

ENERGY CONSERVATION POLICY ANALYSIS IN PAKISTAN: UNCOVERING DEFICIENCIES AND CHARTING A PATH FOR PROGRESS

Muhammad Amin Durrani¹

Dr. Muqem-ul-Islam²

KJPP

Citation:

Durrani, M. A. (2023). *Energy conservation policy analysis in Pakistan: Uncovering deficiencies and charting a path for progress*. Khyber Journal of Public Policy, 3(1), Winter

Article Info:

Received: 18/09/2023

Revised: 24/10/2023

Accepted: 2/11/2023


Published: 31/12/2023

Disclaimer:

The opinions expressed in this publication do not implicitly or explicitly reflect the opinions or views of the editors, members, employees, or the organization. The mention of individuals or entities and the materials presented in this publication do not imply any opinion by the editors or employees regarding the legal status of any opinion, area, territory, institution, or individual, nor do they guarantee the accuracy, completeness, or suitability of any content or references.

Copy Right Statement:

© 2022 Khyber Journal of Public Policy

 This work is licensed under a Creative Commons Attribution 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract:

Energy efficiency policies are crucial in promoting sustainable energy use and reducing environmental impact. These policies, adopted globally, aim to address energy challenges such as increasing demand, environmental sustainability, and energy security. This research focuses on the evolution and implementation of energy efficiency policies in Pakistan, highlighting the need for a strategic framework to enhance energy management and address the country's ongoing energy crisis. The establishment of ENERCON in 1985 marked the beginning of Pakistan's efforts in energy conservation. The subsequent legislative developments, including the Pakistan Energy Efficiency and Conservation Act of 2011 and the National Energy Efficiency and Conservation Act of 2016, set the foundation for institutional initiatives. The recent National Energy Efficiency and Conservation Policy of 2023 aims to achieve energy-saving targets and reduce emissions. This paper underscores the importance of a holistic approach, including financial incentives, public-private partnerships, and comprehensive policy integration, to ensure long-term sustainability and optimal resource utilization in Pakistan's energy landscape.

Key words:

Energy Efficiency, Policy, Pakistan, Sustainability, Energy Conservation

¹ Currently posted as Assistant Chief-Fuel Energy, Appraisal and Plan Formulation Section, Ministry of Planning, Development & Special Initiatives, Islamabad

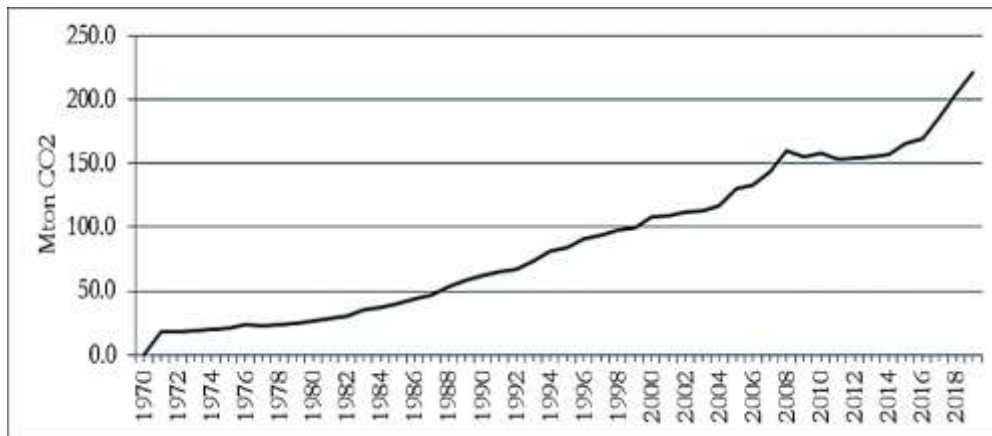
² Editor

Introduction

Energy Efficiency Policy is a strategic framework designed to promote and regulate the efficient use of energy resources within a given jurisdiction. These policies aim to minimize energy waste, enhance productivity, and reduce environmental impact by encouraging the adoption of energy-efficient technologies, practices, and systems (Kerr, Gouldson, & Barrett, 2017). Governments and organizations worldwide recognize the significance of energy efficiency policies in addressing energy challenges, such as increasing demand, environmental sustainability, and energy security. These policies typically encompass a range of measures, including setting energy efficiency standards for appliances, promoting research and development in energy-efficient technologies, and providing incentives for businesses and individuals to invest in energy-saving initiatives (Mushafiq, Arisar, Tariq, & Czapp, 2023). The implementation of effective energy efficiency policies can result in numerous benefits, including cost savings, reduced greenhouse gas emissions, and increased energy security (IEA, 2019). As the global community intensifies efforts to combat climate change and ensure sustainable development, energy efficiency policies play a pivotal role in shaping a more resilient and sustainable future (Mushafiq et al., 2023).

Need for Energy Efficiency

The global discourse on energy efficiency has gained unprecedented importance, driven by recent events and comprehensive studies emphasizing its pivotal role in addressing worldwide energy challenges. Energy and electricity, while essential, can lead to wastage and environmental pollution if used without thought (Aslam, 2021). As cities and populations grow, the demand for electricity rises, especially in developing countries, posing challenges. Electricity shortages significantly impact industries and the overall economic situation on micro and macro levels. Globally, energy consumption is increasing by 3.4%, with the Asia-Pacific region experiencing one of the highest growth rates (Aslam, Nazir, & Zia, 2021). A notable report from the International Energy Agency (IEA) emphasizes the indispensable contribution of energy efficiency in addressing contemporary energy crises, proposing urgent measures to alleviate their profound impacts (IEA, 2022). The report indicates that enhancing action in energy efficiency could significantly reduce global CO₂ emissions by an additional 5 gigatons per year by 2030.



In the context of Pakistan, initiatives for energy efficiency play a central role in the national energy landscape. The country addresses unique energy challenges by focusing on green alternatives and various energy-saving solutions (Jilani, ur Rehman, & Islam, 2021). The urgency to expedite action in energy efficiency is underlined by the potential for significant reductions in CO₂ emissions, recognizing its role as a vital escape route from the ongoing energy crisis (Xin, Bin Dost, Akram, & Watto, 2022). These incidents underscore the imperative for immediate and collaborative endeavors to enhance energy efficiency globally and within the specific context of Pakistan.

Evolution of Pakistan's Energy Policy

Pakistan's energy policy has undergone significant changes over the years in response to a myriad of challenges and opportunities. In the 1960s, the country heavily relied on hydropower projects like the Tarbela Dam, marking the initial stages of energy infrastructure development (Factsheet, 2020). The nationalization of energy assets in the 1970s and subsequent economic challenges in the 1980s and 1990s led to a shift in focus. The early 2000s witnessed privatization and power sector reforms to address inefficiencies, with a particular emphasis on attracting investments and improving efficiency through independent power producers (IPPs) (Mirjat et al., 2017). Recognizing the need for sustainable solutions, recent developments have seen a renewed focus on energy efficiency and renewable sources. The introduction of energy efficiency measures is critical to optimizing energy consumption and mitigating the impact of resource scarcity. The importance of addressing energy issues in Pakistan is underscored by the ongoing energy crises, which have persisted for more than a decade. The nation's reliance on imported fossil fuels, circular debt, political instability, and governance issues contribute to the challenges (Khatri et al., 2023). Pakistan's energy crisis emphasizes the need for a policy-making framework to enhance energy management through a probabilistic approach (Sajid & Javaid, 2018). The

energy industry in Pakistan is in crisis due to a lack of energy output to meet rising demand, underscoring the urgency of finding sustainable solutions (Ikram, 2022). In essence, addressing these challenges requires a holistic approach that combines effective policymaking, investments in alternative energy sources, improvements in governance and regulatory frameworks, and a strong emphasis on energy efficiency measures to ensure optimal resource utilization and long-term sustainability.

Energy Efficiency Regime in Pakistan

Establishment of ENERCON

The focus on energy efficiency and conservation in Pakistan began with the establishment of the Energy Conservation Project (ENERCON) in 1985 as a USAID project, aiming to enhance energy efficiency across different sectors of the economy (Team, 2021).

Pakistan Energy Efficiency and Conservation Act, 2011

The initial legislative step towards energy conservation was the Pakistan Energy Efficiency and Conservation Act of 2011, laying the groundwork for institutional development and initiatives in this domain (NEECA, 2016).

National Energy Efficiency and Conservation Act, 2016

A significant milestone occurred in 2016 when Pakistan enacted the National Energy Efficiency and Conservation Act. This legislation replaced the 2011 Act and received the President's assent on June 28, 2016. It marked a comprehensive effort to drive institutional development, improve energy efficiency, and address the country's energy challenges (Kenji, 2016).

National Energy Efficiency and Conservation Policy, 2023

In 2023, the government approved the NEEC Policy, outlining sectoral measures and a roadmap for sustainable energy development. This policy aims to achieve energy-saving targets and reduce emissions, emphasizing a holistic approach and stakeholder consultations (NEECA, 2023).

Problem Statement

Pakistan's energy sector faces a multitude of challenges that hinder its growth and efficiency. The country's overreliance on imported fossil fuels, particularly oil and gas, has led to soaring energy costs, placing a significant burden on the economy. This dependency on imported energy sources also

exposes Pakistan to price fluctuations and geopolitical uncertainties, making it vulnerable to supply disruptions. Additionally, the country's energy infrastructure is aging and inefficient, resulting in substantial energy losses during transmission and distribution. Moreover, despite the introduction of the NEEC Policy in 2023, significant gaps persist in its implementation. Furthermore, the lack of investment in energy efficiency measures across various sectors, including industry, transportation, and buildings, contributes to excessive energy consumption and exacerbates the energy crisis. These compounding challenges demand a comprehensive assessment of the energy efficiency policy that addresses the root causes of Pakistan's energy woes and paves the way for a sustainable energy future.

Analysis

Situational Analysis

Energy Landscape in Pakistan

In Pakistan, the energy mix includes natural gas, crude oil, coal, renewable energy, nuclear, and hydroelectricity. According to the Pakistan Energy Yearbook 2021-22, total primary commercial energy supplies were 94 million Tonnes of Oil Equivalent (TOE). Notably, natural gas led with 34.309 million TOE, followed by crude oil, petroleum products, and LPG at 29.493 million TOE. In terms of sources, oil accounted for 29.8%, natural gas 26.4%, and coal 17.2%. Final energy consumption in 2021-22 decreased by 7.46%, with the industrial sector leading at 35.1% (HDIP, 2023).

For oil, reserves were 31.2 million tonnes, with 3.6 million tonnes crude production and a USD 19.45 billion import bill. Natural gas had 19.5 trillion cubic feet reserves, producing 3,390 million cubic feet per day, with a 397,965,590 MMBtu LNG import bill. Coal, with 7,775.5 million tonnes reserves, produced 9.6 million tonnes, importing 18.1 million tonnes with a PKR 452 billion bill. In electricity, the installed capacity was 41,402 MW, generating 150,866 GWh, including 6,195 GWh from renewable sources. The country imported 463 GWh, while consumption reached 111,263 GWh. Pakistan's renewable energy installed capacity was 2,742 MW, generating 6,195 GWh (HDIP, 2023).

| Energy Source | Share of Total Primary Commercial Energy Supplies (%) | Balance Recoverable Reserves | Production | Consumption | Import | Import Bill |
|---------------|---|---|--|--|----------------------------------|--------------------|
| Oil | 29.8% | 31.2 million tonnes (232.5 million barrels) | 3.6 million tonnes (26.8 million barrels) | 22.84 million tonnes of petroleum products and LPG | 11.3 million tonnes of crude oil | US\$ 19.45 billion |
| Natural Gas | 26.4% | 19.5 trillion cubic feet | 3,390 million cubic feet per day | 1,342 billion cubic feet | 397,965,590 MMBtu of LNG | US\$ 4,929 million |
| Coal | 17.2% | 7,775.5 million tonnes | 9.6 million tonnes | 27.7 million tonnes | 18.1 million tonnes | PKR 452 billion |
| Electricity | 14.9% | N/A | 150,866 GWh (including 6,195 GWh of renewable energy generation) | 111,263 GWh | 463 GWh | N/A |
| LNG Import | 10.1% | N/A | N/A | N/A | 397,965,590 MMBtu | US\$ 4,929 million |
| LPG | 1.6% | N/A | 1,610 million tonnes | 1,277 million tonnes | N/A | N/A |

Table 1. Energy Sources in Pakistan: A Comparative Analysis of Share, Reserves, Production, Consumption, and Import (HDIP, 2023)

Energy Crisis in Pakistan

Pakistan is an energy-deficit country, and its energy mix heavily relies on imported fuels such as oil and gas. This reliance results in a high import bill, posing a major challenge for the economy (Khatri et al., 2023). The primary energy supply of Pakistan is expected to grow to 116 MTOE by 2030 under the Business-as-Usual scenario. For power production, the major sources of primary energy supply in Pakistan are oil (37%), gas (29%), hydroelectricity

(30%), and coal (4%). The installed generation capacity in the country has reached 41,557 MW against a maximum total demand of 30,000 MW. This indicates an oversupply situation, which results in the operation of inefficient power plants over efficient ones.

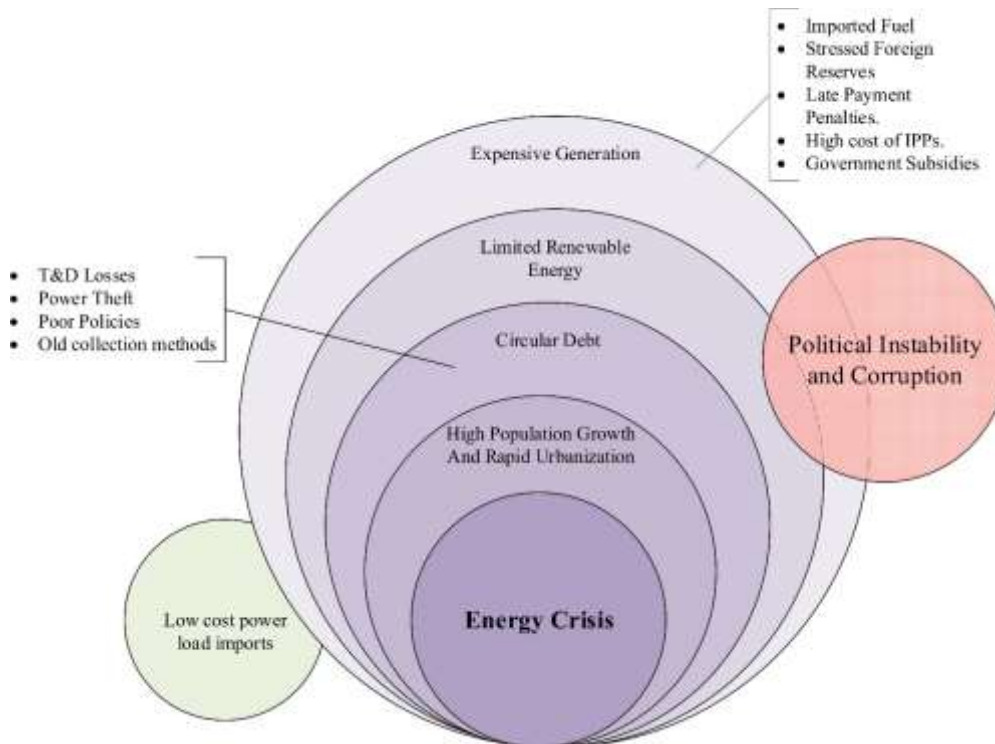


Figure 2. Energy crises in Pakistan (Khatri et al., 2023)

Recent studies highlight the uncertainty in energy data, indicating challenges in effective energy policy formulation (Sajid & Javaid, 2018). The energy sector faces systemic problems, influencing the overall economic situation. A critical analysis of Pakistan's economic and energy landscape is imperative to understand the complexities of the crisis (Khatri et al., 2023).

SDG 7: Ensuring Affordable and Clean Energy

The seventh Sustainable Development Goal (SDG 7) focuses on ensuring access to affordable, reliable, sustainable, and modern energy for all. Energy efficiency is a crucial aspect of this goal, as it plays a pivotal role in reducing energy consumption, mitigating climate change, and promoting sustainable development.

Pakistan is committed to achieving SDG 7 on energy efficiency. The country has set ambitious targets for reducing energy consumption and increasing the share of renewable energy in the energy mix. However, despite the progress made, Pakistan still faces a number of challenges in achieving SDG 7. The

country's energy infrastructure is aging and inefficient, and there is a lack of investment in energy efficiency and renewable energy. Additionally, Pakistan's energy sector heavily relies on imported fuels, making it vulnerable to price fluctuations. To achieve SDG 7, Pakistan will need to continue investing in energy efficiency and renewable energy.

Dimensions of Issues

The preceding analysis illuminates critical issues within Pakistan's energy sector, necessitating attention under the NEEC Policy. These challenges include:

- **Limited Financing Access:** Energy efficiency projects face hurdles in securing funds due to high initial costs, extended payback periods, and a lack of performance guarantees for solution providers.
- **Information Asymmetry:** Major stakeholders rely on traditional channels such as technicians, electricians, masons, and TV advertisements, leading to information asymmetry for energy-efficient products.
- **Inadequate Energy Information Sharing:** Insufficient sharing and delivery of energy information hinder investments in energy efficiency programs.
- **Low Implementation in Industry:** Industry lags in implementing energy efficiency measures due to a lack of awareness, capacity, and effective regulatory frameworks.
- **Inefficient Energy Use in Buildings:** Buildings experience energy inefficiency through poor insulation, outdated equipment, and a lack of awareness among occupants.
- **Limited Adoption of Energy-Efficient Transportation:** High technology costs, lack of incentives, and limited infrastructure hinder the adoption of energy-efficient transportation systems.
- **Challenges in the Agriculture Sector:** The agriculture sector faces obstacles in adopting energy-efficient practices, stemming from a lack of awareness, capacity, and technology access.
- **Supply-Side Inefficiencies in the Power Sector:** Outdated equipment, insufficient transmission and distribution infrastructure, and high losses contribute to inefficiencies in the power sector.
- **High Power Distribution Losses:** Outdated power infrastructure and inefficient equipment contribute to high power distribution losses, reaching over 38% for some Distribution Companies (DISCOs).
- **Potential Solution:** Implementing demand-side management through energy efficiency and conservation measures stands out as a strategic approach to alleviate the burden on the national grid, presenting a silver bullet for peak shaving.

Analytical Techniques

The following analytical techniques have been employed to assess the current energy conservation policy and to develop recommendations for improvement:

Policy Gap Analysis

A gap analysis of the NEEC Policy 2023 has been conducted by comparing the policy's goals and objectives with the current state of energy efficiency and conservation in Pakistan. The following are some of the key gaps that have been identified:

Institutional and Regulatory Gaps

- Weak intergovernmental coordination between the federal and provincial governments on EE&C issues: This gap could be addressed by establishing a mechanism for regular consultation and coordination between the federal and provincial governments on EE&C issues.
- Lack of adequate capacity and resources at the provincial level to implement EE&C measures: This gap could be addressed by providing funding and technical assistance to the provincial governments to develop and implement EE&C programs and initiatives.

Economic and Financial Gaps

- High upfront costs of energy efficiency investments: This gap could be addressed by providing financial incentives to businesses and individuals to invest in energy efficiency, such as tax breaks, rebates, and loans.
- Lack of access to affordable financing for EE&C projects: This gap could be addressed by developing innovative financing mechanisms for EE&C projects, such as public-private partnerships and green bonds.
- Lack of economic incentives for businesses and individuals to adopt energy-efficient technologies and practices: This gap could be addressed by developing market-based mechanisms to promote energy efficiency, such as carbon pricing and energy efficiency trading schemes.

Awareness and Knowledge Gaps

- Low awareness among consumers and businesses of the benefits of energy efficiency: This gap could be addressed by raising awareness of the benefits of energy efficiency through public education campaigns and other outreach initiatives.
- Lack of technical expertise and skills in the field of energy efficiency: This gap could be addressed by investing in training and capacity building programs for energy efficiency professionals.

Technology Gaps

- Limited availability of energy-efficient technologies in the Pakistani market: This gap could be addressed by promoting the development and commercialization of energy-efficient technologies in Pakistan.
- High cost of imported energy-efficient technologies: This gap could be addressed by reducing tariffs and other trade barriers on imported energy-efficient technologies.
- Lack of local capacity to manufacture energy-efficient products: This gap could be addressed by investing in research and development and technology transfer initiatives to promote the local manufacture of energy-efficient products.

Gaps in Implementation

- Lack of a comprehensive implementation plan for the NEEC Policy 2023: This gap could be addressed by developing a comprehensive implementation plan for the NEEC Policy 2023 that outlines the specific actions that need to be taken by the government and other stakeholders to achieve the policy's goals.
- Weak monitoring and evaluation mechanisms for tracking the progress and impact of EE&C measures: This gap could be addressed by developing robust monitoring and evaluation mechanisms to track the progress and impact of EE&C measures and identify areas where further improvement is needed.

Policy SWOT Analysis

The following is a detailed Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis of the EE&C Policy in Pakistan:

Strengths (Internal Factors)

1. The policy provides a comprehensive framework and guidelines for promoting EE&C in key sectors of the economy, including industry, buildings, transport, and agriculture.
2. The government has established provincial designated agencies to ensure effective implementation and monitoring of the policy.
3. The government is committed to the policy and has provided financial and technical support.
4. Pakistan has a pool of experienced experts and professionals in EE&C, and there is a range of technology options available for EE&C interventions.
5. The policy is aligned with the country's national energy policy and sustainable development goals, and it has a strong focus on capacity building and awareness raising.
6. The government has developed a number of financial incentives to

promote EE&C investments, such as tax breaks, rebates, and subsidized loans.

Weaknesses (Internal Factors)

- There is limited awareness and knowledge about EE&C, particularly among SMEs and consumers.
- There are insufficient financial and human resources for policy implementation and enforcement.
- There are operational and technical gaps, such as limited availability of energy-efficient products and services, lack of testing infrastructure, and a shortage of certified energy auditors.
- There are financial gaps, such as limited financial and credit products.
- EE&C policy implementation is still in its early stages, and the institutional and regulatory framework needs to be strengthened.
- Private sector involvement in EE&C is still limited, and a more enabling environment for private sector investment needs to be created.
- A more robust system for monitoring and evaluating EE&C policy implementation needs to be developed.

Opportunities (External Factors)

- The increasing demand for energy and rising energy prices are creating a need for higher energy efficiency and conservation measures.
- The availability of clean energy technologies and renewables could help increase energy efficiency and reduce carbon footprints.
- There is potential for collaboration with international partners for knowledge sharing and support in financing EE&C interventions.
- Rapid advancements in digital technologies, such as the Internet of Things (IoT) and Artificial Intelligence (AI), could open up new opportunities for EE&C interventions and monitoring.
- The growing interest in green finance and sustainable investment presents an opportunity to mobilize financing for EE&C projects.
- The development of smart grid technologies could enable more efficient energy management and distribution.
- The adoption of behavioral economics principles could help promote energy efficiency among consumers.

Threats (External Factors)

- The availability of fossil fuels and increasing reliance on imports could increase energy costs and affect energy security.
- Exchange rate volatility and economic uncertainty could affect financing and investment in EE&C interventions.
- Ineffective policy implementation due to political or bureaucratic hurdles could hinder the progress of the EE&C agenda.
- Climate change and natural disasters could disrupt energy supplies and

create infrastructure challenges.

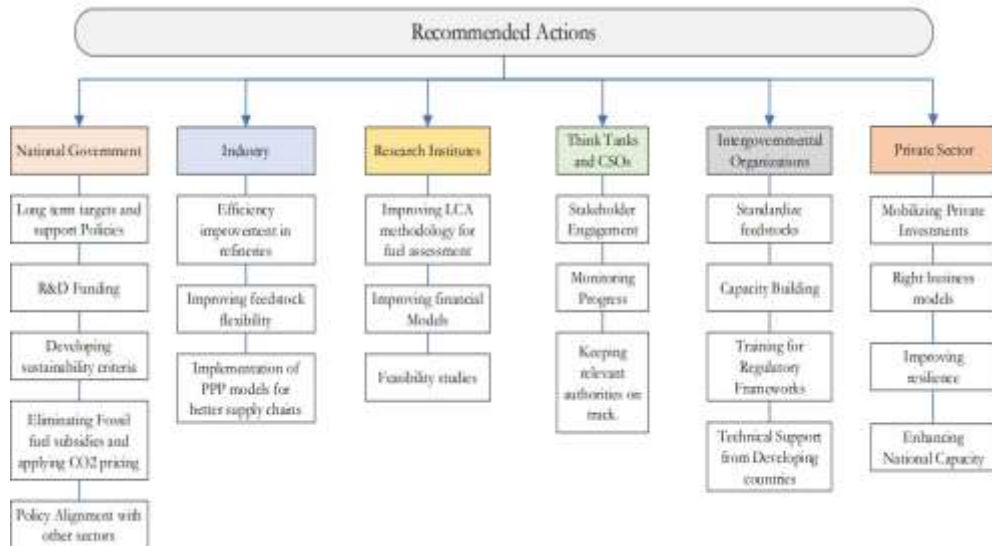
- The lack of political will or commitment could undermine EE&C policy implementation.
- Rising energy subsidies could reduce incentives for EE&C investments.
- The high upfront costs of some EE&C technologies could be a barrier to adoption, especially among SMEs and low-income households.

Policy Stakeholder Analysis

Stakeholder analysis involves identifying key stakeholders, assessing their interests, needs, and concerns, and prioritizing their involvement in policy development and implementation. The main stakeholders identified in the NEEC Policy 2023 are:

- Government:** The federal and provincial governments of Pakistan are key stakeholders in the policy development and implementation process. The federal government has established the NEECA, responsible for promoting energy efficiency and conservation in the country. The provincial governments are responsible for implementing energy efficiency and conservation measures at the local level. The government's interest in the policy is to meet its international climate commitments, improve energy security, and promote economic development.
- Industry:** The industrial sector is a major stakeholder in the policy development and implementation process. Industries are significant energy consumers, and a reduction in energy costs can lead to increased competitiveness and profitability. Industrial stakeholders may have concerns about the cost of incorporating energy efficiency measures, potential impact on production processes, and potential impact on competitiveness.
- Consumers:** Consumers are key stakeholders in the policy development and implementation process. Improving energy efficiency can help reduce electricity bills for households, resulting in increased disposable income. Consumers may be interested in policies that promote the use of energy-efficient products and appliances and may need information on selecting energy-efficient options to achieve savings.
- Energy Suppliers:** The energy sector, including electricity and gas suppliers, is an important stakeholder in the policy development and implementation process. Improved energy efficiency may result in lower demand for energy, impacting the industry's revenue. However, energy suppliers can benefit from reducing the demand for energy and improving the reliability of energy supply.
- Financial Institutions:** Banks and other financial institutions are important stakeholders in financing energy efficiency and conservation measures. Incentives and financing programs can encourage investment in energy-efficient equipment and projects, reducing the financial burden on companies and households. Financial institutions may be interested in

- policies that reduce risks involved in financing energy-efficient projects.
- f. **Civil Society:** Civil society organizations, including environmental NGOs, consumer advocacy groups, and energy efficiency professionals, are stakeholders in the policy development and implementation process. Civil society organizations can provide technical expertise and advocacy for consumer and environmental interests and may also act as watchdogs over the implementation and enforcement of energy efficiency policies.



Core Outcome

The policy paper underscores the importance of energy efficiency policies in tackling global energy challenges, aligning with Pakistan's distinct energy issues. Assessing the NEEC Policy 2023 revealed gaps like institutional and regulatory shortcomings, provincial capacity deficits, and insufficient economic incentives. These gaps underscore the need for a comprehensive strategy to address financial, knowledge, and technological challenges.

Additionally, the policy paper identifies opportunities and challenges in Pakistan, such as collaboration potential and clean energy technologies versus financing constraints, information gaps, and equipment inefficiencies causing power losses. These factors emphasize the necessity for investments, bridging information gaps, tailored awareness programs, and regulatory frameworks, plus a power sector overhaul.

Conclusion

The success of Pakistan's National Energy Efficiency and Conservation Policy hinges on a holistic approach to addressing financial barriers, information gaps, and sector-specific challenges. The policy should incentivize

investments, bridge information asymmetry, and implement tailored awareness programs and regulatory frameworks in key sectors. Additionally, a comprehensive overhaul of the power sector, focusing on infrastructure upgrades and reducing power losses, is crucial. The integration of demand-side management measures is imperative to alleviate stress on the national grid, providing a strategic solution for peak shaving. Ultimately, the NEEC Policy's success lies in fostering collaboration, promoting innovation, and ensuring sustained commitment to achieving energy efficiency and conservation goals in Pakistan's dynamic energy landscape.

Recommendations

The following recommendations are made to address the deficiencies in the current energy conservation policy and chart a path for progress:

Short Term Recommendations:

- a. **Raise Awareness Immediately:** Launch an immediate public education campaign highlighting the benefits of energy conservation. Initiate short-term behavioral change programs for consumers.
- b. **Financial Incentives:** Implement short-term financial incentives like temporary tax breaks and rebates for quick adoption.
- c. **Institutional Capacity:** Provide immediate funding boosts to NEECA to enhance its short-term capabilities.

Medium Term Recommendations:

- a. **Integrated Policy Development:** Develop and implement an integrated energy conservation policy within the next 1-2 years.
- b. **Behavioral Change Emphasis:** Integrate behavioral change initiatives into the NEEC Policy 2023 within the next 2-3 years.
- c. **Research and Development:** Allocate medium-term funds for research and development in energy-efficient technologies.
- d. **Public-Private Partnerships:** Strengthen and expand public-private partnerships over the next 2-3 years.
- e. **Targets Revision:** Revise and set more ambitious targets for energy efficiency in the mid-term.

Long Term Recommendations:

- a. Comprehensive Energy Policy: Develop a comprehensive energy conservation policy addressing all sectors for long-term sustainability.
- b. Innovative Financial Incentives: Establish long-term fiscal policies and financial incentives for sustainable energy practices.
- c. Research and Development Investment: Continue investing in long-term research and development for sustainable technologies.
- d. Institutional Strengthening: Strengthen institutional frameworks for long-term efficiency through continuous funding and training.
- e. Policy Integration: Ensure integration of EE&C with national policies for sustainable development and climate change goals.

Enabling Action Areas:

- a. Immediate Measures: Launch immediate cross-cutting measures such as energy information sharing and appliance testing.
- b. Regulatory Measures: Implement mandatory regulatory measures and energy audits within the next 1-2 years.
- c. Financial Incentives Implementation: Establish and implement financial incentives like tax credits and subsidies over the next 2-3 years.
- d. Capacity Building: Focus on continuous capacity building for government departments over the long term.
- e. Investment Prospectus Linkages: Ensure immediate linkages of investment programs with the National Energy Efficiency and Conservation Action Plan.

INTENDED BENEFITS OF POLICY CHANGES

The envisaged benefits resulting from the modifications in the NEEC Policy 2023 are as follows:

- a. **Greenhouse Gas (GHG) Emission Reduction:** Mitigating GHG emissions associated with energy consumption aligns with Pakistan's commitment to curbing emissions under the Nationally Determined Contributions (NDCs) and contributes to global climate change mitigation efforts.

- b. **Enhanced Energy Sustainability:** Promoting energy sustainability fosters industrial competitiveness, reduces the energy import bill, facilitates the transition to clean energy, enhances access to energy, and aligns with the NDCs and Sustainable Development Goal #7.
- c. **Balanced Energy Supply and Demand:** Closing the gap between energy supply and demand ensures a stable energy supply, minimizing shortages during peak demand periods.
- d. **Reduced Energy Bills:** Lowering energy bills for households, businesses, and the government increases disposable income and competitiveness, particularly for export-oriented industries.
- e. **Job Creation in the Energy Sector:** Generating employment opportunities in the energy sector, specifically in energy audits, management, and building and industrial retrofitting.
- f. **Wider Availability of Energy-Efficient Products:** Facilitating an increase in the market availability of energy-efficient products fosters competition, reduces prices, and stimulates demand.
- g. **Enhanced Quality of Life:** Improving access to affordable and sustainable energy for all contributes to an overall improvement in the quality of life for the people of Pakistan, simultaneously reducing pollution from energy production and use.
- h. **Holistic Societal and Economic Benefits:** The effective implementation of energy efficiency and conservation policy changes has the potential to yield multiple benefits, extending beyond the energy sector to various sectors of Pakistan's economy and society.

References

1. Aslam, H. (2021). Green recovery from COVID-19: Outlook for Pakistan's energy and power sector.
2. Aslam, H., Nazir, A., & Zia, U. (2021). Pakistan's way forward towards a green economy: Perspectives for a clean energy transition. *JSTOR Sustainability Collection*.
3. World Bank. (2020). Tarbela Fourth Hydropower Extension Project (T4HP). Retrieved from <https://www.worldbank.org/en/news/factsheet/2020/02/25/tarbela-fourth-hydropower-extension-project-t4hp>
4. Hydrocarbon Development Institute of Pakistan. (2023). *Pakistan Energy Yearbook 2021-22*. Ministry of Energy (Petroleum Division). Retrieved from <https://www.hdip.com.pk/pakistan-energy-yearbook>.
5. International Energy Agency. (2019). *Multiple benefits of energy efficiency*. Paris: IEA. Retrieved from <https://www.iea.org/reports/multiple-benefits-of-energy-efficiency>.
6. International Energy Agency. (2022). *Energy efficiency 2022*. Paris: IEA. Retrieved from <https://www.iea.org/reports/energy-efficiency-2022>.
7. Ikram, M. I. (2022). Energy crisis in Pakistan and its solution. *Paradigm Shift*. Retrieved from <https://www.paradigmshift.com.pk/pakistan-energy-crisis-and-its-solution/>
8. Jilani, S. G., ur Rehman, A., & Islam, R. (2021). Energy and national security of Pakistan. *NDU Journal, 35*, 93-111.
9. Kenji, A. (2016). Pakistan enacts National Energy Efficiency and Conservation Act. *Envilience Asia*. Retrieved from https://envilience.com/regions/south-asia/pk/report_4210
10. Kerr, N., Gouldson, A., & Barrett, J. (2017). The rationale for energy efficiency policy: Assessing the recognition of the multiple benefits of energy efficiency retrofit policy. *Energy Policy, 106*, 212-221. <https://doi.org/10.1016/j.enpol.2017.03.053>
11. Khatri, S. A., Mirjat, N. H., Harijan, K., Uqaili, M. A., Shah, S. F., Shaikh, P. H., & Kumar, L. (2023). An overview of the current energy situation of Pakistan and the way forward towards green energy implementation. *Energies, 16*(1), 423.
12. Mirjat, N. H., Uqaili, M. A., Harijan, K., Valasai, G. D., Shaikh, F., & Waris, M. (2017). A review of energy and power planning and policies of Pakistan. *Renewable and Sustainable Energy Reviews, 79*, 110-127. <https://doi.org/10.1016/j.rser.2017.05.040>
13. Mushafiq, M., Arisar, M. M. K., Tariq, H., & Czapp, S. (2023). Energy efficiency and economic policy: Comprehensive theoretical, empirical, and policy review. *Energies, 16*(5), 2381.
14. National Energy Efficiency and Conservation Act 2016, (2016).
15. National Energy Efficiency and Conservation Policy, 2023, (2023).
16. Sajid, Z., & Javaid, A. (2018). A stochastic approach to energy policy and

- management: A case study of the Pakistan energy crisis. *Energies*, 11*(9), 2424.
17. NEECA Team. (2021). Energy policy reforms & outcomes. Retrieved from <https://neeca.gov.pk/Detail/ZDVjNTg2MjMtYzZmNy00NjhiLWIyNWUtOTVjMjhlMmRiM2Uy>
18. Xin, Y., Bin Dost, M. K., Akram, H., & Watto, W. A. (2022). Analyzing Pakistan's renewable energy potential: A review of the country's energy policy, its challenges, and recommendations. *Sustainability*, 14*(23), 16123.