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Panels Supplied
to HESCO



Energy Past & Present
IEEEP Seminar



Full Fledged
T&C in Saudi Arabia



Emergency Services
at 220 kV KAPCO



Field Services Team
kept Global pace



From the Desk of **Director** Jehanzeb Saleem

As Muslims we are blessed in so many ways, at times I ponder on the endless opportunities ALLAH SWT has bestowed on us, Eid ul Adha, second of the two great festivals that Allah SWT has blessed this Ummah with, an event that tops the list of bounties by Allah SWT's on Muslim Ummah. Unlike some other random festival, meant for wasting time and meaningless pleasure, Eid ul Adha demands a special understanding of the trust of Prophet Ibrahim (AS) on ALLAH SWT, and a comprehensive overhaul of our faith in ALLAH SWT. The energies we spend on this great event would go to waste if the true spirit is missing throughout. And the struggle and endeavour of Hazrat Imam Hussain (RA) - one of the greatest sacrifices we commemorate every year - is the culmination of this very concept of sacrifice that transcends everything else in this old world of material gimmick. Let us make an effort to understand that act of Prophet Ibrahim (AS), "the friend of Allah SWT", the title bestowed on him by Allah SWT Himself, he did not let his extreme love for his son come in the way of fulfilling Allah's demand, he proved his commitment to Allah SWT. Even the idea of sacrifice of giving up his dearest son could not deter him. Imagine ourselves in Ibrahim's (AS) place, are we ready to take on challenges of life with the same passion, are we ready to sacrifice dishonest ways towards our defined success, are we ready to do justice, even if it goes against our close relatives, are we ready to give up things that displease ALLAH SWT, are we geared up for hard struggle to achieve excellence in technology and quality of life, can we achieve true harmony and growth in general in the absence of this passion, can we become one Ummah in the absence of the concept of sacrifice, are we ready to become part of the "brick wall" by playing our role... Perhaps your answer would be "No" to all the questions raised above, let us take all the chance and time that ALLAH SWT has granted us in this life and think over how we can debut the idea of sacrifice that will benefit us and all Muslims at large. I pray to Allah SWT to bless us with this true blessing, Amin!



A Scribe by the **Editor** Noor Al Huda

Pakistan, at present, is facing the worst energy crisis of its history. This crisis has rendered thousands of industries lifeless and millions lurking in darkness. The direct and indirect economic cost of this crisis is unimaginable. GoP and its concomitant institutions, MoWP, NEPRA, PAEC, WAPDA, PEPCO, NTDC, PPIB, AEDB, PPPMCL, are wriggling and mulling over to get over the crisis. Our National Power Policy identifies four key challenges our power sector is facing at present: yawning supply-demand gap, highly expensive generation of electricity, terribly inefficient generation & transmission system including theft, and circular debt; and to bridge these exigencies the GoP has set nine goals and devised nine corresponding prioritized strategies; namely, supply strategy to build a power generation capacity that can meet Pakistan's energy needs in a sustainable manner; demand management strategy to create a culture of energy conservation and responsibility; affordable power strategy to ensure the generation of inexpensive and affordable electricity for domestic, commercial, and industrial use by using indigenous resources such as coal and hydel; supply-chain strategy to minimize pilferage and adulteration in fuel supply; generation strategy to promote world class efficiency in power generation; transmission strategy to create a cutting edge transmission network; distribution strategy to minimize inefficiencies in the distribution system; financial efficiency strategy to minimize financial losses across the system; and finally the governance strategy to align the ministries involved in the energy sector and improve the governance of all related federal and provincial departments as well as regulators. It concludes to eradicate the supply-demand gap by 2017 and to export energy by the end of this decade. Let's hope, pray and work hard that our energy woes are redressed and Pakistan stands energy-affluent in the comity of nations. You can always drop your feedback and suggestions regarding this newsletter at epetribune@epesol.com.

Energy in Pakistan – Past & Future



Engr. Akhlaq Ahmad,
Abdul Munim Muhammad Ra'ad,
Engr. Noor Al Huda

EPESOL (Pvt.) Ltd.



1. INTRODUCTION

From the first glint of fire, an accident actually, man has mired himself into the quagmire of power and its cause energy. Then centuries later Michael Faraday and Joseph Henry in 1832 invented first laboratory models of electric generator. In November of 1879 Thomas Edison filed for the patent of his first commercially practical incandescent light and on September 4, 1882 Edison switched on his Pearl Street generating station's electrical power distribution system, which provided 110 volts direct current (DC) to 59 customers in lower Manhattan and by this the revolution began! After a decade Nicola Tesla invented AC generator which made it possible the long transmission.

Between 1931 to 1936 Americans came with 'Hoover Dam' during their great depression, this not only brought them out of depression but that dam lit three major states; Arizona, Nevada and Colorado. This brought the revolution in American economy and supported their capitalistic mass production industrial model. By the end of 1950 Americans and USSR were on the top in electricity generation, one of the reason which made them what they were.

Britishers in Indo-Pak soon realized its importance and it was not after 1900 when every major administrative building was shifted on electric energy in Delhi and Calcutta. By the end of 1930s Britishers started shifting their biggest enterprise in Sub-continent, the Indian Railways Network on electricity.

The huge subcontinent needed huge amount of energy to keep pace with the rest of the world. To fulfil this need Britishers came with the rapid induction of electricity for industries mainly and when they were leaving the Indian continent net generating capacity of the area was 1422 Mega Watts[1], main sources of which were hydro power and coal based thermal power and so, at the time of independence Pakistan inherited a net generation capacity of 60 MW [2], a 4.2% of total. As of October 2013 India has an installed generation Capacity of 229.251 GW [3] comprising world's fifth largest capacity, an increase of 16731% as compare to 1947. On the other hand Pakistan has an installed capacity of 24,953 MW [4] as of 2014, an increase of 41488.3% compared with independence data. This capacity will soon rise to 32,400 MW [5] by 2018 even if the current government do absolutely nothing to prevent or to slow down the progress being made on the projects that were approved and progressed in previous government.

Now before we move further lets define *energy* and stick to the definition.

2. ENERGY – AS WE KNOW IT!



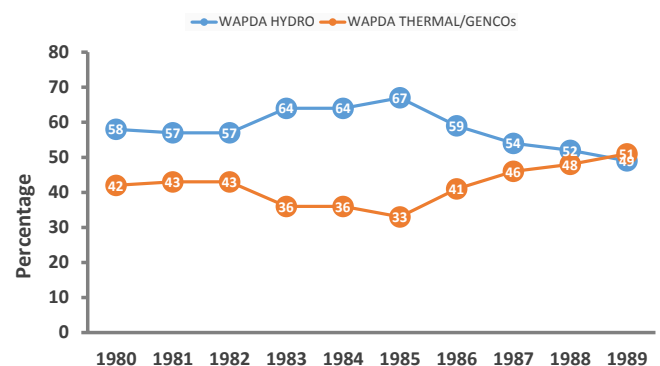
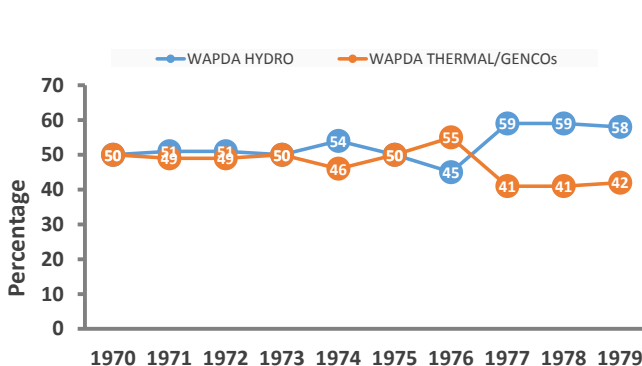
The International Electrotechnical Commission (Commission électrotechnique internationale) or more commonly known as IEC defines energy in a very subtle way, perhaps we should stick to their definition. IEC states energy in the form of: "scalar quantity which may be increased or decreased in a system when it receives or produces work, respectively." Another way to state it is that Active energy is an integral of Power. [6] The non SI unit of it is Watt hour (Wh) and through IEC convention the energy meters measures the energy in kilo Watt hours (kWh).[7] This being said, our discussion will be limited to the power system of Pakistan, its past and its present.

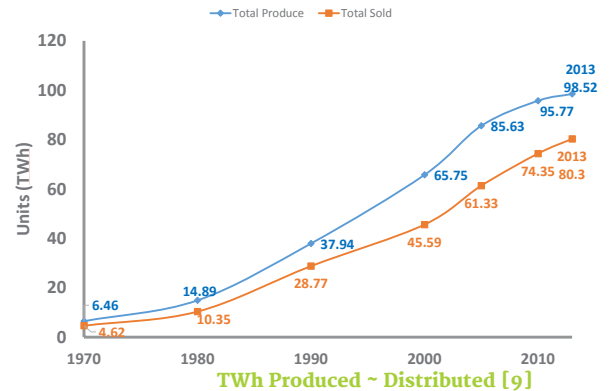
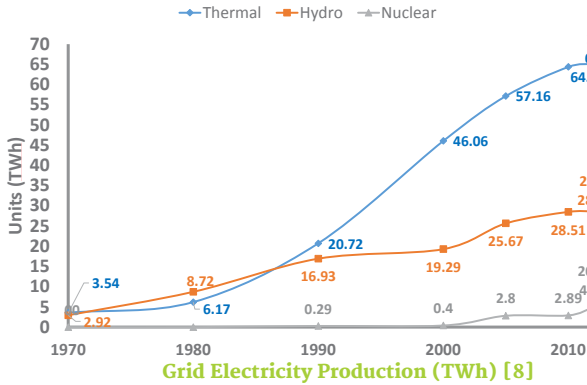
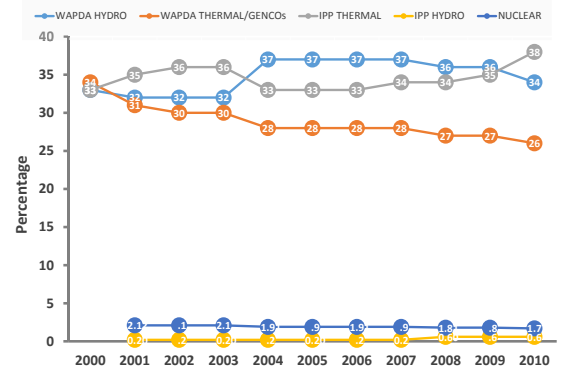
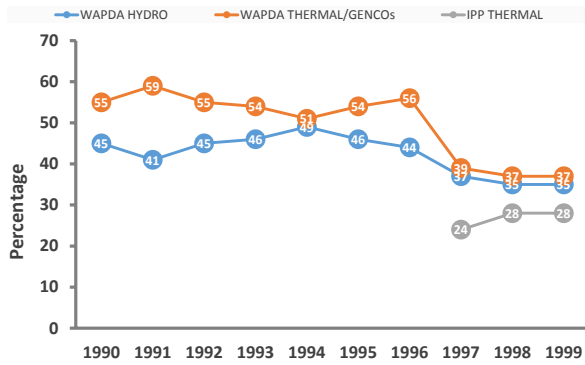
3. POWER IN PAKISTAN – AN INTERNATIONAL CONCERN

Pakistan enjoys a very dynamic stature in international strategic and social hierarchy. Every development in Pakistan reflects on international hemispheres, power is one of them, without an iota of doubt. Keeping the legacy and genesis of Pakistan's power system designers and elders which are often hailed internationally as the pioneers of this craft, a power crisis is no doubt an international concern. The Economist leads saying: "Pakistan's energy shortage, Lights out! Another threat to a fragile country's stability" in October of 2011 was among the first international hue of this issue. But this wasn't the last, The Washington Post in July 2012 strapped this issue with potential terrorist threat by leading: "Pakistan's power crisis may eclipse terrorist threat." The UPI (United Press International) report in August 2013 was more worrisome an excerpt of which is: "It is a bigger menace to our economy, to our existence, than the war on terror. This problem of energy, shortage of energy in Pakistan, has crippled our economy in the last 10 years" stated Minister of Power and Water, Khawaja Asif. Was Pakistan always like this? Let's explore some past.

4. PAST STATISTICS OF POWER IN PAKISTAN [4]

The ending years of 1970s was the era when Pakistan started relying more and more on thermal/GENCOs power generation. But several dam projects lifted this situation positively in coming decade and Pakistan touched largest share of hydro power ever in its history up till this day, 67% in 1985. This eco-friendly and cheap electricity generation situation was very short lived as by the year 1989 thermal/GENCO again was the dominating and dependent power generation source and Pakistan never recovered out of this combination till today. The vision of the intelligentsia became clear in 1997 after an abrupt 24% induction of Thermal IPP in power generation.





Grid Electricity Production (TWh) [8]

TWh Produced ~ Distributed [9]

5. RATE OF UNIT & REASONS OF PRICE HIKE

Two tables below clearly give the picture of what happened to the power system of Pakistan following the 70s and 80s era. It is clear that the end tariff affected deeply as we moved towards new millennium.

	Thermal – Overall Cost/unit (Rs./kWh)	Hydro – Overall Cost/unit (Rs./kWh)
1980-81	0.24614	0.02249
1981-82	0.35846	0.02041
1982-83	0.42644	0.03314
1983-84	0.50088	0.03858
1984-85	0.54952	0.05118
1985-86	0.62292	0.05342
1986-87	0.64310	0.05540
1987-88	0.67843	0.05799

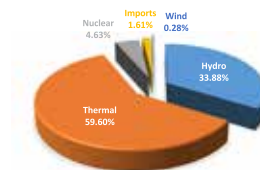
Rates in 1980-88 [10]

Power Station	2010	2011	2012	2013	2014
Hydro					
Tarbela	0.33	1.13	0.96		
Mangla	0.77	0.95	0.64		
GENCO / Thermal					
Jamshoro	8.27	12.54	23.05	19.12	21.69
Guddu-I	4.47	6.76	7.50	7.19	
Guddu-II	3.33	4.20	6.18	0.33	7.19
Muzaffargarh	11.09	14.25	19.39	20.05	19.86

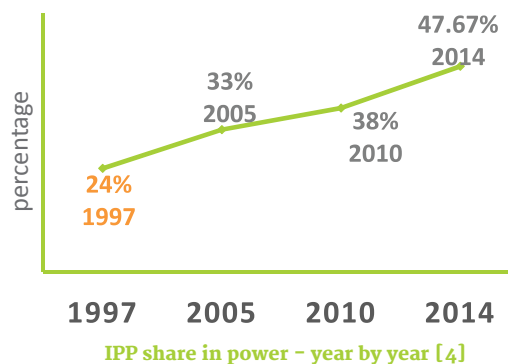
Rates in recent years [4]

The major reason of these price hikes was our shifting towards thermal power generation on the cost of hydro power generation. In the Fiscal Year 2014, the data shared by PEPCO illustrates our priorities clearly. But this was not this generation balance always; from the falling years of 70s till the mid 90s Pakistan was taking the major power chunk from its hydro power generation assets. The situation took this turn and never recovered when on its debut year 24% of Pakistan's total power generation was abruptly shifted on thermal IPP in 1997. The results were quite devastating as we all witnessed and experienced the quagmire our country got stuck into and still struggling to get rid of it.

	Hydel	Thermal
1977	59%	41%
1985	67%	33%
1996	56%	44%
1997	37%	63%
2003	32%	66%



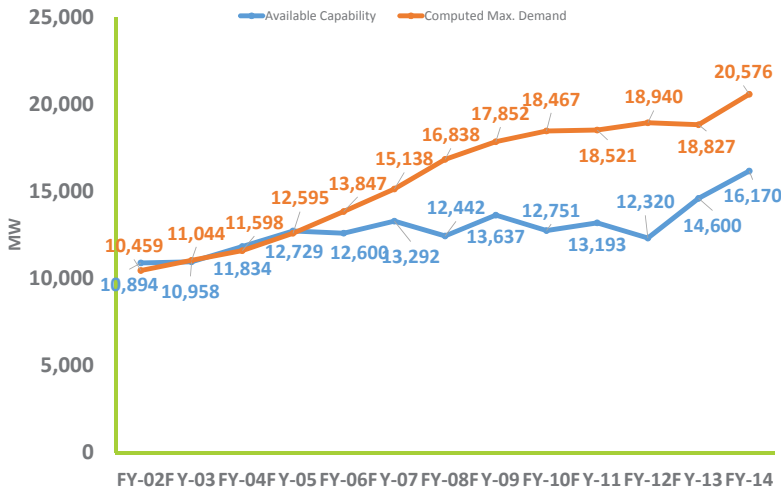
Energy Purchased By Fuel Type FY-2014 (PEPCO) [4]



IPP share in power - year by year [4]

6. THE ERA AFTER SURPLUS POWER!

The major negligence, on the part of movers and shakers of power system in Pakistan, was loosing the golden opportunity of expansion after having a smooth era of surplus power. Even after the National Power Policies of 1994, 98 and 2002 there was no serious effort of evaluating, implementing and improvising these policies and of course that led to the decade long power crisis which shook every dimension of national growth, stability and image. It appears that the power system was managed without any vision or strategy as even after initial years of major short falls nobody on helms of affairs took serious notice until the situation got out of hand resulting in massive hue and cry both on national and international levels. The graph below clearly illustrates that even after the start of new millennium and change in power regime Pakistan had a surplus power; the generation capacity was more than the demand, but this situation was taken for granted until 2012 when the shortfall reached its peak. By then there was no quick remedy, old power system assets were already not in a condition to cope with this situation and were depreciating and breaking the camel's back met with this lapse.



Available Capability Vs Computed Max. Demand [11]

Organisational Discrepancies

One of the major reason of negligence while we had chance to correct ourselves was the state of affairs at the institutes and organizations dealing with power system in Pakistan. The major power stakeholder, WAPDA, was unbundled in 1998 without taking proper measures and the momentum of change was so high that it pushed down the planning and implementation of power policies resulting in confusion and uncertainty at every level of power system regime. Even after the unbundling there was a massive restructuring of departments at NTDC, WAPDA, DISCOs and GENCOs. This led to the inception of power system rupturing. The uncertainty and chaos at the policy making pedestals trickled down to the micro level resulting in engineers' job dissatisfaction, one of the major reason behind lack of skilful planners and executioners in coming years. As if it was not enough, as the political regime changed with new millennium the new MD of WAPDA introduced the infamous rotation policy; the reason behind which was quite ridiculous. This was a big blow to the dignity of engineer who actually is the fundamental integer of power system. At the same time private power infrastructure was more secure and glamorous for the young engineers who readily opt for the opportunity either joining national or multinational firms. This yielded quite devastating results; the managerial skills started diluting on departmental level and no one was there to make firm decisions. What left was aging skilful Human Resource depicting the Freudian dilemma 'if youth new knew, if age could'. As the years passed there was no replacement of that skilled human resource therefore the skills started vaporising without transferring and institutionalizing of those skills. Adding fuel to fire, with the start of privatization in 90s there was a further massive brain drain from Pakistan due to job insecurity, ambiguity in power corridors of Pakistan and foggy carrier path. And with it the left human resource developed an evil culture of time-killing and 9 to 5 routine. Another major evil was the popping up of lack of organisational ownership, as no one was thinking of organization growth but of his own.

8. ECONOMIC PRECEDENTS!

At present Pakistan has one of the lowest per capita grid electricity consumption as compared with other countries of developing world or G-20. There is no significant growth in this trend as well, comparing with other developing countries which the world see as potential investment opportunities and markets. The dilemma is that Pakistan is not even running its existing power generating assets at their full potential, too. The plant factors of existing power generating units are alarming and point towards multiple variables that need fix before opting for new power generation start ups.

(kWh/capita)	1970	1980	1990	2000	2005	2010	2013
Pakistan	77	129	266	332	402	428	436
India		173.1	346.6	552.6	637.2	~778.5	
USA (TWh/Capita)	6,790	9,218	11,373	12,732	12,896		12,115
China		306	549	1067	1913		
Turkey	244	550	1006	1891	2231	2854	3205+

Per Capita grid electricity consumption [13]

	2010	2011	2012	2013	2014
Tarbela	45	52.54	46.17	48.41	49.70
Mangla	54.47	69.72	54.64	53.66	66.80
Jamshoro	57.50	45.60	22.18	61.00	52.07
Guddu-II	48.92	42.13	34.13	61.00	68.70
Guddu-I	50.26	70.36	62.54	68.00	68.70

Plant Factors [4]

9. CONCLUSION & FUTURE PROSPECTS!

Under National Power System Expansion Plan 2011-2030 GoP has planned to boost total generation to 112,639 MW by 2030 with necessary structural long term enhancements in transmission and distribution networks. GoP has approved power generation policy 2015 which accommodates alternate fuel provisions like coal and R-LNG for power generation. It has vowed to add electricity generation of 10,400 megawatts to Pakistan's national grid by 2017-18 along with reduction in the cost of generation and transmission losses. The work on mega projects like Neelum-Jhelum (969 MW) and Diamir-Basha (4500 MW) hydropower projects is under way. Work on three R-LNG plants of 1000-1500 MW each is also ongoing. Total power generation anticipated from three coal projects is 2400 MW by 2018. On nuclear side C-3, C-4, K-2 and K-3 are also under construction. There are almost 31 wind IPPs which are at various stages of development to add nearly 2000 MW in national grid. On solar side 33 LOIs have been issued to solar IPPs to add around 900 MW in national grid. 1500-2000 MW of power is expected to be generated in next 2-3 years from biomass/bagasse under co-generation policy 2013. CASA-1000 agreement is underway to import 1000MW electricity from central asian states and electricity is also being imported from Iran at present. In the light of such developments, it can be said that the future is not bleak; however, it warrants honesty of purpose and due diligence with professionalism to make a 'Roshan Pakistan' forever.

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- [4] Excluding K-Electric Power Assets, POWER SYSTEM STATISTICS, 2013-2014, 39th Edition, PLANNING POWER NTDC.
- [5] The Express Tribune, Energy: Power generation capacity expected to jump 46% by 2018, April 8, 2013.
- [6] IEC 60050: IEV ref: 113-03-45
- [7] IEC 60050: IEV ref: 131-11-58
- [8] Years in this Table are fiscal (1st July - 30th June).
Electricity transmission and distribution losses are not deducted.
Source: (HDIP: 2012) and (NEPRA: 2012).
http://www-pub.iaea.org/MTCD/Publications/PDF/CNPP2013_CD/countryprofiles/Pakistan/Pakistan.htm
- [9] (HDIP: 2013) and (NEPRA: 2013)
- [10] Electrical Power (Information Booklet), IAEA - Project Planning Report by WAPDA Consultants, 1988-89
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- [12] Pakistan Bureau of Statistics, QIM Report, January 2011, 12, 13, 14
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7. WHY WE MISSED THE GOLDEN OPPORTUNITY OF EXPANSION!

There are numerous reasons behind this sheer negligence with magnitudes ranging from micro to macro levels. But let's discuss some major ones:

Did Managers Sense Load Growth?

It is important to figure out that did the managers at power stake holders have clear sense of load growth? A simple arithmetic can show us the gravity of that load growth. The mere addition of ACs, Lights and Fans is enough to guess what really the power system has been experiencing every year. The below data by Pakistan Bureau of Statistics shows the flux of these appliances in power system. If we do little calculation, even by maintaining low figures and rough estimates, 500 MW has been adding to power system annually only from the appliances influx. Now the question is, did planners had any foggiest notion of this growth trend? If yes, why didn't they respond promptly?

	FY-11 (No's)	FY-12 (No's)	FY-13 (No's)	FY-14 (No's)	FY-15 (No's)
Air Conditioner	85,955	94,591	55,280	126,986	110,419
Bulbs	42,357	49,943	43,417	47,803	41,932
Fans	951,464	891,544	925,262	876,687	938,452

Appliances addition in market by FY [12]

Brand Pakistan now in Arabia

EPESOL Expands Its Commitment of Quality to Arab Lands



Full fledged Testing & Commissioning services by 'EPESOL Field Services' landed in Saudi Arabia

Since its inception, EPESOL has aimed and committed to be an iconoclast. With its core values based on passion and faith EPESOL has achieved many traditional and nontraditional milestones and this quarter went similar. EPESOL has a highly acclaimed and professional Testing and Commissioning team which has proved itself wherever it went in Pakistan. In fact if someone wants both quality and time efficiency the obvious choice pops out is EPESOL. Being a partner of largest electrical conglomerate in the world, General Electric aka GE the learning and exposure of EPESOL increases exponentially.

The biggest news for this quarter is the full-fledged launching of EPESOL Testing and Commissioning, a unit of EPESOL Field Services, in Arab Lands specially Saudi Arabia. This in fact is a big news for those who aspire for quality, passion, commitment and time efficiency. By now, EPESOL has fully functioning Testing and Commissioning teams for international projects and our services have already been recognized in Iraq and Saudi Arabia. The most recent project by our Testing and Commissioning was the replacement and configuration of 9 SR469 motor protection relays at a

petrochemical plant of Jubail city, Kingdom of Saudi Arabia. The project was acquired through AL QAHTANI SONS. EPESOL has a strong portfolio established through the partnership with GE. This quarter was quite busy for EPESOL Testing and Commissioning teams in that domain. A lot of projects has been completed releasing the work load but still there are few which are going on in Arab lands. EPESOL aims new horizons and its structure of challenge acceptance will win it all those milestone that seems impossible for other start ups. Stay connected for more fresh news of #BrandPakistan.



Emergency Handling with Quality; Team EPESOL once again proved itself

Team EPESOL beats time and space graphs for 220kV KAPCO on their emergency call

EPESOL has once again maintained its high level of commitment and in time services in case of emergency situations. This time after a catastrophe on plant site at KAPCO 220kV EPESOL's Design & Consultancy team along with Testing & Commissioning teams commissioned two

self-manufactured 220kV marshalling kiosks panels thereon in place of existing burnt-out ones. Multifariousness of task required to accurately trace out the scorched cables, rewire up the healthy ones, test & commission the same while performing the design & drawings work in parallel.

Energy-in-Pakistan assessed in light of Past, with hopes for Future

Discrepancies in the system need to be addressed in an engineered way, not otherwise – CEO EPESOL

Seminar on "Energy - Past and Future" was organized by IEEE Lahore. The seminar was chaired by Minister of Commerce Khurram Dastgir Khan and attended by MD NTDC, Mr. M Arshad. And Ex-MD KE, Tanzeem Naqvi. Mr. Shams ul Mulk, Ex- Chairman WAPDA joined via videolink. CEO EPESOL Mr.

Akhlaq Ahmad in his lecture sorted out the discrepancies in the power system of Pakistan by assessments through the Past. The current ongoing in energy sector is skeptical and dubious and needs to be addressed by the engineers and not some alien motivated agendas, said Mr. Akhlaq Ahmed.



EPESOL Panels, rocking the Power Systems!

Purely ingenious, customized and beautifully designed

EPESOL Design & Consulting department with close tabs on Manufacturing team completed the customized Auxillary AC/DC panels for HESCO. Apart from this; NTDC approved RP4 Panels were also provided by EPESOL home production.

Nandipur got its Generators and Transformers secured

G60 and T60 relays supplied to 525 MW hub

Devoting its services in the national asset projects has always been a remarkable achievement for any organization especially when the cause is concerned with the development of your country. Recently, EPESOL has supplied Generator and Transformer protection relays G60 and T60 used for the protection of generator and transformers installed at NANDIPUR Power Plant which has the potential to generate 525 MW of electricity.

LV Business yields positive figures this quarter amid new contracts

Mega supply to new vendors in Pakistan

We are long known in power market for our remarkable, quality driven and cost friendly HV and MV solutions. But after EPESOL's LV agreements with GE, we have embarked footings in LV Solutions too. This quarter proved really affluent in domain of low voltage stream as we secured orders of supply of low voltage components from our vendors SIDDIQUE SONS, MK Engineering and Solutions Engineering.

More relays supplied producing more safety and security of assets

Relay & Control business thriving as always

EPESOL Relay & Control business is the leader of the market in terms of quality, simplicity, dynamism and cost. With every quarter that passes this impression engraves more deep thereby achieving multifarious milestones by every passing quarter Alhamdulillah. This quarter was no different from the previous; we supplied relays to many customers which include FESCO, LALPIR Power, FKPCL, BILAL ENG and many others.

International Field Services

EPESOL around the globe, pinning brand Pakistan with its quality commitment

Upgradation of Central Control Units at ARAMCO:

» We feel very proud to announce that EPESOL has extended its services portfolio in communication. We have successfully completed the upgradation of 20 units of CCU's at ARAMCO plants, KSA. The scope included the dismantling of existing units, configuration of new units, verification of internal programming of new units and then installation and commissioning of new units.

Commissioning of Transformer Protection Panels at Najybia Power Plant, Basra, Iraq:

» EPESOL has successfully completed the commissioning of 5 transformer protection panels of 04 power transformers, 04 auxiliary transformers and 02 service station transformers. The scope included comprehensive functional testing of 10 units of transformer protection system, commissioning checks, primary tests to verify the stability of transformers, interface signals verification and monitoring of all parameters up to control room through Enervista Viewpoint Monitoring software.

Commissioning of Online DGA Analyzers in Saudi Arabia:

- » EPESOL has extended its services of Monitoring & Diagnostics products for transformers in Saudi Arabia. Our team has successfully commissioned 18 more units of online DGA Analyzers at the following sites in Saudi Arabia.
- » 02 Units of Online DGA Analyzers type Transfix make GE at 380kV Wadhi Dewaseer Substation.
- » 07 Units of Online DGA Analyzers type Transfix make GE at 380kV AS-Safa Substation, Riyadh.
- » 05 Units of Online DGA Analyzers type Transfix make GE at 380kV Makkah Central BSP.
- » 04 Units of Online DGA Analyzers type Transfix make GE at 380kV Al Mashaar BSP.

Field Services, Serving at home!

Happiness is to traverse the whole country with top quality

Korangi Power Station Karachi, Pakistan:

» EPESOL is honored to announce the completion of commissioning project of a steam turbine generator at Korangi Power Station Karachi. The scope included testing & commissioning of generator protection panel, interface verification with instrument and excitation panel, primary testing of all protection functions for the generator then auto synchronization with the grid. All the tasks have been performed with professional approach and state of the art test sets.

220kV Orient Power Plant, Balloki:

- » EPESOL has completed yet another mega testing project at Orient Power Plant, Balloki. The scope includes:
 - Testing of all plant protection relays including Bubsar, Generator, Line, Transformer, Feeder, Motor and Synchronization relays make Siemens.
 - IR, Capacitance & Dissipation Factor, Turn ratio and Winding Resistance testing of power and auxiliary transformers.
 - IR, Capacitance & Dissipation Factor, Vacuum Bottle Integrity, Contact Resistance and Timing Testing of 6.6kV Breakers.

Induction of Engro PowerGen expands EPESOL clientele

Complete G60 services to power giant

Our expert team of field services always gave its best while performing locally at different power plants and satisfying the needs of customers. We have already performed G-60 services in the past at FFC Got Machhi, FFC Mirpur and FFBL Karachi. On the same grounds; we have recently secured our project of 2 G60 relays services (Installation, Testing and Commissioning) at ENGRO Power Gen at Deharki which is one of the biggest tycoons of our present industry.

Transmission Lines at UCH Power; now more reliable, more secured

Three 220 kV lines protected through relays

EPESOL recently got a services project of securing three 220 kV lines of UCH power plant. The project required testing and commissioning of relays and transducers. 6 Distance relays; 1 Micromo GEC Alstham, 1 SEL and 4 LZ960A by ABB were tested in the project. 5 Breaker Failure relays made by ABB were also tested as a part of contract. Apart from that 12 transducers were also tested. EPESOL Testing and Commissioning team done the project in time and got positive feedback by customers.

Addition in EPESOL Family

As the days pass by

EPESOL since 2009 is on its journey of wonders and constant expansion. To put it in perspective since 2009 we are increased by 6X of the original size of our human resource. Our Design and Consultancy is marching on high momentum with more than 147 drawings per day. Our FS has been dealing with more than 2X the activity of last fiscal year. Our Sales and Marketing are matching our expectation in fact we have added more than 5 resources in past 2 quarters to tackle the load, the recent addition being Salman Rashid Qureshi with 3 years experience.

Lalpir Power and PakGen Power Ltd. got its whole plant relays serviced

727 MW plants smooth & clean for the year

During recent plant overhauling Lalpir and PakGen settled on the quality commitment of EPESOL and awarded all of their 'relay testing' to EPESOL. Plants of such magnitude have huge number of relays and thus require a very thorough, detailed and engineered approach for testing. EPESOL did transformer, generator, line, feeder, motor and all other major and minor relay testing and that too in time. Apart from that all CT, VT and all bays and busbars were also tested by EPESOL Team.



Fatima Fertilizer now has its generators and feeders protected

14 relays were tested to ensure safety

Fatima Fertilizer is among the top fertilizer producers of Pakistan with 800,000 tons of annual fertilizer production. Such huge production needs a huge power supply and that power supply demands safety protection with constant monitoring. Fatima Fertilizer recently acquired EPESOL services for its Generators protection relays and EPESOL tested 2 G60 relays and one 489 relay of GE. A part from that 12 REX521 & REF542 relays of ABB were also tested for feeder protection.

KAPCO updated their generators for more swift operations

GPP relays tested & VDF-10 relays supplied

1600 MW Kot Addu Power Company needs a very swift, smooth and uninterrupted operation to yield results that satisfy their customers, investors and shareholders. When it comes to outsourcing services for more quality oriented monitoring the obvious choice becomes EPESOL. Recently KAPCO acquired EPESOL's services for testing of all the relays in their Generator Protection Panels. Apart from that Artech VDF-10 auxiliary trip relays were also supplied by EPESOL.

EPESOL Field Services ready to handle more engineered energy optimization

Zenon will enable FS of highly dynamic process optimization for industries

COPA-DATA Zenon is a SCADA/HMI software which is a powerful solution to provide highly dynamic process optimization in industries. For Energy & Infrastructure, zenon ensures regulated processes in the production and distribution of energy - including secure interlocking, two hand operation and simple configuration per Wizards. EPESOL's engineers were recently trained by GE for this highly exclusive software mastering at KSA. Main purpose of this 5 day training program was to give hands on experience to EPESOL Engineers with COPA-DATA Zenon software. Training

Session included basics of software, parametrization of IED's of complete substation, configuration of IEC61850, DNP3, Modbus and other communication protocols and practical exercise with real IED's using server/client and master/slave topologies. Our engineers have successfully got the registration of COPA-DATA after passing the certification test and are fully ready to configure IED's having multiple communication protocols, implementation of single line of complete substation and power plant in HMI and Testing and Commissioning of SCADA automation system.

EPESOL FS Engineers trained on updated M&D equipment

Focused on online DGA equipment EPESOL FS team got 3-day training at Bahrain

GE Monitoring & Diagnostics products are offering wide range of solutions to monitor and manage critical assets on the electrical grid, detect and diagnose issues and provide expert information and services to customers. A unique photo acoustic process ensures the accurate results through oil sample and both online and offline equipment. 3-day training session was conducted at GE's office at Bahrain. The prime focus of training session was to train EPESOL engineers with services and maintenance of Online DGA

equipment. Our engineers have already completed the level 1 training of installation and commissioning of M&D products and now this level 2 training will ensure their expertise in maintenance of these products. Our engineers are now certified to maintain the main parts of online equipment i-e, manifold and DGA of Transfix and Minitrans which are the base of photo acoustic process, upgrade firmware of transfix and minitrans using advance softwares and tools and replace power supplies, Sensors and peltier cooler using state of art tools.



Design
Consultancy &



By EPESOL

Innovating Solutions

SUBSTATION ENGINEERING (SECONDARY)

01

- Relaying & Metering SLD
- SCADA One Line Diagrams
- Interlock Logic Diagrams
- Cable Interconnection
- CT/VT Sizing Calculations
- Relay Setting Calculations
- I/O Signal Lists
- Three Line Diagrams
- Control Cable Schedules
- Panel Engineering

POWER SYSTEM STUDIES

02

- Load Flow
- Short Circuit
- Reactive Compensation
- Power Factor Improvement
- Insulation Coordination
- Relay Coordination
- Harmonic Analysis
- Motor Starting

SYSTEM WIDE ANALYSIS

03

- Protection Coordination
- Nuisance Tripping
- Energy Audit
- Load Shedding Scheme
- Retrofit Design Solutions
- Automatic Bus Transfer
- PFI Issues
- Equipment Sizing