and coordinated a pre-feasibility study of a 500 MMCFD capacity, 600 Km long Gas pipeline from Dadu (Sindh) to Multan to supply gas to 5 major power plants in the Multan region. The responsibilities included assessment of gas demand of power plants, gas-fuel oil substitution possibilities and competitive fuel and stranded assets analysis
- Strategic Review of E&P Business Plan, for Premier-Shell Pakistan (BV): Worked on the strategic review designed for optimal development of 7 producing Assets in Pakistan. The analysis included preparation of gas demand forecast for power and other categories, infrastructure analysis, financial analysis of SSGC & SNGPL to test their ability to pay and ability to invest in the system to absorb newly discovered gas.
- Gas Commercialization Study, Pakistan, for Petronas Carigali Pakistan: The assignment included detailed gas demand -supply and infrastructure analysis, gas value chain, and sales option available for the commercialization of gas to be produced from Mubarak Gas Field
- Initial Environmental Examination (IEE) of a thermal power plant: Led an environmental examination of the thermal power plant. The study involved the analysis of liquid effluents, solid waste disposal—including oil sludge and waste lube oil—air emissions, noise, and the safety and health conditions of workers.

Assistant Program Manager, Motorola Pakistan, 1998

At Motorola, Mr Qureshi was responsible for the preparation and implementation of purchase orders placed by Motorola's clients in Pakistan. He was also responsible for various periodic progress reports for the senior management.

Assistant Director, Planning (Power), WAPDA, 1991-1998

Mr Qureshi worked as Assistant Director, in the Planning (Power), Department of the Water and Power Development Authority (WAPDA). He was trained as an economist and financial analyst during the preparation of the National Power Plan project (NPP), funded by the Canadian International Development Agency (CIDA) and executed jointly by M/s Acres International of Canada and the Planning Department of WAPDA. His responsibilities as the principal WAPDA counterpart to the CIDA team included economic and financial analysis of alternative generation and transmission expansion plans and their impact on utility tariffs, cost analysis for hydroelectric and thermal generation and transmission projects, load forecasting, generation and transmission expansion planning, and recommendations on demand-side management. Mr Qureshi also worked on an NPP team to conduct a market survey to determine the cost of energy not served (outage cost) for different categories of WAPDA consumers.

In his seven-year tenure at WAPDA, Mr Qureshi also worked on a series of major assignments, including;

- Privatization plan for a power distribution company (FESCO) in Pakistan: Mr Qureshi was primarily responsible for developing a financial model to determine distribution charge and sale proceeds of the distribution company. The assignment also included technical assessment of assets for investment requirements and potential efficiency gains in utility operations expected to result from privatization.
- National Power Plan Project (NPPP 1992-94): Principal WAPDA Counterpart Economic and Financial Analysis - He worked in the NPPP team to conduct a market survey to determine cost of energy not served (outage cost) for different categories of WAPDA

consumers. Also worked on project screening analysis for least cost development plan and alternative scenarios of generation expansion plans. He assisted the consulting team in performing the analysis in areas of hydro project costing, thermal plant costing, hydro projects: layout, quantities and cost review, power planning economic and financial analysis, creation and maintenance of data base-NPPP, data base documentation and transfer, demand side management methods and designs, load forecasting methods and design.

- National Power Plan Update Project (1994-96): Principally responsible for financial analysis of hydro & thermal projects including cost estimation, power planning, project economic and financial analysis and impacts of different alternatives and assumptions on utility tariffs, utility financial projections, preparation of the update of Economic and Financial Analysis Reports in the FY1995 and FY1996.
- Thermal Power Plant Feasibility Studies (1994-96): Principally responsible for thermal project cost estimates and economic & financial analysis of the six power plants at different sites. Also worked on determination of power purchase tariff for WAPDA from these power plants for base load and peaking conditions if installed in Private Sector.
- 1992 Power Sector Restructuring Plan: Mr Qureshi was part of the WAPDA Working Group formed to study and prepare the comments on this Plan under which the WAPDA power wing was dissolved into 11 independent companies.
- Pakistan's 9th Five Year Development Plan's section pertaining to power sector: As part of WAPDA team, worked on an assignment that included demand forecasts, a generation expansion plan, a paper on demand side management and projections of fuel requirements for thermal power plants.
- Studied and estimated the power demand in the far-flung areas of Balochistan, including those, which are yet to be connected to the national grid. This assignment was carried out in response to a query raised in parliament.
- KAPCO Environmental Impact Assessment Study: Prepared input module to the dispersion model used to simulate gaseous plume for KAPCO. The input module function was to transform the five-year historic meteorological conditions into dispersion model specific input combinations.
- Economic Evaluation and Tariff Analysis of Malakand-III Hydropower Project: A case study to assess the relative economic viability of Malakand-III hydropower project under the two scenarios of development by public or private sectors. The study compared the relative price for sale of electricity generated from power plant to WAPDA under the two development options and prepared recommendations thereon.

In addition to specific projects, Mr Qureshi worked on a large number of studies on techno-economic issues related to energy policies, independent power producers (IPPs), private hydroelectric generation and transmission projects, transmission and distribution losses, fuel use in thermal power stations, thermal emission models for environmental impact assessments of thermal plants and restructuring and privatization options for the power sector.

2.2 ENGR. SAIMA IQBAL

Environmental Expert

Positions Held

- E2 Consulting, Environmental Expert, March 2017 to date
- Lecturer (BPS-18 on Contract Basis), Environmental Design, Allama Iqbal Open University, Islamabad, January 2010 to September 2014
- Assistant Engineer, Environment, Enerman Group, Energy and Environment Management Consultants, Islamabad: 1998-2003

Academic Records

Degree	*Majors*	*Institution*	*Date of Completion*
M.Sc	Environmental Design	Allama Iqbal Open University, Islamabad, Pakistan	2009
B.E.	Civil Engineering	University of Engineering and Technology Lahore, Pakistan	1998

Research Thesis

"Remodeling of a Public Primary School Building in Islamabad: Securing Conducive Environment for Children"

Research Papers Published in Journals

i. An Environmental Assessment of Public Primary Schools of Islamabad and Proposed Remodeling for one Selected School;
Journal of Research in Architecture and Planning (JRAP), NED University of Engineering and Technology

ii. Comparative Study of Energy and Water Conservation in Domestic Gas Geysers;
Research Journal of Pakistan Home Economics Association, 3-P Block II, PECHS, Karachi, 74500, Pakistan; nurture@chek.edu.pk, nurture2000@gmail.com, EISSN 1994-1633

iii. Exploring the Reuse and Recycling of House hold Waste of Islamabad, the Capital city of Pakistan;
Research Journal of Pakistan Home Economics Association, 3-P Block II, PECHS, Karachi, 74500, Pakistan; nurture@chek.edu.pk, nurture2000@gmail.com, EISSN 1994-1633

International Conference Paper

An Environmental Assessment of Public School Buildings in Capital City of Pakistan presented in *Commemorative International Conference of the Occasion of the 4th Cycle Anniversary of*

KMUTT, Sustainable Development to Save the Earth: Technologies and Strategies Vision 2050: (SDSE2008), 11-13 December 2008, Bangkok, Thailand.

Professional Affiliations

- Member of the Pakistan Engineering Council (Civil/27291)

Work Experience

Lecturer, Environmental Design (BPS-18), Department of Home and Health Sciences, Allama Iqbal Open University (AIOU), Islamabad:

January 2010 to September 2014

Engineer Saima Iqbal has been working as lecturer in the Department of Home and Health Sciences, AIOU, Islamabad since January 2010. Her responsibilities include:

i. Administrative support to faculty;

ii. Thesis evaluation (46 No,);

iii. Preparation of student's assignments (6 subjects annually);

iv. Preparation of question papers for examination (6 subjects annually);

v. Marking of answer sheets (6 subjects annually);

vi. Conduct workshops, seminars and study tours;

vii. Provide guidance to research students.

The detailed work experience of Engr. Saima as Lecturer, Home and Health Sciences Department, AIOU is attached as **Annexure-A**.

Enerman Group, Energy and Environment Management Consultants, Islamabad:

March 1999-July 2003

Associated Companies: Enerman (Pvt.) Limited,
Integrated Solutions Services (Pvt) Limited,
Enerman Group Advisory Services

Engineer Saima Iqbal worked for nearly five years in the fields of environmental studies and engineering work with the Enerman Group. During her job, she also assisted the Manager (Admin) on routine administration and management affairs of the Enerman Group office.

In her capacity as a civil engineer, she was involved in a number of environment related studies and projects in the electrical power, oil and gas and industrial sectors mainly dealing with the air emissions, liquid and solid waste from plants and facilities, assessment of environmental and social impact of the energy and infrastructure projects. She also provided useful assistance in coordination and integration of project components in management of consulting assignments undertaken by the group companies.

In her role as the office administrator, she was involved in public dealing, management of office correspondence and records, costing and budgeting of office supplies and procurements and contract negotiations.

Key Conferences, Workshops, Seminars and Meetings Attended at AIOU

i. Seminar on 'World Water Day 2012, Water for Cities: Responding to the Urban Challenge, conducted by Govt. of Pakistan, Plan Pakistan, UNICEF, UN-Habitat, WASH and PIEDAR on March 22nd, 2012**.**

ii. Farewell function of PIEDAR's CEEPAL Program in the Honor of Officials from Finland Embassy on 7th Feb. 2012

iii. First International Conference on "Energy and Environment" held by AIOU, October 2011

iv. National Behavior Change Strategies - June 2011

v. Program on 'World Water Day 2011, Water for Cities: Responding to the Urban Challenge, conducted by Govt. of Pakistan, Ministry of Environment, UNICEF, UN-Habitat, WASH and PIEDAR on March 22nd, 2011.

vi. Seminar on "Energy Efficient Building Materials" delivered by Dimensions 4 Architects on 5th March 2011.

vii. Working on the Development of the Way Forward for Drinking Water Quality Monitoring and Improvement, August 2010

viii. Exhibition, "Connecting People through Crafts", it was a UNESCO- Norway Funded Project for the Empowerment of Women through Crafts, April 2010.

ix. Commemorative International Conference of the Occasion of the 4th Cycle Anniversary of KMUTT, Sustainable Development to Save the Earth: Technologies and Strategies Vision 2050: (SDSE2008), 11-13 December 2008, Bangkok, Thailand.

x. Institute of Computer Training (ICT) Training (MS Power Point) arranged by Deptt. Of Computer Science from 28th May- 1st June 2012.Workshop on Script Writing organized by IET Department held from 10th May to 17th May 2010 and prepared a documentary on Introduction of Faculty of Sciences of AIOU

xi. SPSS Workshop arranged by Deptt. Of Mathematics and Statistics from 24th– 26th April, 2012.

xii. Training Workshop on Community Lead Total Sanitation (CLTS) from 20th to 24th June, 2011 by Akhtar Hameed Khan National Centre for Rural Development and Municipal Administration, Park Road, Chak Shahzad, Islamabad

xiii. Training Workshop on EIA from 24th to 26th May, 2011 by Akhtar Hameed Khan National Centre for Rural Development and Municipal Administration, Park Road, Chak Shahzad, Islamabad

xiv. Introduction to Environmental Laws organized by the Society for Enforcement of Rule of Law in collaboration with the Konrad- Adenauer- Stifung.

xv. Consultative Meeting of the National Working Group on Water Quality Monitoring by Ministry of Environment and UNICEF

xvi. First Consultative Meeting of the National WASH Adaptation Plan for Climate Change by Ministry of Environment and UNICEF

xvii. Statistical Practices in Social Sciences (SPSS) held from 25th to 27th May 2010 arranged by Deptt. of Mathematics and Statistics

xviii. Interactive Tutor Training Workshop on 'Sustainability in Building Design', March 27-30, 2006, conducted by Allama Iqbal Open University, Islamabad, in collaboration with Higher Education Commission and British Council, Islamabad.

Personal Information

- Date of Birth: September 10, 1972
- Religion: Islam
- Nationality: Pakistani
- Domicile: Lahore, Punjab
- Marital Status: Married with three children

Contact Details

- Home Address: House No. 316, Street 101, I-8/4, Islamabad.
- Cell: +92 321 517 9658

Languages

- Engr. Saima Iqbal has excellent speaking and writing skills in English and Urdu. She also speaks fluent Punjabi.

Computer Knowledge

- Ms Saima Iqbal is proficient in the use of a variety of computer applications, including MS Office programs.