Energy Problem in Pakistan and Solar is an Alternative Solution

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Abstract:
This work examines Pakistan's energy problem and Solar is an alternative problem. Statistics from various secondary sources , i.e. annual reports, have been obtained. The SPSS-21, which has been studied, is highly reliant on coal energy for energy production in Pakistan. Such sources do not satisfy the country's actual energy needs due to the immense population and recent industrialisation growth. These are meanwhile detrimental to the climate and are economically inadequate for remote electrification. The purpose of this report is to highlight the best solar power electricity option in Pakistan, therefore, there is a need to find alternative energy sources. For a year, we collected wind and solar traffic information in four major Pakistani cities. The findings show that solar power is Pakistan's biggest choice in terms of size, life, business and maintenance costs for sustainable power. Semi-structured interviews with industry experts identified significant obstacles across the entire solar energy spectrum. Lastly, important policies for institutions and governments have been proposed to resolve these barriers and to use full solar energy in the region.
Keywords: *Energy Problem in Pakistan, Solar Solution*

Introduction

Energy is an economic lifeline and is an important contribution to the survival of manufacturing, commercial and domestic operations. Infrastructure failures and resource scarcity not only contribute to lack of economic development and jobs, but have a negative effect on social stability. Since 2007, the energy crisis has broken up in Pakistan and has deepened, significantly adversely, in 2012. The inability to provide adequate planning, an economically and financially sustainable policy and a disabled regulator contributed to supply-demand discrepancies. The situation combined involved high losses of transport and dispersion, production of gray force and lower revenue. This is used to control revolving debt collection with this semiconductor diode. As a result, Brobdingnagian subsidies had to be taken from the federal budget to cover money holes in the power sector, which, on the one hand, threatened economic stability and increased public debt.

Nevertheless, the present government has taken a comprehensive decision to address this issue as the primary priority of its economic reform agenda by realizing the gravity of economic activities and their energy importance, with particular stress on the revitalisation of the almost stalled industrial sector, the creation of jobs and financial gains. In this sense, at the time of taking the oath that had an additional 1752 MW of electricity in the grid, government revoked the circulary debt (Rs 480 billion). The government has established the National Power Policy (2013) to provide the country with an affordable energy supply through an economic generation, transmittal and distribution network with a view to solving the problem permanently. Policy is expected to concentrate on a rapid economic and social development flight in the asian region. Additionally an 84 M W New Ring Hydro Power Scheme, the largest hydro IPP in Pakistan / AJ&K, has been constructed with the goal of cutting power generation prices to fair quantities, Although the power generation began at 10.5 MW of coal, which was mainly based on the Davis Energen project in Jhang, and is favorable towards the FESCO system. Also, the city center was opened with two x 660 MW external coal dependent mainly on the Power Project in Port Qasim.

In short, the govt has addressed the problems facing the energy infrastructure of the Asian nation. Efforts are therefore under way to overhaul the existing power network in order to boost the ambitions of the energy sector. Over the last decade, there is a prediction of the highest power level decreasing for a final-shopper, who might bring wealth or social reform inside the nation; as an Asian country, from energy insufficient to

regional power businesses. The possible improvements of transmission and distribution would decrease.

LITERATURE REVIEW

This paper is mainly aimed at finding why it is unable to handle increasing energy deficiencies in the Islamic Republic of Pakistan. I have analyzed a wide selection of peer reviewed literature, guides, state-supported studies and energy seminar literature in my preliminary research. This shift entirely different facets of the problem but what has led to the intensification of the Pakistani crisis is the more inefficient recovery mechanism. It is a challenging fact that theft of electricity is so widespread in society that it severely threatens the recovery of energy costs. The large and powerful sectors of the population, who are in agreement with energy generation and distribution firms, also engage in major electrical theft that not only weaken the recovery pool, but often increase the circular burden in the energy sector. Increasing the reclamation side is made possible by adding coal, bad and inefficient electricity supply controls. The new government has certainly brought the recovery inefficiency from 24% to 16%, but further steps do need to be taken in this regard.

The research on 'Electricity crises in Pakistan and the Future Guideline for policymakers' has been conducted by Shah and Bhatti (2010). The article responds to the question of what the electricity supply shortage in Pakistan is. It discusses the basic reasons of the supply deficit. Figure 2 indicates the share of various types of power plants in Pakistan. Table 2 describes Pakistan 's historical peak demands from 2002-2007. For the years 2009-2020, Table 3 provides a forecast of demand and production. A cautious review of Tables 2 and 3 shows evidently the continuing shortage [the Federal Bureau of statistics 1998] while the capacity built in Pakistan will increase. To resolve this crisis, the government must take action. An analytical data and approximate estimates have been made for the next 10-12 years. The possible electricity and energy sources for Pakistan are discussed briefly. It also addressed the importance of using Pakistan's coal resources. The water resource capacity for the hydro-electric power plant construction is also defined by referring to the importance of the river power project. Solutions to resolve the crisis are also given in the short and long term. This article addresses the value of energy sources for renewables including solar and wind energy. This paper offers a short overall picture of the electricity crisis of Pakistan and the major site for reducing the power shortfall of Pakistan.

Saleem (2003) has developed the research paper 'Electricity Generation Technical Efficiency of Pakistan' to address the question; what is the effect on Pakistan of public and private ownership? The aim of this paper is to test the zero hypothesis that technical efficiency exists in public-owned companies. That is done by the use of business annual reports and the collection of data during field visits to Pakistan's electricity market. This paper performs a comparative study of technological efficiency of 21 power plants and two methodologies of state-of- the art: Stochasic Frontier Study (SFA) and Data Envelopment Analysis (DEA) using panel data from 6 years (1998-2003). The findings show a mixed technological and size performance outcomes for public and private plants. Many public and private organizations have a high degree of technological performance. The findings also indicate, however, that public ownership affects the technological performance of companies negatively. Although there are less clear systemic differences between public and private plants, performance measurement is desirable for public undertakings that use commercial plants as their comparative instruments. Our analysis offers a broader context for a major research gap which is technically successful for private and public electricity production. The study also shows that public and private plant output systems are also somewhat different because of ineffectiveness such as billing, loans to machinery, average demand and per capita electricity usage.

Basharat (2010) wrote a paper focused fundamentally on the issue: 'Where is all power gone? 'Electrical & electronics engineers Pakistan is the member of the central council institution. The exploration of the gentleman with very little insight into the subject contributed to an inadequate review. Given what is written, we remember the massive shedding of load at the end of 2007 leading to a disappearance of the previous political situation and to the continuation of power deficits since 2004-05 even though they have spread from the larger cities. The writer again makes errors by describing Pakistan's April 20, 2010 demand as

14.500 MW, compared to 17.000 MW on that day, while at the end of June and early July, it exceeded the 20.000 MW level. Indeed, the PEPCO area was 14,500 MW (excl. KESC), and due to an extremely low power generation of only 2300 MW from or so the low production of that day was expected to be 4,000 MW. Nevertheless, the demand has been a little below 18,000 MW for the last few days due to cooler temperatures and floods in large areas.

Mr. Tahir later provided a list of power plants previously constructed in the country from 1959 to 1992, and then only summed up the total capacity constructed that, unfortunately, is unrelated to the actual capacity of those power plants themselves. The numerous strategies relating to power house activities and their availability at different times of the year have often been neglected. Indeed, it should be recognized that power generating equipment decreases efficiency immediately upon installation, this is then preserved through stringent recovery and restoration procedures only. If, in some situations, the maintenance required cannot be carried out, then the capacities may be de-rated. In fact, the Power Sector has been refused the requisite funds in general over the past 15 years and in particular until 2008, resulting in a decreased production capacity as a whole.

The state economy, then weak, had strengthened by 75% to late 20, partially due to fiscal stimulus against the government and also due to inflation. A industrial recession over a focused part of production was warned by the State, according to a recent announcement by the Federal Ministry of Finance in Pakistan, that it must harden about 1 trillion rupees annually to establish the Islamic Republic of Pakistan (SBP) 's banking concern. The marginal energy tariffs given led to high prices for supply. The lack of energy required has had an equal effect on services. In the future, as a result of a shortage of coal, the rail industry would have reduced its activities to most tracks, rising and predicted to end the road figures. Official estimates state of work: "Since 2008 the country's energy crisis has been a significant contributer to the growth of the world economy, with 4,1 million employment and economic prospects destroyed. In order to function, energy is needed for all human activities, such as education , healthcare, agriculture and employment. Without proper use of oil, a country cannot succeed. Pakistan is considered to be the main economic component of a region, and is a developing country. Due to recent changes, the country needs tremendous energy in support of its large population and industry to keep things on track[2,3]. Nevertheless, the power supply is low and the country is facing the worst resource shortage. The gap in demand for electricity and supply has dramatically risen in recent years particularly in the summer which has contributed to a full shutdown of energy from 10 to 12 hours in metropolitan cities particularly 16 to 18 hours.

Problems of energy shortages affect not only people's lives, but also hinder country economic growth. The country was badly affected by long power outages and caused tremendous economic losses in all industries, including agriculture, manufacturing, transport, domestic and energy generation. The current share of green energy is low in Pakistan's overall electricity mix. The nation's energy needs are fulfilled by the use of fossil fuels. High dependence on coal energy has a global responsibility and has helped to resolve various environmental challenges, such as greenhouse impacts, carbon pollution, global warming, and erratic weather patterns. In addition, due to over-use of fossil fuels , renewable resources are being exhausted. A new energy economy must therefore be created. Solar energy will rise 8 times by 2030 and 20 times by 2050 in Pakistan's current economic scenario. The energy crisis in Pakistan is mainly due to sudden price rises and thermal resources such as electricity, petroleum and gas and the power grid of Pakistan is crucial. It is predicted that Pakistan’s energy deficit will grow by 8 to 20 by 2030. The proportion of hydropower has declined substantially in the recent past. In addition, renewable sources of energy meet nearly 0.3 percent of the country's electricity needs. Solar power provides numerous clean energy solutions with the ability to overcome these obstacles. This has emerged as the world's most cost-effective technology. At the end of 2017 global solar photovoltaic power exceeded 402 gigawatts (GW), the International Energy Agency reports. This will extend by approximately 580 GW and contribute to the development of renewables[13]. The institutional and technological obstacles to solar energy have been established by Luckow et al . [14]. Since nearly two decades, the European Commission has been implementing solar energy research programs to reduce pollution and emissions of carbon, to ensure stability in energy and diversify the European countries' energy mix[15].

Pakistan lies in the sunbelt geographically, receiving large amounts of sunshine during the year. The use of developed solar power to tackle potential energy issues is of critical importance. In the meantime, private and public spending is very necessary to maximize income. Many academics have concentrated on solar energy to assess Pakistan 's capacity for successful use; Khalil and Zaidi recognize that Pakistan is undergoing power shortages. The value of solar power as the natural resources for Pakistan was emphasized by Shaikh et al. The best solution for the country's current power crises was suggested by Farooq and Shakoor. The technological potential of solar electricity generation was evaluated by Farooq and Kumar. The country has a total solar energy capacity of 1600,000 MW in its estimates, Shakeel & Mirza discussed Pakistan 's viewpoint and position on solar-power usage and highlighted the role of R&D organizations. As potential solar heat applications, i.e. solar energy heating to fabrics, have been identified by Muneer. The PV system was planned for domestic customers by Ghafoor and Munir. Several scientists have identified renewable energy challenges. Nonetheless, no one attempted to equate native sustainable energy with various variables to ensure best green electricity of Pakistan.

Research Methodology

The data collection and usage is contrasted with other energy types from different secondary sources of solar use. We are collecting data from solar project projects in Pakistan, analyzing data using the SPPS-24 version. For the first time in four major cities in Pakistan, Karachi , Lahore, Bahawalpur & Larkana, we collected data for the first time on solar energy and wind speed for one year. The NASA Sun Map and Pakistan Wind Map were used to determine the best location for the maximum solar and wind speeds. Measure the production of solar and wind power; data were then measured and plotted using a MAT LAB and RT screen against the 1 kW solar photovoltaic and wind Turbine (figures 8–11).

Results & Discussions

Pakistan is located in such a blessed area, with four seasons and a huge renewable energy potential. The government will take action to use alternative (renewable energies) energy sources, since such tools are used globally, but these are still being considered. Throughout the coastal areas of Baluchistan and on the banks of the river Sindh there are many available winds. In the country, and particularly in hot climate zones such as Thal, Thar and Cholistan, we have an abundance of solar energy. When renewable energy is adequately used, the supply deficit can be reduced.

Wind Energy

Under the eighteenth modification, electricity generation profits go directly to the province that generates electricity, for instance if Warsak dam produces electricity. In order to achieve their own income for each territory, we have to remove the national grid. Since they cannot offer their own rights because they are linked to the national grid, which is contrary to the 18th amendment. Each province generates a lot of energy and can sell it in another province if the government takes this step. The governments get away a little as each province wants its municipal administration to do so and does not accuse the federal government. This is called 'provincialization' and not 'previncialization,' and the province generating more energy would be supported by the federal government. It will boost their infrastructure and greatly minimize line losses and power stealing which will give their people cheaper energy.

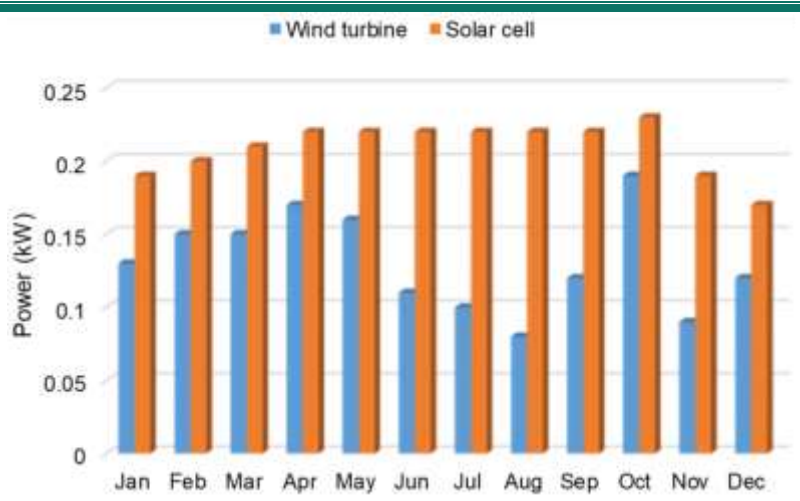

Figure 8. Comparison of power generation at Karachi solar photovoltaic and wind turbine.

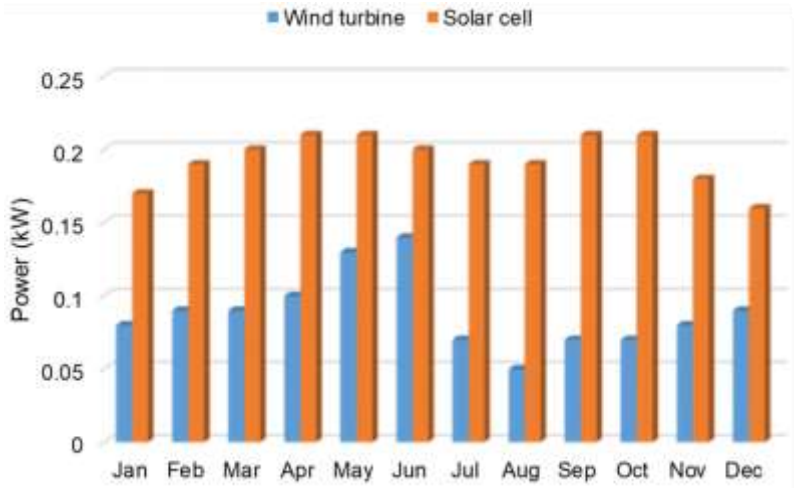

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Figure 9. Comparison between solar and wind turbine power generation at Lahore. Lahore.

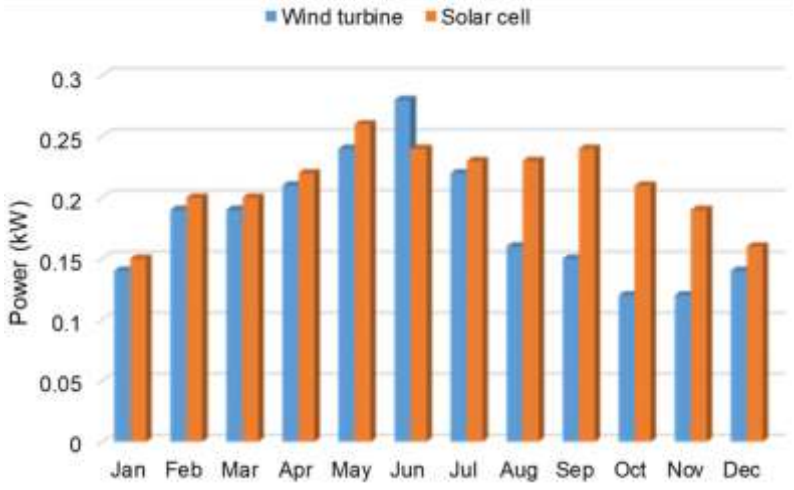
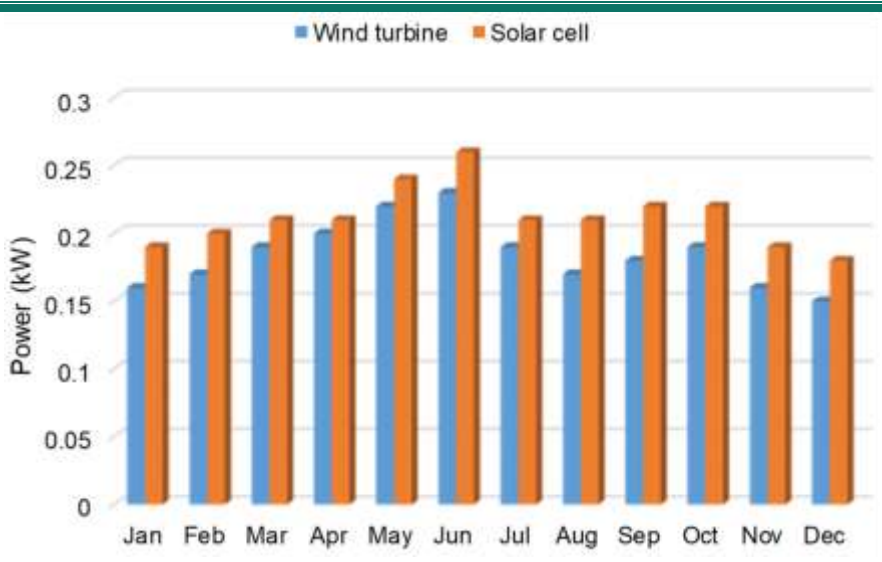


Figure 10. Comparison of power generation at the Larkana solar power plant with wind turbines.



7. Solar Energy Grid Structure and Situation in Pakistan

For a country's social and economic growth, modern energy services are essential. Conventional energy sources are not capable of fulfilling Pakistan's current needs of resources , resulting of big electricity-deprived populations. Due to technological advancements which placed extra pressure on grids, energy requirements have increased dramatically. Pakistan's conventional grid system is designed primarily for traditional power that cannot sustain current electricity loads and does not incorporate renewable sources of energy. Network losses, such as delivery and storage loss, are even greater in other South Asian countries. New lines and substations would make the power shortages even worse. The grid network therefore needs to be considerably improved to meet the growing demand for electricity. The current grid system must become an intelligent, self-contained network in order to achieve a high degree of renewable energy. Smart grids would also reduce the risk of transmission and distribution failures.

Conclusions and Recommendations

The findings of the research paper indicate that the competitiveness of leather, textile and pharmaceutical industries has been sustained given the power problems in Pakistan. Although textile, pharmaceutical and leather industry's competitiveness declines during 2007 power issues, comparative benefits values are higher than 1 and Pakistan is concluded to be competitive in the above-mentioned industries. Nevertheless, the tobacco industry is uncompetitive, since its profit for the tobacco sector is less than zero. Furthermore, in Pakistan, the productivity of the industrial sector in electricity production is significantly supported; the cost of production is high. As a consequence, the industry’s profits are reduced by lower energy availability and more consumption.

For the socio-economic development of a nation, energy is critical. Pakistan relies exclusively on conventional energy sources, as do many other developing countries, to create electricity. Due to its large population and recent growth in the industry, energy demand is high. In fact, fossil fuel prices have risen recently and energy scarcity is not feasible in terms of generating capacity. There has been enormous growth in electricity demand and supply gaps. The growing energy gap has severely affected all sectors of life. Politicians around the world are searching for renewable energy alternatives to energy shortages. In Pakistan, too, there is exploration of different sources of conventional and renewable energy. We measured the performance, average duty life cycles, toxic emission of waste, fuel use, running costs, and maintenance costs of renewable energy sources such as solar and wind. We assume that solar energy is the principal source of renewable energy because it is cheaper, needs no maintenance or service costs and has an estimated lifespan of less than wind. Wind velocities are ideal for 5 to 6 months a year only, with sunlight available in the country. In fact, green energy is limited to the national budget for the purchase of unreliable fossil energy sources. The only choices in Pakistan are photovoltaic panels, solar water heaters, solar

geysers, solar heaters or solar pumps. The Quaid-e - Azam Solar Park is growing in growth and associated projects and making people more conscious of solar energy. However, until now, the share of the country's overall energy mix is negligible. The topography and climate in Pakistan are suitable for the best use of solar energy. Finally, battling solar impediments and rising recognition of current global energy issues has been having a multifaceted political impact, promoting and endorsing renewable energy initiatives, and drawing foreign or domestic investment in solar projects. Ultimately, solar energy will solve the energy shortage in Pakistan in a matter of time.

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