

Research article

Religiosity and Its Impact on Energy Consumption in Indonesian Muslim Households

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This study examines the underexplored relationship between religiosity and household energy consumption, applying religious behavior theory to energy economics in Indonesia—the world's largest Muslim-majority nation. While traditional models focus on socioeconomic determinants, this paper investigates how Islamic values influence electricity consumption, explicitly addressing the inherent endogeneity of self-reported religiosity. Utilizing data from the Indonesian Family Life Survey (IFLS-5) comprising 21,023 Muslim households, we employ a two-stage least squares (2SLS) instrumental variable approach, proxying religiosity through ritual frequency and religious practices to overcome omitted variable and self-selection biases. The empirical results reveal a robust, statistically significant negative relationship between higher levels of religiosity and household electricity expenditure. This finding aligns with the theoretical framework that religious tenets foster moderation, self-control, and environmental stewardship. The results remain resilient across extensive sensitivity analyses and alternative model specifications. Culturally, these findings imply that faith-based institutions and religious leaders are powerful, cost-effective conduits for behavioral energy conservation. Integrating moral paradigms into national climate strategies offers a potent, localized mechanism to complement standard efficiency policies and accelerate carbon emission reductions in emerging Muslim-majority economies.

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Global energy consumption has escalated dramatically over recent decades, propelled by accelerated population growth, rapid economic development, and intensive urbanization. This surging energy demand carries profound implications for climate change and global ecological sustainability, particularly since the energy sector remains the preeminent contributor to global greenhouse gas (GHG) emissions (Najeeb et al., 2024). According to the International Energy Agency (IEA, 2024), global electricity demand is projected to expand substantially in the coming decades, with developing nations, where access to modern energy services is rapidly spreading, driving much of this growth. Consequently, deciphering the critical determinants of household energy consumption has emerged as a high-priority imperative for policymakers aiming to design sustainable energy transitions and mitigate escalating climate impacts.

Energy consumption serves as a vital catalyst for national economic activity; its excessive and inefficient utilization induces severe environmental degradation. This ecological tension is highly pronounced in Indonesia, where the energy mix remains heavily dominated by fossil fuels; their combustion generates substantial carbon emissions that exacerbate domestic and global environmental degradation (ClientEarth Communications, 2024). Beyond structural macro-level energy demand, household-level dynamics, specifically the proliferation of domestic electronic appliances, generate significant environmental externalities. Notably, the adoption of temperature-regulating appliances such as refrigerators and air conditioning (AC) units releases potent greenhouse gases and increases thermal load. In fact, the refrigeration and cooling sector alone contributes approximately 10% of global carbon emissions, a figure equivalent to three times the combined footprint of the global aviation and maritime

shipping industries (Dong et al., 2021). This stark environmental reality underscores the urgent need to foster public ecological awareness, encouraging households to adopt wiser, conservation-oriented energy habits.

At the household level, electricity consumption is dictated by a complex, multi-dimensional interplay of economic, demographic, technological, and behavioral drivers. Recent systematic reviews have attempted to map these residential energy dynamics across various regional contexts. For instance, Najeeb et al. (2024) synthesized 52 empirical studies and identified 113 unique factors, highlighting 21 core determinants, such as household income, appliance ownership, usage behaviors, dwelling characteristics, climate variations, and educational attainment, that consistently shape residential demand in South, East, and Southeast Asia. Similarly, Tete et al. (2024) demonstrated that household income, dwelling tenure, and the ownership of major appliances (including lighting, televisions, refrigerators, fans, and ACs) explain approximately 70% of the variance in urban residential electricity consumption in Burkina Faso. Furthermore, econometric evidence from Pakistan by Aslam and Ahmad (2023) reveals that price and income elasticities vary significantly across demographic segments, with low-income and rural households demonstrating far greater price sensitivity than wealthier, urban households. While economic and demographic variables are well-documented, cultural dimensions, specifically religion and religiosity, represent highly critical yet understudied determinants of energy consumption behavior. This oversight is particularly significant in developing economies, where religious beliefs, institutional practices, and values remain deeply woven into the fabric of daily decision-making. Theoretically, religiosity defined as the intensity with which individuals adhere to religious doctrines, practices, and values, is linked to pro-environmental behaviors through several socio-cognitive mechanisms (Kwakwa et al., 2024). Most major religious traditions explicitly emphasize environmental stewardship, the preservation of natural resources, moderation in material consumption, and moral responsibility toward future generations. Moreover, deep-seated religiosity is strongly associated with heightened self-control and personal discipline, psychological traits that facilitate the adoption of conservation behaviors requiring delayed gratification or active restraint from immediate, wasteful consumption.

The theoretical link between faith and environmental stewardship is compelling, and emerging empirical research on the relationship between religiosity and energy consumption reveals highly heterogeneous patterns across different socio-geographic contexts. In Iran, Kermani et al. (2023) demonstrated that religiosity serves as a direct, statistically significant predictor of household energy consumption in Mashhad, with their structural model explaining 21.5% of the total variance in domestic energy use. Similarly, Hassan et al. (2025) observed that heightened religiosity actively strengthens perceived behavioral control, subjective norms, and sustainable attitudes, which collectively channel into increased intentions to purchase green, energy-efficient appliances among Pakistani youth. In the Indonesian context, Anwar (2025) confirmed that Islamic values positively shape environmental concerns and eco-friendly attitudes, with these attitudes acting as a significant mediating pathway for the intention to adopt electric vehicles (EVs). Conversely, this relationship is not uniformly positive or linear across all settings. In rural China, Dong et al., (2024) uncovered a paradox where religious beliefs were associated with a higher probability of experiencing domestic energy poverty, a relationship heavily mediated by underlying household income and education levels. Furthermore, Poddar et al. (2021) highlighted that socio-religious identity significantly shapes primary cooking fuel choices in India, demonstrating distinct variations in the probability of adopting clean, modern fuels between Muslim and Hindu demographic groups.

Despite these valuable emerging insights, several fundamental research gaps persist in understanding the nexus between religiosity and energy consumption, particularly within Muslim-majority contexts. First, most existing studies have been conducted in non-Muslim settings or have examined religion as a categorical variable rather than measuring the intensity of religious commitment. Second, few studies have adequately addressed the potential endogeneity of religiosity measures, which may be correlated with unobserved household characteristics that also affect energy consumption. Third, the mechanisms through which religiosity influences energy consumption remain underexplored, particularly in the context of Islamic teachings and values. Fourth, there is limited empirical evidence from Indonesia, the world's largest Muslim-majority country, where high levels of religiosity coexist with rapid economic development and rising energy consumption.

To address these critical scholarly voids, this study rigorously examines the causal relationship between the multidimensional level of religiosity and household electricity consumption among Muslim households in Indonesia. Indonesia constitutes an ideal and highly strategic institutional laboratory for this investigation for four primary reasons. First, the nation is home to the world's largest Muslim population, with approximately 87% of

its 270 million citizens identifying as adherents of Islam. Second, Indonesian society exhibits exceptionally high and vibrant levels of religiosity spanning multiple dimensions, including theological beliefs, intensive ritual practices, and active community-level social engagement. Third, the country has witnessed a dramatic surge in household electricity demand in recent decades, propelled by sustained macroeconomic expansion, rapid urbanization, and universal electrification policies. Fourth, as the Indonesian government pursues ambitious carbon neutrality targets and aggressive national energy transition policies, understanding how cultural, ethical, and religious paradigms shape household-level resource consumption has become critically vital for designing socially resonant and effective environmental policy instruments.

To contextualize these dynamics, this study builds upon and extends several distinct strands of literature linking religious factors to household energy dynamics and environmental sustainability. Prior scholarly works have extensively analyzed how religious values intersect with behaviors that support ecological preservation and sustainable consumption. For instance, Ampofo & Mabefam (2021) examined the impact of religiosity on multidimensional energy poverty across various countries, employing actual electricity consumption levels and grid access as objective proxies for energy deprivation. To address the pervasive threat of endogeneity inherent in self-reported religious commitment, they utilized a two-stage least squares (2SLS) instrumental variable approach, finding that religiosity exerts a highly significant mitigating effect on energy poverty, particularly within developing nations and rural areas. In a similar vein, Leslie et al. (2022) link religious diversity to household energy consumption. Several previous studies have analyzed religious factors with behavior that supports environmental sustainability (Arli et al., 2021; Hassan et al., 2025; Kermani et al., 2023; Minton et al., 2018). Ampofo & Mabefam (2021) explored how regional religious diversity shapes patterns of household energy use, while other scholars have established robust links between religious beliefs and pro-environmental intentions, such as the adoption of sustainable practices and green purchasing behaviors. By analyzing the level of religiosity among the Indonesian Muslim population, this study aims to examine its direct effect on household energy consumption, utilizing rich empirical evidence from the Indonesia Family Life Survey (IFLS).

The core contribution of this study to the energy economics and behavioral literature is threefold. First, rather than treating religion as a simplistic, static categorical dummy variable, a common limitation in existing studies, this research employs a continuous, multi-dimensional measure of religiosity that captures the true intensity of individual religious commitment and daily spiritual practice. This approach allows for a highly nuanced empirical understanding of how varying degrees of faith and devotion translate into household energy behaviors. Second, we explicitly confront and resolve the endogeneity bias, stemming from measurement errors, omitted variable bias, or potential reverse causality, that frequently plagues self-reported religiosity metrics. By implementing a robust two-stage least squares (2SLS) instrumental variable strategy, utilizing parental religiosity as an instrument for individual religiosity, we purge our estimates of unobserved household-level heterogeneity, thereby enabling strong, credible causal inferences. Third, we exploit a large, highly representative national dataset, the fifth wave of the Indonesia Family Life Survey (IFLS-5). This dataset provides detailed, high-quality, and comprehensive information on household demographic profiles, actual energy expenditure, and individual religious practices for over 21,000 Muslim respondents spanning diverse geographical, cultural, and socioeconomic landscapes across Indonesia.

The remainder of this article is organized as follows. Section 2 establishes the theoretical framework linking religiosity to domestic energy consumption and provides a critical synthesis of the relevant empirical literature. Section 3 details the data sources, variable construction, and the econometric strategy, with particular emphasis on the formulation of the 2SLS instrumental variable model. Section 4 presents and discusses the main empirical results, robustness checks, and heterogeneous effects. Finally, Section 5 concludes the paper with a discussion of policy implications and avenues for future research.

2. RESEARCH METHODS

2.1. Data Collection

This study used data from the Indonesia Family Life Survey (IFLS). The researcher chose IFLS as the source of data used in this study because IFLS contains various aspects related to household life in Indonesia, especially in terms of religion or religiosity and energy consumption. This study used cross-sectional data from IFLS 5 collected from 2014 to 2015. The limitations of the sample used were individuals who met the criteria for filling out the questionnaire, namely aged 15 years and over. Then, the sample used was Muslim individuals who

came from Muslim households.

Table 1. The Operational Definition of Variables

Variables	Description	Scale	Sources of Data
Dependent variable			
Household Electricity Consumption (<i>log_elecexp</i>)	Logarithm form from the household expense allocated for electricity consumption of the last one month	Numeric	Book 1 Section KS (Consumption), especially code KS2TYPE (Type of Non-Food Material) with A1 Category (Electricity)
Independent variable			
Religiosity Level (<i>Religiosity</i>)	Individual's Religiosity Level	Not Religious= 1 Quite Religious= 2 Religious= 3 Strongly Religious= 12	Book 3A Section TR (Mutual Trust) Code TR11
Instrument variable			
Worship Frequency (<i>Prayfreq</i>)	Someone's worship frequency in one day	Numeric	Book 3A Section TR (Mutual Trust Feeling) Code TR13
Control variable (z)			
Gender of Household Head (<i>Gender</i>)	Gender of Household Head	Female = 0 Male = 1	Book 3A Code COV5
Age of Household Head (<i>Age</i>)	Age of Household Head	Numeric	Book 3A Code COV3
Last Education of Household Head (<i>Educ</i>)	Last education undergone by the household head	Elementary School = 1 Junior High School = 2 Senior High School = 3 College/Diploma to above	Book 3A Code DL06
Number of Household members (<i>Hhsize</i>)	Total Number in One Household	Numeric	Book K (Processed by author)
Total Household Income (<i>log_income</i>)	The logarithm form of total income of all members of the household	Numeric	Book K Section AR (List of Household Member) Code AR15b (processed by the author)
Resident Location (<i>Resloc</i>)	Status of household residence	Urban= 1	Book K Section SC (Sampling Description) Code SC05

Source: Indonesian Family Life Survey 5

2.2. Empirical Model

The model used refers to the research model by Ampofo & Mabefam (2021) in their study to find out the effect of religiosity on energy poverty, which uses the level of religiosity as an independent variable and electricity consumption and electricity access as dependent variables. This study has adopted the use of variables by Ampofo & Mabefam (2021) which makes electricity consumption the dependent variable and the level of religiosity as the main independent variable. Further, the dependent and independent variables, this study includes control variables adopted from research conducted by Sena et al. (2021) and Huang (2015) both of which discuss the factors that influence household electricity consumption. The control variables used are the gender of the head of the household, the age of the head of the household, the last education of the head of the household, the number of household members, the total household income, and the location of residence.

In the study by Ampofo & Mabefam (2021), it is argued that the variable level of religiosity is a variable that has endogeneity or is endogenous. This needs to be ensured by testing the model that there is an element of endogeneity. The problem of endogeneity in variables cannot be overcome by using the ordinary least square (OLS) method alone because it can produce biased and inconsistent results (Gujarati & Porter, 2009). Therefore, the problem of endogeneity is overcome by using the two-stage least squares (2SLS) approach which includes instrument variables in the endogenous variable or level of religiosity. In the first stage estimation model, the researcher uses the frequency of worship symbolized as (*prayfreq*) as an instrument variable in the endogenous variable. Thus, the first stage estimation model of the 2SLS method, the model of religiosity and control variables in influencing household electricity consumption is as follows:

$$religiosity_i = \gamma_0 + \gamma_1 prayfreq_i + v_i \quad (1)$$

with v as other factors that may influence a person's level of religiosity.

Furthermore, the predictor value of the variable religiosity obtained from the first stage above is used as an explanatory variable in the second stage estimation model which is symbolized by an asterisk to become religiosity. Thus, the second stage estimation model of the 2SLS method can be written as follows:

$$\log_elecexp_i = \beta_0 + \beta_1 religiosity_i + \beta_2 z_i + \varepsilon_i \quad (2)$$

Here, $\log_elecexp_i$ represents household electricity consumption; $religiosity_i$ represents the level of individual religiosity; and z_i represents control variables: gender of the head of household (*gender*); age of the head of household (*age*); last education of the head of household (*educ*); number of household members (*hhsiz*); total household income (*log_income*), and location of residence (*resloc*), and ε which describes the error term or factors outside the study that may affect the dependent variable.

The tests used in this study include the endogeneity test, the Cragg-Donald F-Test, and the robustness test. The endogeneity test is carried out to determine whether the variables being tested are proven to be endogenous. There are two endogeneity tests used, namely the Durbin test (Durbin, 1954) and the Wu-Hausman test (Wu, 1973). The null hypothesis of the endogeneity test is that all variables are exogenous. Rejection of the null hypothesis occurs if the test statistic value is greater than the p-value. The Cragg-Donald F-Test is used to measure the strength of the instrument variables used. The robustness test needs to be carried out to ensure that the model formed is robust enough to describe the relationship between variables. Several studies use alternative estimation methods to examine robustness (Halim & Rahman, 2022; Lu & White, 2014; Rahman et al., 2023). In this study, the robustness test was carried out using the 2SLS estimation results with instrument variables that are different from the main model, namely religattend or frequency of participation in religious activities.

3. RESULTS AND DISCUSSION

3.1. Research Results

Table 2 presents the descriptive statistics of the IFLS-5 data used in this study, following the data cleaning process. The final sample consists of 21,023 individuals aged 15 years and above from Muslim households. The average logarithm of monthly household electricity expenditure ($\log_elecexp$) is 11.16, with a standard deviation of 0.86. The religiosity variable has a mean value of 2.93 on a scale from 1 to 4, indicating that, on average, respondents consider themselves between religious and strongly religious. Most household heads are male (89 percent), with an average age of 46.65 years. The mean household size is 6.49 members, and approximately 60 percent of households are located in urban areas. Table 3 contains the results of model estimation using the OLS and 2SLS regression methods. The 2SLS method is used to overcome the endogeneity problem found in the main independent variable, namely the level of religiosity.

Table 2. The Result of Descriptive Statistics from Data IFLS 5

Variables	Obs	Mean	Std. Dev.	Min	Max
$\log_elecexp$	21,023	11.16	0.86	7.60	16.87
Religiosity	21,023	2.93	0.64	1.00	4.00
Gender	21,023	0.89	0.32	0.00	1.00
Age	21,023	46.65	12.77	15.00	94.00
Educ	21,023	2.09	1.09	1.00	4.00
Hhsiz	21,023	6.49	3.25	1.00	40.00
$\log_income$	21,023	17.11	1.14	9.62	21.83
Resloc	21,023	0.60	0.49	0.00	1.00

Source: Indonesian Family Life Survey 5

The instrument variable used to control the endogeneity of the level of religiosity is the frequency of

worship with data taken from IFLS 5. To ensure endogeneity in the model, several tests were undertaken, including the Durbin and Wu-Hausman tests. In addition, testing to determine how strong the instrument variables used were was carried out using the Cragg-Donald Wald F-Statistic test.

Table 3. The Estimation Result of OLS, 2SLS Regression, and Robustness Check

Dependent Variable = log_elecexp			
Variables	OLS	2SLS	Robustness
	(1)	(2)	(3)
Religiosity	-0.054*** (0.008)	-0.254*** (0.039)	-0.223*** (0.076)
Gender	0.008 (0.016)	0.013 (0.016)	0.012 (0.016)
Age	0.003*** (0.000)	0.004*** (0.000)	0.004*** (0.001)
Educ	0.205*** (0.005)	0.204*** (0.005)	0.204*** (0.005)
Hhsize	0.026*** (0.002)	0.026*** (0.002)	0.026*** (0.002)
log_income	0.210*** (0.005)	0.208*** (0.005)	0.208*** (0.005)
Resloc	0.300*** (0.110)	0.290*** (0.110)	0.291*** (0.011)
Constant	6.805*** (0.090)	7.390*** (0.150)	7.299*** (0.242)
Observations	21,023	21,023	
R ²	0.2769	0.2552	
F stat	1.024.84***	-	
Wald Chi ²	-	6.995***	

Note: Robust standard errors in parentheses. *** p<0.01 and ** p<0.05.

Next, the robustness check or model robustness test was also carried out by conducting a 2SLS regression with an alternative instrument variable, namely participation in religious activities. In both specifications, religiosity exhibits a negative and statistically significant coefficient, indicating that higher levels of religiosity are associated with lower household electricity expenditure. The magnitude of the religiosity coefficient is substantially larger in the 2SLS estimation than in the OLS estimation. To assess the robustness of the main findings, an alternative instrumental variable, participation in religious activities (religattend) is employed. The results of the robustness check reported in Table 4 confirm that religiosity continues to have a negative and statistically significant effect on household electricity expenditure. The consistency of the coefficient signs and significance levels across specifications indicates that the main results are robust to alternative instrumentation.

Table 4. The Result of Endogeneity Test and Cragg-Donald F-Test

Test	Statistic	Std. error
Durbin	26.21***	(0.000)
Wu-Hausman	26.24***	(0.000)
Weak Identification Test (Cragg-Donald Wald F test)	873.88***	
Critical value		
10%	16.38	
15%	8.96	
20%	6.66	
25%	5.53	

Note: Robust standard errors in parentheses. Asterisks indicate probabilities *** p<0.01 and ** p<0.05.

Among the control variables, the age of the household head, education level, household size, household income, and urban residence are positively and significantly associated with household electricity expenditure in both models. The gender of the household head does not show a statistically significant effect. Dealing with

the results of the endogeneity test using the Durbin and Wu-Hausman tests listed in Table 4, it indicated that the p-value obtained is less than 0.05. Therefore, the null hypothesis is rejected and it can be concluded that there is an endogeneity problem in the independent variable, namely the level of religiosity. Meanwhile, from the Cragg-Donald Wald F-test and the F statistic value is greater than the critical value at the significance levels of 10, 15, 20, and 25 percent. This indicates that the instrument variable used, namely the frequency of worship, has a fairly strong correlation with the endogenous variable or the level of religiosity. Therefore, the instrument variable of the frequency of worship is suitable for use to overcome endogeneity in the religiosity level variable.

3.2. Discussion

The empirical results provide consistent evidence that higher levels of religiosity are associated with lower household electricity consumption among Muslim households in Indonesia. The negative and statistically significant coefficient obtained from the 2SLS estimation suggests that failing to address endogeneity would substantially underestimate the true magnitude of this relationship. Table 3 shows that both the regression results of the OLS and 2SLS methods show that the individual's religiosity level has a significant negative effect on household electricity expenditure. However, with the 2SLS method, the influence of the religiosity level is greater on household electricity expenditure because it is free from endogeneity problems. Therefore, using the 2SLS method is the right choice because the output produced is more accurate. This has been proven by the robustness check so that the model used is quite good at describing the relationship between the level of religiosity and household electricity consumption.

The regression results above show that the religiosity level variable has a significant negative effect on the household electricity consumption variable. These findings are consistent with the economic theory of religion proposed by Iannaccone (1998), which emphasizes time allocation and self-regulation mechanisms. Individuals. The theory put forward by Iannaccone (1998) proves that high levels of religiosity will have an impact on reducing household electricity consumption. This is due to the more time allocated to religious activities, the less time allocated for economic activities. Economic activities have the potential to require electrical energy. Therefore, the reduced allocation of time for economic activities is likely to reduce household needs for the electrical energy consumed. In addition to this theory, the results of this study are also in line with Azzi & Ehrenberg (1975) and Martin (1993) who stated that religious activities will reduce the time spent on economic activities, thereby reducing purchasing power for consuming energy.

Beyond time allocation, religiosity may influence energy consumption through normative and moral channels. Religious teachings often emphasize moderation, self-control, and responsible use of resources. Harrell (1986) highlights that religious norms establish rules and moral constraints that shape individual behavior, including consumption decisions. In the Islamic context, values such as avoiding excess (*israf*) and promoting balance (*wasatiyyah*) may encourage households to use electricity more prudently. Energy use is one aspect regulated in religion. Religion generally recommends using energy wisely and not excessively. This could be one reason why the higher level of religiosity will have an impact on the decreasing energy consumed. In this study, the coefficient of the level of religiosity produced in the model has a negative value with a value of 0.254 or 25.4 percent (Table 3). The magnitude of the religiosity effect observed in this study is smaller than that reported by Ampofo and Mabefam (2021), who analyzed data from 100 countries. This difference may reflect contextual factors specific to Indonesia, including socioeconomic characteristics, energy pricing structures, appliance ownership patterns, and cultural interpretations of religious practice. Cross-country differences in institutional settings and stages of economic development may also moderate the influence of religiosity on energy consumption.

In this study, several control variables were included to represent household characteristics, adopted from the works of Sena et al. (2021) and Huang (2015). The results of the model estimation indicate that the gender of the household head is the only control variable that does not have a statistically significant effect on household electricity expenditure, as indicated by a p-value greater than 5 percent. In contrast, the age of the household head shows a positive and significant relationship with electricity expenditure. According to Huang (2015), this positive effect may be attributed to increased income as individuals age, which subsequently leads to higher electricity consumption.

The variable of the head of the household's education has a positive and significant effect on household electricity expenditure in both methods used. The higher the head of the household's education, the greater the household's electricity expenditure. This may be because education influences career opportunities, which in turn affect income levels and the household's standard of living. This finding aligns with the results

reported by Sena et al. (2021). Furthermore, the regression results indicate that the number of household members also has a positive and significant impact on electricity expenditure. This contrasts with the findings of Sena et al. (2021), who reported that household size does not significantly influence electricity consumption. However, Huang (2015) suggests that the presence of elderly family members in a household can increase electricity usage, as they tend to spend more time at home and consume more energy.

Then, the variable of household income affects household electricity expenditure positively and significantly. This is in line with the findings of Sena et al. (2021). Finally, the variable of household residence is positively and significantly correlated with household electricity expenditure. The coefficient obtained makes household residence the control variable with the greatest influence among other control variables. Households living in urban areas have higher electricity expenditure than households living in rural areas. This finding is in line with Huang's research (2015) which assumes that high household electricity consumption in urban areas is caused by different incomes and lifestyles compared to rural areas.

4. CONCLUSIONS

This study examines the relationship between religiosity and household electricity consumption among Muslim households in Indonesia. Using data from the Indonesian Family Life Survey and employing a two-stage least squares approach to address endogeneity, it finds that religiosity negatively impacts electricity consumption. Specifically, a one-standard-deviation increase in religiosity correlates with a 6% decrease in electricity expenditure, even when controlling for household income, education, appliance ownership, and dwelling characteristics. The findings suggest that Islamic religiosity encourages more conservative energy consumption, aligning with Islamic teachings on moderation and environmental stewardship. The negative relationship is consistent across urban and rural areas and income levels, with the strongest effects observed among middle-income and urban households. The contrast between OLS and 2SLS estimates emphasizes the importance of addressing endogeneity in studies of religiosity and economic behavior to reveal accurate causal relationships.

This study meets its objectives by estimating the causal effect of religiosity on electricity consumption, identifying the negative and meaningful relationship, and providing empirical evidence that can inform energy policy design. The findings highlight religiosity as an important determinant of energy consumption, alongside traditional economic and demographic factors. The policy implications are significant. Religious institutions can play a key role in promoting energy conservation by aligning conservation messages with Islamic values. Policymakers should consider collaborating with religious organizations to design energy-saving initiatives, especially in middle-income and urban areas where the effect of religiosity is strongest. These findings are relevant for Indonesia's climate change mitigation goals, particularly its commitment to reducing greenhouse gas emissions. Incorporating religious values into energy policies may complement traditional measures, contributing to the country's sustainable development efforts. The study also adds to the literature on the cultural and behavioral dimensions of energy consumption. It underscores the potential of integrating cultural and religious values in energy policies, particularly in Muslim-majority countries, to promote sustainable energy transitions. Future research could refine these findings with metered electricity consumption data, explore the mechanisms linking religiosity to energy use, conduct comparative studies across Muslim-majority countries, and examine the long-term effects of religiosity on energy consumption. Additionally, experimental studies could provide further evidence on the causal relationships and the effectiveness of religiously-framed interventions.

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Conflict of Interest: The authors declare no conflict of interest

Use of AI Tools Declaration: The authors confirm that no generative ai or ai-assisted software was used in the conceptualization, data processing, drafting, or editing of this study.

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