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*Report – Public Talk*

# **“Dynamics of Pakistan’s Energy Security”**

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## PICTURES OF THE EVENT



The Institute of Strategic Studies Islamabad (ISSI) organized a Public Talk titled, "*Dynamics of Pakistan's Energy Security*" on September 13, 2019. Dr. Gulfaraz Ahmed, former Federal Secretary, Ministry of Petroleum & Natural Resources was the guest speaker at the occasion.

Welcoming the speaker and guests, Director General ISSI, Ambassador Aizaz Ahmad Chaudhry, said the topic of the talk is important, especially for Pakistan, as we recently went through one of the worst energy crises in our history. The shortfall of energy became a major impediment to economic development. Even today, we experience shortfalls in the power sector and the natural gas sector, though at a much lower level than in the recent past. Power shortages cost billions of rupees to Pakistan's economy every year. Hence, the importance of energy security.

Given the importance of this subject, the ISSI had organized a public talk in April 2019 by an experienced former director of the World Bank, Mr. Ziad Aladad, who educated us on *Resolving Pakistan's Energy Dilemma: Critical Starting Point and Role of CPEC*. ISSI received a positive feedback of the event. The ISSI, therefore, is pleased to host a second talk on this important subject.

Energy is the lifeline of industry and economy. No country in the world can conceive of economic progress without achieving energy security. Power supply deficits in our country have been exacerbated by the fluctuating oil prices in the international market, higher costs due to gradual phasing out of subsidy, and the circular debt problem. The government is taking diverse measures to circumvent this crisis. Expansion and refurbishment of the existing power plants, induction of new power plants, and encouragement of renewable energy are some of the measures being taken.

Most of the power projects under CPEC have already been completed, or are at near completion phase of the construction. This has helped us in addressing energy shortfalls in the country to quite an extent. For future energy supplies, Pakistan can also meet some of its demand from projects like CASA and TAPI. A feasible source of supply through IP gas pipeline became a victim of US sanctions against Iran. On balance, power creation is one area where considerable progress has been made in the past few years. However, transmitting all that power with minimal pilferage and losses to the industry and households is the real challenge.

We would, therefore, need to take an expansive view of both demand and supply sides of the equation. Consumption patterns and future needs of all consumer segments should be assessed along with the potential implications of our energy choices for the consumers. The International Renewable Energy Agency has noted the absence of an Integrated Energy Plan as a fundamental challenge faced by the country's energy sector. There is a need to develop a strategic plan with participation from public and private sector stakeholders. We hope that this public talk will stimulate further thinking on the importance and dynamics of energy security, which is so vital for the present and future of Pakistan.

Dr. Gulfaraz Ahmed gave a power-point presentation in which he stated that Pakistan is at a historical cusp of energy security: enough capacity to meet the demand and a challenge to lower the cost to boost the economy. He emphasized that energy security is a complex interplay of numerous dynamic factors, national and international, that cut across many sectors of economy, governance, planning, international energy markets and diplomacy. In the case of Pakistan, it is further complicated by conflicting interests of the superpowers on materialization of interstate gas pipelines to Pakistan. He stated, that at the start of year 2000, Pakistan's energy sector was resourceful and quite dynamic with surplus power, as well as gas. From 2000 to 2010, all surpluses, redundancies and reserves were exhausted, but no worthwhile project was initiated bringing the perilous crisis that kept taking off 2.5 - 3 points from the annual GDP growth. The mounting circular debt has brought the sector to near insolvency. Energy security is not simply the energy self-sufficiency: Japan and Morocco import 95% energy needs yet enjoy relative energy security, Nigeria, on the other hand, is an exporter of oil and still suffers from energy insecurity.

Dr. Ahmed, said that 1950 marked the start of unprecedented industrialization and economic development buoyed by ten-fold increase in energy consumption growth. This laid the base for emergence of OECD countries at the top of the world economies. Energy leads to wealth generation and poverty reduction. Talking about Pakistan's energy strengths and challenges, he said that there is an existent country-wide electric and natural gas infrastructure. Pakistan is a natural gas-based energy economy with countrywide gas infrastructure including 3 LNG import terminals, Karachi-Lahore RLNG gas pipeline (proposed), 2 interstate gas pipelines, and 2 LNG import terminals. Energy crisis that started in 2009 was precipitated essentially by natural gas

crisis and there was not enough gas available to generate needed power. He said that there while there is a country-wide national grid connecting all provinces and population centres, there is a need to provide sparse and remote areas with local mini-grids. He said that work on grid augmentation is part of CPEC energy projects.

Highlighting the strengths/ challenges further, Dr. Ahmed said that Pakistan has large untapped hydel power and water storage potential, and vast lignite deposits in Thar suitable for power generation. He said that Pakistan has prospective geology with proven hydrocarbons potential, and work in promising frontier/security-risk areas has been started. There is also large solar/wind potential for cheaper, G&G emissions free power. Some of the other challenges include: low energy consumption per capita (1/5th of World average); low generation of wealth; low development; and endemic poverty. Also, there is high energy intensity: low efficiency of converting energy into wealth/GDP – energy intensive industry, inefficient appliances. He said that increasing dependence on imported oil, LNG and coal with low exports result in balance of payment challenges. Excessive transformation/transmission/distribution/theft losses are also adding to circular debt caused by expensive imported fuels.

Dr. Ahmed, further stated that the national campaign for commercial introduction of CNG as an alternative fuel to imported gasoline was launched in early 1997. By 2010, Pakistan had emerged as a world leader in use of cleaner fuel in transport sector, winning wide ranging appreciation in the world. In 2010, it had the highest percentage (61) of vehicles running on CNG (61). In 2010, it saved 2.5 million tons of gasoline import saving US \$ 2.5 billion in FE. Ambient air quality in Karachi was better in 2010 than in 1997 despite more than twice the number of vehicles in the metropolis. Decision to curtail use of oil in transport and taking gas contribution to nearly 50% of energy mix was predicated on gas import.

He then talked about the saga of changing energy security 2000-2008 to insecurity 2008-2023 by gross neglect of energy sector from 2000 to 2012. Having suffered energy crisis for about 15 years, which stunted the economic growth by a drop of 2.5-3% from annual GDP growth, an energy turnaround started with the launch of CPEC investments of over USD 38 billion in energy sector in 2013. Empty energy infrastructure projects pipeline started filling up with hydel, coal, RLNG, wind, solar and nuclear plants and ancillary transmission projects. In a decade up to

2023, Pakistan would have surplus power and required gas supply boosted by LNG import, and possibly, by regional gas pipelines. Prevalent energy crisis was precipitated essentially by gas shortage: 3.5% yearly growth historically started levelling off and in 2011 onward started declining, bringing about the crisis. Cost of LNG based power from 62% efficient turbines is about half that of 30+ efficient RFO power plants.

Dr. Ahmed said that in 1997, UNESCO reported lead pollution in Karachi reaching a dangerous level. We also needed to reduce import of Motor Spirit (MS) used in vehicles. We have reduced greatly the use of CNG in vehicles, and are instead importing MS. It could be more cost effective to import LNG for vehicles, which will have a positive effect on city environment, as well as restoring jobs lost due to reduced CNG.

Pakistan needs to increase economic growth rate to at least 6.5% for economic security, job creation and poverty alleviation. Having remained stagnant taking 2.5% off the GDP, the installed capacity is fast increasing with CPEC Early Harvest Plants. A record generation of 142000 MW in July 2019 is a positive sign of demand picking up and capacity not staying idle. Pakistan could skip the lost ground of industrial economy and leap frog into knowledge economy, 5G is a great promise. If all the generated power is positively utilized, it will give a boost to energy-starved economy. The increasing installed capacity must be productively utilized avoiding idle capacity charges.

Some suggestions in this regard are:

1. Accelerate work on SEZ to generate productive demand.
2. Stimulate industry to utilize reliable power and increase GDP.
3. Retire old power plants running on RFO with very low efficiency.
4. With surplus power situation follow strictly the economic dispatch.
5. Upgrade power grid to reduce transmission losses.
6. Enable DISCOs to reduce distribution losses by better technology.

7. Make DISCOs responsible for buying power from dues collected.
8. Control theft of expensive power.

Talking about CPEC, Dr. Ahmed said that the first phase of CPEC dominated by infrastructure development is coming to an end. Over 10,000 MW new power capacity has been commissioned and more is at advanced stage of construction. Important motorways linking Karachi to Lahore and Gwadar to up country have been completed or under way at the moment. A 392km Sukkur-Multan 6-lane Motorway has also been opened. Nearly \$60 bn had been committed to the infrastructure development. Government played a leading role in this phase.

The second phase is about industrial cooperation and development of agriculture and trade. It includes the establishment of 9 SEZ. The government has started engaging with the industry and has set up a Business Council under the Chairmanship of Mr. Razzaq Daud. All businesses will play an important role through the Council in this phase and it is recommended to include the SMEs also in the program. New and productive demand for power is the focus of this phase. China has shipped equipment worth \$ 1.7 bn for energy project of the Matiari-Lahore direct current transmission line to carry 4000 MW power from coal-based power plants located in Sindh to Punjab main Grid. This will add new capacity to national grid and provide a new high-speed power evacuation circuit to the consumption centre. This is the first of the two projects for upgrading of the national power grid.

He also informed about the commissioning of 1100 MW K2 and K3 nuclear power plants in 2022 and 2023 respectively. K2, K3 will have a design life of 60 years and account for roughly 10% of the country's total generation capacity. The Hualong One advanced Pressurized Water Reactor of Generation III+ design comes with a single stack layout, 177 nuclear fuel assemblies, a double containment structure, and a combination of active and passive safety systems. C5 and C6 are also planned for construction at Chashma which already has C1 – C4 of 340 MW each already operating. Pakistan's has targeted installed nuclear capacity of 8800 MW by 2030. The Prime Minister has also approved an energy package for export industry till 2024. A package had been allowed to export industry (textile, leather, carpet, sports and surgical) up to 2020, which

has now been extended up to 2024. Under this package, the export industry is allowed the availability of RLNG @ \$ 6.5 per MMBTU and electricity @ 7.5 cents per unit. This will stimulate industrial production, increase exports, utilize increased generation capacity and ease the burden of mounting capacity payments.

Dr. Ahmed also talked about strategic opportunities of adjusting priority stating that it's time to phase out/or upgrade public sector power plants that have low thermal efficiency, need heavy maintenance and are no more cost effective. With sufficient generation available, it is crucial to start merit-based dispatching of power on least-cost basis including pass-through fuel cost. Beneficial management of LNG is key to successful management of the energy sector. Based on the end-use economics, LNG in the order of priority:

1. Providing fuel to 62% thermal efficiency 3600 MW power plants.
2. Making CNG shortfall to reduce import of Motor Spirit for vehicles.
3. Medium thermal efficiency gas plants to eliminate/curtail use of RFO in power generation.
4. Selective industrial gas demand shortfall to value adding industry.
5. Domestic gas supply during winter peak demand counting against higher cost domestic consumers' slabs instead of distributing among all domestic consumers.

Talking about opportunities for investment and development of energy sector, Dr. Ahmed stated that there is need for:

1. Economies of Scale safer Nuclear power plants of over 1000 MW.
2. Advanced CCGT with thermal efficiency of over 64%.
3. Major thrust on hydro for strategic balance of 50% hydel generation to cut power cost and G&G emissions, and for critical water storage.
4. A revolution of rooftop solar, especially for off-grid communities.

5. Tapping high velocity wind power along coastal areas and inland wind corridors.
6. Improving capacity, reliability and efficiency of national grid to reduce losses and increase evacuation capacity.
7. Rationalizing power & gas tariff towards cost of service.
8. Turning DISCOs into cost centres to buy power with revenues collected. Local load shedding on feeders of low recovery.
9. Increasing capacity and expertise of regulatory bodies and ensuring stand-alone and autonomous regulation.
10. Enforcing governance to cut down energy theft and ensuring payment of dues.

Talking about management of specialized ministries like Energy, Petroleum and Power, Planning, Finance, Economic Affairs Division, Science & Technology, and Environment, Dr. Ahmed said that Pakistan's administrative services are continuing to follow the old British practice of administration through generalist bureaucrats. With frequent turnovers, the generalist federal secretaries seldom develop adequate understanding of the specialized ministries and are not able to institute policy reforms. Therefore, optimal management suffers serious setbacks breeding inefficiency and inaction. He said that as an example, he started a tradition that in the Energy Year Book the Federal Secretary Petroleum would share his vision in a policy paper setting out priorities and guidelines for efficient energy management. After 1999, this practice was discontinued. There is a need of a professional cadre of highly qualified specialist bureaucrats or in case of generalist, extraordinary education programs in specific fields including PhDs. Continuous service reforms are needed for a vibrant and efficient public service.

Dr. Ahmed concluded by saying that if China decides to buy the Iranian oil, the price could sink to \$30 a barrel according to Bloomberg. If wishes were to come true, our energy import bill could go down from \$12 bn to \$6 bn and economy would move into green. China and Iran fleshed out a strategic partnership in August 2019 according to which:

1. There will be \$280 bn Chinese investment in Iranian oil, gas and petroleum sector over 25 years.

2. A 2,300 km New Silk Road that would link Urumqi (the capital of China's western Xinjiang Province) to Tehran via Tabriz.
3. China has agreed to increase imports of Iranian oil in defiance of a US decision not to extend China's waiver on imports from Iran in May 2019.
4. There will be up to 5,000 Chinese security personnel on the ground in Iran to protect Chinese projects.
5. Chinese companies to have first right to bid on projects undertaken by China.

Russian State Bank on September 11, 2019, indicated the likelihood of oil dropping to \$25 a barrel by middle of 2020. It would be a help from blue to Pakistan.

The outlook on falling oil price stems from the current over-production capacity of oil in the world. This has been contributed mainly by the Permian shale oil in America which currently is producing 4 million barrels a day, but has the ready capacity to increase to 8 million barrels a day if there is sufficient demand of oil in the world. The Permian oil is profitable even at \$35 a barrel.

Dr. Ahmed concluded his presentation with an upbeat note on improving Pakistan's energy security, as well as its economy but stressed on the need for carrying out the energy sector reforms identified during the presentation. The talk ended with an interesting question and answer session