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RESEARCH ARTICLE

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Energy Efficiency Gap: Evidence from Comparative Analysis of Public and Private Sectors

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Abstract: This research explores the energy efficiency gap by comparing public and private sector electricity usage with a concentration on the issue of consumer heterogeneity. We analyze electricity usage trends through a range of public sector university hostels and hostels in the private sector. The study investigated the energy efficiency gap, which is that the average electricity usage of public sector hostels is significantly higher than that of private sector hostels. From this perspective, the study evaluates the electricity conservation pattern of users by analyzing issues of common pool resource (CPR) and moral hazard in public sector organizations. The findings indicate the existence of an electricity efficiency gap with a significant difference in per-capita electricity usage between the public and private sectors. The study's novelty is based on investigating the energy efficiency gap through a comparative analysis of the public and private sectors, concentrating on issues associated with free riders and consumer heterogeneity.

Keywords: Conservation, Energy Efficiency Gap, Public Sector, Private Sector, Heterogeneity, Common-Pool-Resource, Moral Hazard

Introduction

This study aims to investigate the electricity efficiency gap by comparing users' electricity conservation patterns across public and private sector hostels with a focus on addressing the issue of consumer heterogeneity. The nature of energy conservation in the public sector is different from that in the private sector. Extensive literature suggests that the availability of free energy at organizations essentially makes individuals less willing to conserve electricity (Abatayo & Lynham, 2023; Abbas et al., 2026; Gabrielle et al., 2019; Scherbaum et al., 2008; Siero et al., n.d.; Xu et al., 2022; Zhang et al., 2013b). The investigation of the energy efficiency gap through public and private sector comparison with homogeneous consumer support literature regarding the energy efficiency gap by sectoral comparison and the energy efficiency paradox by undertaking the issue of heterogeneity, as highlighted by (Allcott & Greenstone, 2012; Gambardella & Pahle, 2018; Golove & Eto, 1996; Xu et al., 2022). Energy efficiency is among the main goals of both developed and underdeveloped countries. Pakistan is among these countries that are facing issues in the energy sector. According to (Ullah et al., 2014), inefficient usage of energy has driven 52 percent of the rise in energy intensity for Pakistan in the last 50 years, where this issue is investigated from two angles: the demand side and supply side of the electricity crisis (Ullah et al., 2026). The supply side covers problems relevant to electricity generation and transmission. The demand dimension is concerned with energy inefficiency, which is the main issue in developing Pakistan. This evidence of inefficiency is complemented by the fact that, in

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terms of energy efficiency, Pakistan lags far behind most developed nations as well as other developing nations. For example, Pakistan utilizes 25 percent more energy for every dollar of GDP compared to the Philippines and 15 percent more energy compared to India. However, the energy intake of Pakistan per unit of GDP is five times higher compared to the average value for developed nations and double the average value of the world, where future savings from energy efficiency for Pakistan are projected at 18 percent with 11.16 Million-Tons of Oil-Equivalent (MTOE), which results in about a 51 percent decline in oil imports, as suggested by the Pakistan Power Sector Taskforce (NEECA, 2019). Each of these indicators suggests that the country can conserve energy by demand-side steps but has struggled to do so to date.

Targeting the energy efficiency gap, economists have long identified market deficiencies, including environmental externalities, inefficient energy costs, lack of awareness, and energy-related principal-agent problems (Kenneth Gillingham et al., 2009). Some economists have recently proposed that the significant gap in energy efficiency may be clarified by systemic behavioral disparities in consumer decision-making, for example, (Allcott & Greenstone, 2012; Tietenberg, 2009). Besides, (Metcalf & Hassett, 1999) and (Smith & Moore, 2010) suggest that the engineering approach would overstate the net benefits of energy conservation projects, indicating that the gap may be much smaller than expected or could be no gap at all. More precisely, the gap may be overestimated due to heterogeneity of the consumer, hidden costs, uncertainty, overestimated savings, and the rebound effect. (K Gillingham & Palmer, 2014) Reviewed the energy efficiency gap literature to explain an energy efficiency phenomenon called the "energy efficiency paradox," suggesting that the real size of the energy efficiency gap remained unclear. Various explanations, such as consumer heterogeneity, hidden costs, inflated estimates of electricity efficiency, and uncertainty, all suggest that measurement errors contribute to the observed energy efficiency gap.

The heterogeneity of consumers can also help to understand why certain studies indicate a gap exists. Products that are financially attractive to the average consumer might not be desirable to other customers due to variations in preferences, expected product usage, and borrowing costs (Allcott & Greenstone, 2012; Golove & Eto, 1996; Xu et al., 2022). Gambardella and Pahle (2018) Concentrated on understanding sectoral consumer heterogeneity regarding the size and patterns of consumption. The demand for electricity thus contains the three major consumer categories of electricity markets, including residential, commercial, and manufacturing. The choice experiment section (Broberg & Kaaukas, 2014) addressed the economic incentives required to adjust the participants' energy use in a predefined manner. The objectives are based on how heterogeneity of preferences within the Swedish population can be clarified by socioeconomic factors such as age, class, education, and income. They discuss energy-related considerations, such as living environments and heating systems.

Previous research covers energy efficiency with demand-side management through different channels such as the energy efficiency gap, free users' electricity-saving behavior in the organization, and consumers' heterogeneity related to energy efficiency, for example, (Allcott & Greenstone, 2012; Kenneth Gillingham et al., 2009; Metcalf & Hassett, 1999; Smith & Moore, 2010). However, none of the studies focused on the energy efficiency gap with consumer heterogeneity and investigated the energy efficiency gap through a comparison of consumers' electricity conservation across public and private sectors to highlight issues related to free riders.

Literature Review

The research related to energy conservation reflects three Strands: the energy efficiency gap, energy conservation patterns of free riders, and the role of consumer heterogeneity in energy conservation.

The first strand, "the energy efficiency gap," contains extensive work suggesting that the energy efficiency gap is unclear due to differences in engineering and economic aspects. To identify the gap in energy efficiency, economists have long identified market deficiencies as inefficient, including environmental impacts, inefficient energy costs, lack of awareness, and energy-related agent problems (Abbas et al., 2026;

Kenneth Gillingham et al., 2009). Several other economists (Allcott & Greenstone, 2012; Tietenberg, 2009; Xu et al., 2022) have recently suggested that systemic behavioral disparities in consumer decision-making could clarify the significant gap in energy efficiency. Moreover, several economists argue that the engineering approach would overstate the net benefits of energy-saving programs, suggesting that the difference could be much smaller than predicted or that no difference at all could be (Metcalf & Hassett, 1999; Smith & Moore, 2010). Gillingham and Palmer (2014) reviewed the literature on energy efficiency gaps to describe an energy efficiency anomaly called the "energy efficiency paradox," indicating that the real size of the gap in energy efficiency remained uncertain due to technological and economic differences.

The strand associated with energy conservation patterns of free riders suggests that the availability of free energy at organizations essentially makes individuals less willing to engage in electricity conservation (Abatayo & Lynham, 2023; Gabrielle et al., 2019; Scherbaum et al., 2008; Siero et al., n.d.; Zhang et al., 2013a, 2013b). Various factors influence conservation behavior (Gabrielle et al., 2019), indicating that awareness of monitoring and social norms feedback in organizations increased energy efficiency by 11% and 10%, respectively. Scherbaum et al. (2008) concentrate on considerations at the individual level and conclude that public environmental awareness is a significant indicator of personal norms related to the environment. In consideration of energy-saving factors (Zhang et al., 2013a, 2013b, 2014) measure the status of factors such as personal norms, social norms, and organizational norms, which support energy saving. They propose that environmental, organizational, and personal benefits, along with energy-conservation habits within organizations, motivate employees to participate in electricity conservation in organizations.

The third strand focuses on the literature on the role of consumer heterogeneity in the energy efficiency gap. The importance of consumers' homogeneity in the estimation process of the energy efficiency gap is highlighted by (Allcott & Greenstone, 2012; Broberg & Kaaukauskas, 2014; Gambardella & Pahle, 2018; Golove & Eto, 1996). Consumer heterogeneity clarifies the energy efficiency gap. Consumer heterogeneity, regarding the differences in tastes, product use and selection, and borrowing costs, plays an important role in the energy efficiency gap (Allcott & Greenstone, 2012; Golove & Eto, 1996). Goods which are financially appealing to the average consumer may not be desirable to other consumers. Gambardella and Pahle (2018) focused on understanding sectoral market variability in the scale and trends of consumption. Broberg and Kaaukauskas (2014) Discussed the economic conditions required to change the energy usage of the participants in a predetermined way. The objectives are focused on how socioeconomic variables such as age, gender, education, and income can explain the heterogeneity of preferences within the Swedish population. In the same way, this study focuses on the electricity efficiency gap by comparing consumers' electricity conservation patterns across public and Private sectors while addressing the issue of consumer heterogeneity.

The literature relevant to behavior (Fischer, 2008; Gabrielle et al., 2019; Shah et al., 2019; Vohra et al., 2021; Xu et al., 2022) analyses individuals' electricity-saving behavior. They were interested in seeing whether electricity saving is affected by awareness, information, and other related factors of individuals' electricity saving. For this purpose, they used primary data. They used individuals' willingness to save electricity as a dependent variable (Jaffar et al., 2024; Jaffar & Latiff, 2024). The results of these studies show a positive correlation between individuals' electricity-saving behavior and lower expenditure, subsidies for energy conservation, regulation, social norms, and past experience of electricity shortfall, while showing a negative correlation with discomfort caused by electricity-saving activities. Control variables such as level of education, income, and gender were also included in the estimations, but most of them had no significant impact on the willingness to reduce electricity consumption.

The above-mentioned literature has filled the research gap on the demand side of electricity through different channels such as employee electricity-saving patterns in organizations, household electricity-saving patterns at home, and the role of energy-efficient appliances in energy saving. However, none of the above-mentioned studies provides a comparison of behavior towards the use of electricity across the public and private sectors, while tackling the issues of heterogeneous subjects and the energy efficiency paradox. This

study aims to fill the gap. The study is proposed to test whether one of the likely reasons for the electricity crisis in developing countries is the inefficient use of electricity in institutions. In particular, the study proposes to distinguish whether the behavior of individuals towards the consumption of electricity in the public sector is efficient. For this, the study analyses the behavior of students toward the consumption of electricity in the public sector and compares the same with the behavior of individuals towards the consumption of electricity in the private sector.

Theoretical Framework

There are different economic grounds based on which differences in the usage of electricity across the public sector and private sector are hypothesized. One of the main aspects of using electricity in public sector universities is its similarity to a common-pool resource. A common-pool resource (CPR) is a type of good consisting of a natural or human-made resource system such as irrigation systems, forests, and fishing grounds whose size or characteristics make it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. Unlike pure public goods, common-pool resources are prone to overuse or misuse. In a common-pool resource game Abatayo and Lynham (2023), they recommend to groups what they do to maximize their payoffs using both informative and normative messaging and compare it to a subsidy. They found the subsidy is the most efficient, contributing to a 27.34 percent reduction in CPR extraction compared to no incentive (Buckley & Llerena, 2018). They use a contextualized CPR mechanism and laboratory experiments to examine energy consumption choices. They conclude that in the Common Pool Resource game, the nudge is understood and integrated into the decision-making of subjects faster than an equivalent price. According to Ostrom et al. (1994), the management of the collective resource produces negative externalities. User cooperation plays a vital role in the conservation of common-pool resources, where a lack of user cooperation could lead to its over-exploitation. That is because each customer ultimately benefits from the quantity of the derived item.

Another aspect regarding the misuse of electricity in public sector universities and their hostels is that it has a low level of formal and informal punishment. The universities rarely impose any type of punishment on individuals for misusing electricity. To the study's knowledge, no formal rules regarding the misuse of electricity exist in the public sector. In relevant literature on punishment, Siang (2012) investigates the effectiveness of punishment in an established relationship between employer and employee by experimental treatment at the factory level. The study's behavioral findings indicate that paying fines to co-workers is more efficient than paying the employer to enhance factory worker attendance. In the same way, (Nikiforakis, 2008) conveys that punishment promotes cooperation; nevertheless, in a decentralized framework, peer punishment falls due to the possibility of counter-punishment. In addition to controlled experiments, however, some tests evaluate the effect of punishment in a natural laboratory setting and address the role of punishment in reforming student behavior in institutions (Abatayo & Lynham, 2023). The research indicates that both verbal and corporal punishments have a negative effect on the student's behavior and personality in Khartoum, Sudan. As far as public sector university electricity consumption is concerned Shah et al. (2019) investigate how surveillance and the associated punishment framework address moral hazards. They use the concept of an experiment in the field and contain six treatments. The research concentrated on behavioral factors related to electricity conservation, such as consumer behavior, monetary and nonmonetary punishment, and the experiment's cumulative effect on electricity conservation. Besides, results indicate that monetary punishments are more effective than nonmonetary punishments. Contrary to the above, the marginal cost of additional use of electricity in the private and household sectors is borne by users, making their behavior energy efficient.

Giraudet et al. (2018) Explore the phenomenon of the energy efficiency gap with moral hazards. How can it contribute to optimal energy efficiency investment? A model finding illustrates that associated externalities of carbon dioxide and the deadweight loss from moral hazard are almost twice as high. Likewise, in these scenarios, externalities remain unpriced, and minimum efficiency standards become more desirable

than energy-saving insurance. To relate the general phenomenon of the energy efficiency gap with the moral hazard issue, one of its appearances is the progressively documented gap between the energy savings realized and those predicted by engineering models (Fowlie et al., 2018; Giraudet et al., 2018; Houde & Aldy, 2017; Zivin & Novan, 2016).

To start, the traditional grouping of goods is displayed in Table 1, which distinguishes goods categories into four divisions. Private goods are traded; that is, people may be excluded from usage. Two main characteristics characterize Common-Property-Resources: it is challenging to exclude consumers, and the usage of goods by any person limits the available benefits to other users. Users can be easily excluded from non-Rival goods, referred to as "spite goods", because exclusion doesn't improve overall welfare. On the other hand, Common-Property-Resources are similar to Public-Goods in which the exclusion of users is ambiguous. However, they are also similar to Private-Goods in that users have to compete for them. Public goods, on the other hand, can neither restrict users nor require competition for them.

Table 1
Taxonomy of Goods

	Excludable	Non-Excludable
Rival	Private-Goods	Common-Property
Non-Rival	Spite-Goods	Public-Goods

Source: “Bowles” 2006.

In most public sector universities in Pakistan, electricity consumption is categorized into three types of use: (I) electricity used in common areas, classrooms, libraries, and research labs, (II) electricity consumption in offices, and (III) electricity usage in residence hostels. Public sector universities are subsidized and mark energy as a "public" good, and a lack of moral responsibility leads students and employees to be oblivious to electricity conservation.

On the other hand, private sector hostels are managed for profit, and residential students are entirely responsible for their expenses. As profit-maximizing service providers, hostel administrators would try their utmost to minimize their operating costs, for example, by controlling unwanted usage or the use of electricity-inefficient appliances. Also, the profit motive could encourage them to install electricity-efficient equipment to boost profits. Both considerations should ensure optimum energy use at private sector hostels. According to neoclassical rationale, individuals would compare their marginal electricity costs with the marginal benefit. This motivation helps them to prevent overuse with the installation of energy-efficient equipment. Based on this debate, we believe electricity use in the public sector is inefficient relative to the private sector.

Collection of Data

Electricity consumption data of the public and private sector hostels were obtained from their monthly bills. A formal request was sent to the relevant department for details of the monthly bill history, the number of users per electric meter, and the electronic appliances used in each hostel. The monthly average per-capita consumption was obtained by dividing the average monthly units by the total number of users in the hostels. This allowed us to conduct a per-capita comparison of electricity consumption. The management of the hostels in both sectors provides basic electrical appliances such as ceiling fans, lighting, irons, and charging points for gadgets. We managed to access the monthly electricity billing data for the hostels from March 2022 to February 2023 using the database of the district electrical supply companies.

In Total, we collected data from 1051 rooms in a public sector university consisting of 16 hostels with seven male hostels and nine female hostels. The private sector hostels' data were obtained from 16 hostels, with five female hostels and 11 male hostels. The consumption pattern and the total number of users in each hostel are detailed in Table 2.

Empirical Evidence

The average monthly usage per user in the public sector ranged from 26.66 to 105.78 units, compared to 9.01 to 29.68 electric units in the private sector. Throughout the year of the analysis, the amount of energy used in public sector hostels is significantly higher than in private sector hostels (t-test $p < 0.05$). The table shows the difference in electricity consumption per user between public sector hostels and private sector hostels from January until December. The consumed units of electricity per student were significantly higher in the public sector hostels (46.04 units) than in private sector hostels (19.89 units), except for two months of summer break, August and September, as shown in Figure 1A and 1B.

Figure 1A
Frequency Distribution of Private Sector



Figure 1B
Frequency Distribution of Public Sector



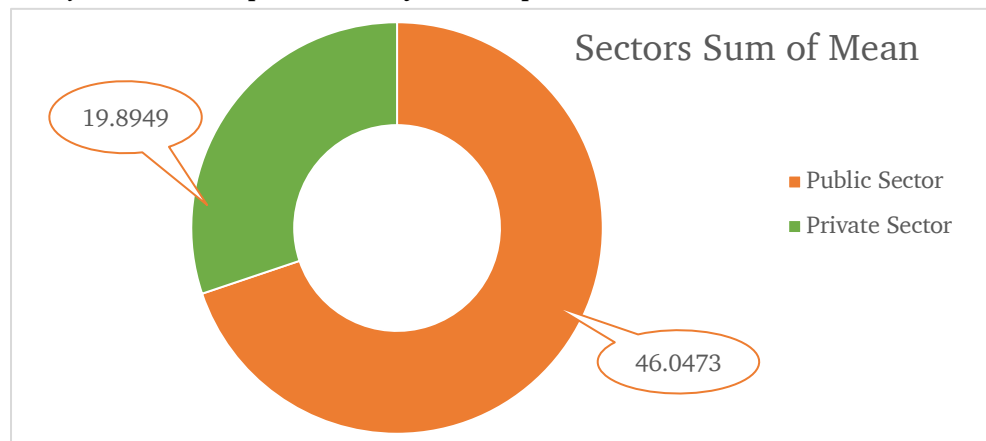
Their electricity monthly bills were used to calculate per-capita electricity usage, for which the study made a formal request to the relevant department in each sector. The study enquired about the number of users per electric meter, in addition to what kind of lighting is used in each sector. Afterward, the study took note of the 14-digit reference number on the bill and used it to access the district electrical supply company's website to get the user's annual billing information for 12 months, from March 2022 to February 2023. In addition, the study has estimated the per capita electricity consumption in electric units (the total used units divided by the total number of actual users) for a comparative study.

Table 2*Proportional Use of Electricity in Public and Private Sectors*

Sectors	Public sector			Privat-Sector		
Hostel List	Average units consumption	Total # of Users	Monthly average per capita	Average units consumption	Total # of Users	Monthly average per capita
Hostel # 1	10038	268	37.45	848	59	14.38
Hostel # 2	6608	247	26.75	1077	51	21.13
Hostel # 3	16373	217	75.45	776	53	14.63
Hostel # 4	17581	223	78.84	2909	105	27.7
Hostel # 5	27292	258	105.78	938	52	18.03
Hostel # 6	14611	382	38.25	2078	70	29.68
Hostel # 7	8517	239	35.64	903	53	17.04
Hostel # 8	10210	247	41.34	1349	59	22.86
Hostel # 9	10868	249	43.65	1083	61	17.75
Hostel # 10	11889	251	47.37	667	74	9.01
Hostel # 11	786	20	39.32	2457	95	25.86
Hostel # 12	700	20	34.99	1562	74	21.11
Hostel # 13	788	21	37.54	952	61	15.61
Hostel # 14	620	20	30.99	1289	56	23.02
Hostel # 15	772	21	36.75	838	61	13.73
Hostel # 16	533	20	26.66	1579	59	26.76

Note: In the public sector, hostel#2, hostel#5, and hostel#10 to hostel#16 are female hostels, and hostel #1, hostel#3, hostel#4, and hostel#6 to hostel#9 are male hostels. In the private sector, hostels #12 to #16 are female hostels, and hostels#1 to #11 are male hostels.

The highest average consumption in the public sector occurs in January, presumably because many users adopt alternative heating methods during the coldest part of the year. The public sector hostels are closed during the months of July and August, which is reflected in the relatively low consumption per user during those months. However, the private sector hostels remain open in the months of July and August as well. The difference in per-capita electricity consumption between the public and private sectors can be retrieved through a sum of means comparison, as shown in Figure 2.

Figure 2*Sum of means Per-Capita Electricity Consumption*

The average consumption by public sector hostels is significantly different from private sector hostels. Using per-capita consumption for a t-test of unequal variances, the study rejects the null hypothesis of no difference. On the regression side, the study used per-capita consumed electricity units as the dependent variable and the sector dummy as the independent variable, as shown in Table 3.

Table 3

Regression Analysis Result (Dependent Variable: Per-Capita Units Consumption)

Intercept	Public sector Dummy	R2
19.76***	25.28***	0.40

Note: *** P < 0.01.

Source: Authors' estimation.

Table 3 is the result of the regression analysis. Per-capita electricity unit consumption is the dependent variable, with the public sector dummy as the independent variable. The overall result of the regression analysis and the t-test of mean comparison explain the significant difference in per-capita usage between the public and private sectors, with homogeneous consumers and the same level of facilities provided in each sector. The study investigated the lighting equipment in each sector. Basically, three types of lighting were used in both sectors: tube lights, light bulbs, and energy savers; see details in Table 4.

Table 4

Sector-wise Comparative Usage of Electricity-Efficient Lighting

Lighting appliances	Public sector Hostels		Private sector Hostels	
	Quantity	% of Total	Quantity	% of Total
Tube-lights	3473	95.62	122	7.72
Light-Bulbs	103	2.84	14	0.89
Energy-Savers	56	1.54	1445	91.41
Total	3632	100	1581	100

Source: authors' estimates.

The adoption of energy-efficient appliances in both sectors varies considerably. The private sector is utilizing appliances like energy savers that are comparatively more electricity-efficient than those in the public sector. Public sector survey statistics demonstrate a total of 3632 lights installed, where the quantity of tube lights is 3473 (95.62%), 103 lighting bulbs (2.84%), and the quantity of energy savers is 56 (1.54%). On the other hand, the private sector hostels and households have given priority to installing electricity-efficient lighting; they installed energy-saver lights by 91.41%, tube lights by 7.72%, and lighting bulbs by 0.89%, respectively. Statistics indicate that the usage of electricity-efficient equipment is still a low priority for public sector organizations relative to the private sector; this contingency also validates the managerial inefficiency of the public sector.

Discussion and Implications

The study found a significant energy efficiency gap by giving attention to explaining the energy efficiency phenomenon of the "energy efficiency paradox" through a comparative analysis of the public and private sectors. The study investigated a significant energy efficiency gap through a comparative analysis of the public and private sectors. The results indicate that per capita electricity consumption in the public sector is significantly higher than in the private sector. This means that a common-pool resource (CPR) exists in the public sector. The larger proportion of subscribers in the public sector makes CPR with serious repercussions for energy losses and addition to the electricity crises and country's economic deprivation as oil dependent electricity producers and investing enough on oil import (Wang et al., 2022). The results are in line with the findings of (Allcott & Greenstone, 2012; Kenneth Gillingham et al., 2009; Tietenberg, 2009).

The study also investigated the energy efficiency gap with homogeneous consumers and tackled the heterogeneity issue highlighted in energy efficiency literature such as (Metcalf & Hassett, 1999; Smith & Moore, 2010). This study's findings address the heterogeneity issue by selecting a data sample with homogeneous characteristics for the public and private sectors. The per capita electricity consumption between the homogeneous public and private sectors remains marginally different. Public sector per capita consumption remains on the higher side, reflecting non-energy-efficient energy consumption behavior. Future work in this field is, however, required to have specific recommendations for addressing the energy efficiency gap with large-scale data and focusing on other variables such as consumer preference, income levels, and educational backgrounds with the comparative examination. The study supports future research by focusing on energy efficiency through a comparative analysis of different heterogeneous sectors with large-scale data sets.

Study results are helpful to government conservation authorities such as National Energy Efficiency and Conservation Authorities, the Ministry of Energy, and policymakers to concentrate on energy efficiency in all other sectors generally, while in the public sector, particularly concerning issues related to free riders. The authority should also focus on public sector institutions to increase electricity savings. On the administrative hand, current study findings explain a weak administrative condition in the public sector. This research helps policymakers set out tools for energy management and conservation by the moral obligation of energy conservation and the negative externalities of energy consumption, such as exhaustion of energy resources and local ecological damage.

The study findings are helpful to policymakers in different scenarios, such as policymakers should equally concentrate on the public sector to reduce the increasing demand for electricity through conservation. The results support energy efficiency literature by tackling the issue of consumer heterogeneity. The study selected homogeneous consumers from public and private sectors with the same facilities provided and found the energy efficiency gap. The study results are beneficial for the literature regarding the energy efficiency phenomenon, "the energy efficiency paradox," with a comparative analysis of homogeneous consumers.

Conclusion

This research was inspired by the purpose of common-pool resources and moral hazards related to "free rider" problems for the energy efficiency gap. Premised on this claim, we analyzed electricity consumption patterns across public and private sector consumers and found a significant difference between both sectors. The average per-capita electricity consumption among homogeneous subjects in the public sector is significantly higher than in the private sector. A dual strategy is needed to increase organizational efficiency in controlling electricity usage and counter higher consumption by developing conservation standards. It is also important to create awareness through mass-level programs to promote energy efficiency by promoting the behavior of efficient use of resources. In addition, certain policy-level measures are needed at this time to overcome energy losses. Such measures will help consumers' energy consumption behavior and the country's socioeconomic conditions in the long run by helping to minimize the cost incurred for the import of oil-based power generation plants.

The study findings explain a weak administrative condition in the public sector. A random check of public sector hostels explains a poor administrative condition; 77 percent of students do not turn off electric equipment before leaving the room. In this perspective, the concerned authorities must take steps to increase electricity conservation in the public sector.

Study findings point out that the public sector is using more energy-inefficient appliances than the private sector. Replacement of inefficient lights with efficient lights such as energy savers and LED lights can significantly decrease the electricity cost of the public sector. Concerned authorities should also concentrate on lighting equipment in public sector institutions to decrease electricity losses.

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