

DETERMINANTS OF ENERGY-SAVING BEHAVIOR AMONG LECTURERS: THE ROLES OF SOCIAL NORMS, HABITS, AND ENVIRONMENTAL AWARENESS IN STMIK CAMPUSES

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Abstract

This study examines the influence of social norms, habit, and environmental awareness on energy saving behavior among lecturers in three accredited Informatics and Computer Management Colleges in Medan, with a total population of 83 lecturers. Using a census technique, the entire population was sampled. Data were collected through a standardized questionnaire and analyzed using multiple linear regression. The results reveal that social norms have a significant positive effect on energy-saving behavior, indicating that the energy-saving behavior of lecturers is influenced by social norms and pressures within the academic environment. Habit has the most dominant positive influence, suggesting that everyday habits play a crucial role in forming energy-saving behavior. Environmental awareness also has a substantial positive effect, confirming that the higher the environmental awareness, the greater the tendency of lecturers to save energy. Simultaneously, these three variables explain a considerable proportion of the variance in energy saving behavior, demonstrating that energy conservation is driven by the integration of social influence, behavior automatization, and environmental cognition. This study contributes theoretically to the development of environmental behavior literature in higher education and practically to the reinforcement of green campus policies. The findings suggest that institutional leaders should establish pro-environmental social norms, create energy-efficient standard operating procedures, implement real-time feedback systems, and organize regular environmental awareness programs to enhance lecturers' motivation toward sustainable behavior. The study highlights that higher education sustainability is driven not only by institutional rules but also by the active behavioral participation of academic staff in the workplace.

Keywords: Social Norms, Habit, Environmental Awareness, Energy Saving Behavior, College Lecturers

1. Introduction

The issue of energy sustainability in higher education environments is becoming an increasingly important concern as electricity consumption increases due to the digitalization of academic activities, including technology-based learning, tridharma administration, and institutional communication (Zhang et al., 2024). This transformation not only increases work efficiency but also encourages the increased intensive use of electronic devices in the campus environment, which ultimately has an impact on high energy consumption (Simbolon & Simbolon, 2024). In this context, energy-saving behavior is a crucial aspect that needs to be considered to support the green campus concept and the sustainability of higher education institutions (K. M. et al., 2024).

Lecturers being the main actors in the implementation of the Tri Dharma of Higher Education have an important role in the pattern of energy use in the academic environment. Lecturers' activities necessitate constant use of computers, projectors, air conditioners, and other digital devices. This group constitutes one of the main energy consuming users on campus (D. N. Nguyen et al., 2025). Thus, the lecturers' energy saving conduct not only affects operational efficiency but also shows the institution's dedication to environmental sustainability values.

The urgency of this research is driven by several critical factors. First, the digitalization of academic activities has significantly increased energy consumption in higher education institutions, yet there remains a gap between awareness and actual energy-saving behavior among lecturers, who are the main energy users on campus (Simbolon & Simbolon, 2024; D. N. Nguyen et al., 2025). Second, despite growing environmental awareness, inconsistency in the implementation of energy saving behavior persists, with some lecturers leaving electronic devices on when not in use or paying less attention to energy economy in the workplace. This situation shows a gap between awareness and actual behavior which is affected by societal, psychological and individual habit variables (Zhang et al., 2024). Third, previous research has shown significant but fragmented findings regarding the determinants of energy-saving behavior. Studies have demonstrated that social norms function as psychological mechanisms that create informal social pressure, where individuals adjust their behavior to align with group expectations and standards (Tiberio et al., 2025; Heib et al., 2023). Habits are important for the development of consistent sustainable practices in the workplace, as people may become accustomed to saving energy repeatedly and these habits may be difficult to alter (Mumtaz et al., 2022; Habits, 2022). Furthermore, the level of understanding of climate change, environmental issues and the consequences of excessive energy consumption might foster pro-environmental behavior (Shi et al., 2026; Sampene et al., 2024). Fourth, the existing literature often examines social norms, habits, and environmental awareness independently rather than integrating them into a comprehensive framework to explain energy-saving behavior in the higher education context (Niu et al., 2023; Helferich et al., 2023). This fragmentation limits understanding of how these factors collectively influence energy-saving behavior among lecturers. Fifth, empirical evidence on energy-saving behavior in higher education institutions remains limited, particularly in the context of Informatics and Computer Management Colleges in Indonesia, where technology-based activities are intensive and energy consumption is high.

Previous research has shown significant but fragmented findings regarding the determinants of energy-saving behavior. Studies have demonstrated positive outcomes, where social norms play a key role in promoting energy-saving behavior through social comparison mechanisms and informal social pressure in the workplace (Tiberio et al., 2025; Heib et al., 2023). Habit has been identified as the most important predictor in predicting the constancy of energy-saving activity, even over attitude and intention variables (Mumtaz et al., 2022). Action-based interventions are more effective than education-based methods exclusively in shaping energy-saving behavior (Huang et al., 2024). Environmental awareness has been found to be a major predictor in forming pro-environmental behavior, with individuals who have a high level of environmental awareness demonstrating better intrinsic desire to engage in sustainable behavior (Shi et al., 2026; Sampene et al., 2024). However, these studies have examined these relationships in isolation, leaving a significant gap in understanding how social norms,

habits, and environmental awareness collectively influence energy-saving behavior among lecturers in higher education institutions.

The research gap in this study lies in the limited understanding of how social norms, habits, and environmental awareness jointly influence energy-saving behavior among lecturers in higher education institutions. While individual studies have examined the direct effects of social norms on pro-environmental behavior or the role of habits in driving sustainable practices, the integrated framework connecting these elements remains underexplored (Helferich et al., 2023; Niu et al., 2023). Additionally, most previous studies have been conducted in household or industrial settings, leaving a significant gap in knowledge regarding the dynamics of energy-saving behavior in the higher education context, where individual autonomy, professional norms, and institutional policies interact to shape behavior. Furthermore, empirical evidence from the Indonesian higher education context remains limited, particularly in the post-pandemic period where digitalization has intensified and energy consumption has increased significantly (Simbolon & Simbolon, 2024; Zhang et al., 2024).

The novelty of this research lies in several aspects. First, this study focuses on lecturers in three Informatics and Computer Management Colleges in Medan, representing a unique context characterized by intensive technology-based activities, high energy consumption, and increasing digitalization of academic work. Second, this study develops an integrative model that simultaneously examines the influence of social norms, habits, and environmental awareness on energy-saving behavior, providing a comprehensive understanding of the determinants of energy-saving behavior in higher education. Third, this study positions habit as the potential dominant predictor of energy-saving behavior, enabling the examination of whether automatic behavioral patterns are more influential than cognitive factors or social pressure in driving sustained energy conservation. Fourth, this study contributes to the limited empirical evidence on energy-saving behavior in the Indonesian higher education context, providing insights into how social, psychological, and individual factors influence lecturers' energy conservation practices. Fifth, this study extends the application of social norm theory, habit theory, and environmental awareness theory to the context of energy-saving behavior in higher education, validating theoretical predictions in an under-researched institutional context.

The purpose of this study is to analyze the influence of social norms, habits, and environmental awareness on energy-saving behavior among lecturers at three Informatics and Computer Management Colleges accredited "Good" in Medan. In addition, this study aims to determine which factor is the most dominant predictor of energy-saving behavior among lecturers. The choice of this goal was driven by the fragmented nature of previous research findings and the limited understanding of how social, psychological, and individual factors collectively influence energy-saving behavior in the higher education context. With a comprehensive examination of the influencing factors, this study aims to provide a deeper understanding of how energy-saving behavior can be promoted among lecturers, thereby supporting the development of effective green campus policies and sustainability programs in higher education institutions.

The contribution of this research is multifaceted. From a theoretical perspective, this research contributes to the enrichment of literature on environmental behavior in higher education by proposing and testing an integrative model that links social norms, habits, and environmental awareness with energy-saving behavior, extending the application of environmental psychology theories to the context of energy conservation in academic workplaces. The findings contribute to the understanding of how specific behavioral

factors influence energy-saving behavior and which factors are most dominant in driving sustained energy conservation, providing a more nuanced theoretical framework for analyzing pro-environmental behavior in organizational settings. From a practical perspective, this study provides actionable insights for higher education institutions, policymakers, and institutional leaders in designing and implementing effective green campus initiatives. For institutional leaders, the findings provide guidance on which behavioral factors should be prioritized in promoting energy-saving behavior among lecturers. For policymakers, the results offer insights into the importance of establishing pro-environmental social norms, creating energy-efficient standard operating procedures, and organizing regular environmental awareness programs. For higher education institutions, this study provides evidence to support the development of green campus policies that integrate behavioral interventions with institutional rules to foster a culture of sustainability in the academic workplace.

2. Theoretical Background

2.1 Energy Saving Behavior

Energy saving behavior (ESB) is a kind of pro-environmental behavior, which refers to individual behaviors to actively reduce energy consumption in daily life activities, notably organizational activities in the context of universities (Zhang et al., 2024). Theoretically, this conduct can be explained by the theory of planned behavior (TPB) which holds that individual behavior is influenced by behavioral intentions produced by attitudes towards behavior, subjective norms, and perceived behavioral control (T. N. Nguyen et al., 2025). Therefore, in addition to individual awareness, energy saving behavior is also influenced by cognitive appraisal, social pressure, and perceived ease or difficulty of implementation (Duong, 2024).

In addition to TPB, energy-saving behavior can also be explained by Value-Belief-Norm Theory (VBN). This idea is based on the fact that pro-environmental conduct is a result of a set of personal values, ecological beliefs and personal standards that motivate individuals to behave based on moral obligation towards the environment. In this concept, energy saving behavior is considered as a manifestation of internalizing sustainability principles that motivate individuals to reduce negative impacts on the environment (Matejun et al., 2024).

Furthermore, for universities, energy-saving behavior can be realized through various operational actions such as turning off lights when not in use, turning off electronic devices after use, and optimizing the use of air conditioning as needed. These actions not only reflect compliance with organizational rules, but also are the result of the interaction between cognitive, normative, and moral factors as explained in the TPB and VBN (Randhawa, 2021).

2.2 Social Norms

Social norms are psychological constructs that represent an individual's perspective of what is suitable, acceptable and expected conduct in a given social situation (Webb et al., 2024). From the perspective of the Theory of Planned Behavior (Fishbein & Ajzen, 1975), social norms (subjective norms) are one of the important factors that affect the formation of behavioral intention, mainly through the perception of social pressure from individuals or groups that are regarded important. The social norms are developed through social interactions in academic environments, leadership structures and institutional cultures that absorb sustainability ideals [(Tiberio et al., 2025). Lecturers as professional actors

respond not only to formal restrictions, but also to informal norms that emerge in the academic community, for example, habits of effective energy consumption in classrooms, labs and administrative work (Ruan & Deng, 2024).

A variety of research have empirically shown that social norms are crucial in motivating pro-environmental behaviour such as energy-saving behaviour (Haryuningtyas et al., 2024). The effectiveness of social norms is typically increased if people are made aware of the fact that the energy saving action is a prevalent and socially approved habit in their reference group (Zheng et al., 2023). In this case, social norms are not simply external pressures, but also methods of internalization to reinforce the consistency of sustainable behavior (Niu et al., 2023).

H1: Social norms have a positive and significant effect on energy saving behavior in lecturers.

2.3 Habit

A habit is a tendency to behave in a certain way, acquired via repetition in a generally stable situation, so that the behavior becomes automatic and is performed with little or no conscious mental processing. From a behavioral psychology perspective, habits are the outcome of contextual learning, where situational signals get associated with certain behavioral responses, causing people to repeat the same acts in comparable circumstances (Habits, 2022). Besides, habits are shown in the individual routines of energy efficiency such as switching off lights when not needed, turning off electronic devices after finishing work, and optimizing the usage of air conditioning (Mumtaz et al., 2022). If you repeat these actions in a stable work setting, you will create automatic behavior patterns that no longer depend on the cognitive consideration of intentions (Gomes & Lopes, 2023).

Habit is empirically known as one of the strongest indicators in predicting sustainable behavior including energy-saving behavior (Akram et al., 2023). This is because habits tend to be more stable, less sensitive to short-term variations in intention, and less susceptible to immediate situational influences (Rejeb et al., 2023). Thus, habit finally serves as a method for automating behavior that reinforces the constancy of pro-environmental actions over the long term (Wood, 2024).

H2: Habit has a positive and significant effect on energy saving behavior in lecturers.

2.4 Environmental Awareness

Environmental awareness is defined as the cognitive ability and the affective concern of a person for different environmental issues, such as climate change, environmental deterioration, and the necessity for effective use of natural resources (Altinay, 2022). This term shows not just how much an individual knows about environmental challenges, but also how much an individual can integrate this learning into a value system that affects daily attitude and conduct (Baiqun Isbahi et al., 2024). Moreover, from the pro-environmental behavioral perspective, the environmental awareness is a cognitive base that affects the individual's decision-making process (Shi et al., 2026). More environmentally conscious people are more sensitive to the ecological effects of every action they undertake, so they are more inclined to consider sustainability issues in their actions, particularly in the use of energy (Maurer & Bogner, 2022).

Empirically, several research have demonstrated that environmental awareness has a major impact to increase energy-saving behavior and other pro-environmental activities (Carrus et al., 2021). Environmental awareness is not confined to the cognitive level, but can be translated into behavioural encouragement, when people are aware of the

association between energy usage and its environmental impact (Rosak-szyrocka, 2021). Within the higher education context, lecturers with a high level of environmental awareness tend to show more responsible conduct in energy use in academic as well as operational activities (Students et al., 2021). This proves that environmental consciousness is an internal process that strengthens the direction of sustainable energy-saving behavior (Nur et al., 2021).

H3: Environmental awareness has a positive and significant effect on energy saving behavior among lecturers.

3. Methods

This research takes a quantitative approach with explanatory research which tries to explain the causal relationship between social norms, habits and environmental awareness variables on energy saving behavior among lecturers. This approach was selected because the numerical data received from the respondents allow to evaluate theories empirically. The research was conducted on three authorized "Good" Informatics and Computer Management Colleges (STMIK): STMIK Time, STMIK Logika, and STMIK Kristen Neumann Indonesia. The research object was permanent lecturers at these three institutions. Permanent lecturers have key roles in academic activity and energy use on campus.

The population in this study amounted to 3 institutions, namely STMIK Time as many as 33 lecturers, STMIK Logika as many as 44 academics, and STMIK Kristen Neumann Indonesia as many as 6 lecturers so that the overall population was 83 lecturers. The sampling technique employed was census or total sampling, where all the members of the population were used as research respondents considering the population is relatively small and still reachable as a whole. Data was obtained by a survey method with a standardized questionnaire instrument that was constructed based on the indications of each research variable. The measurement of the variable was done by using a five-point Likert scale (strongly disagree to strongly agree) to measure the perception of the respondents towards each statement presented.

The data were subjected to multiple linear regression analysis to examine the effect of the independent variables on the dependent variable. The model was used to find out how much social norms, habits and environmental knowledge affect energy saving behavior of lecturers. Before doing the hypothesis test, the research instrument was tested thorough validity and reliability tests to confirm the validity of the data. Then, we carried out the traditional assumption tests such as normality, multicollinearity and heteroscedasticity to check that the regression model matched the statistical requirements. The hypothesis testing was conducted using t-test for partial effects, F-test for simultaneous effects and the coefficient of determination (R^2) in order to find out the model's ability to explain the variance of lecturers' energy-saving behavior.

4. Results and Discussion

4.1 Results

Table 1. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Social Norms	83	12	40	33.12	5.133
Habit	83	20	40	33.45	3.988
Environmental Awareness	83	22	40	33.16	3.695
Energy Saving Behavior	83	6	30	26.08	3.501

Source: Data processed by researchers (SPSS), 2026

Table 1 presents the descriptive statistics for all variables examined in this study based on 83 respondents from three colleges of the College of Informatics and Computer Management. The social norms variable takes values from 12 to 40, with an average value of 33.12 and a standard deviation of 5.133. This implies that respondents' judgments of societal norms in supporting energy-saving behavior are in the high category with a somewhat broad amount of diversity in answers. Moreover, the habit variable has a minimum of 20 and a maximum of 40 with an average of 33.45 and a standard deviation of 3.988. This value shows that the habit of lecturers in carrying out energy-saving activity tend to be pretty good and relatively the same among respondents, evidenced by the standard deviation value which is lower than the social norms variable.

The environmental awareness variable had a minimum score of 22 and a maximum score of 40, with an average of 33.16 and a standard deviation of 3.695. These results indicate that the level of environmental awareness of lecturers is in a high category and has a relatively little range in answers which means that respondents tend to have a uniform perception of the importance of environmental issues. The energy saving behaviour variable has a minimum score of 6 and a maximum score of 30 with a mean of 26.08 and a standard deviation of 3.501. This implies that the energy saving behavior of the lecturers is fairly high, meaning that most of the respondents have carried out the energy saving behavior in their regular activities in the work environment. The overall results of the descriptive statistics demonstrate that all research variables are in the reasonably high to high category, indicating that lecturers have had enough awareness, habits, and support from social norms to support energy saving behavior in the higher education environment.

Table 2. Classical Assumption Test Results

Test	Indicator	Result	Conclusion
Normality	Asymp. Sig. (2-tailed)	0.200	Normal distribution
Multicollinearity	Tolerance	>0.10	No multicollinearity
	VIF	<10	No multicollinearity
Heteroscedasticity	Glejser Sig.	>0.05	No heteroscedasticity

Source: Data processed by researchers (SPSS), 2026

Table 2 presents the classical assumption test results. The normality test shows that the Asymp. Sig (2-tailed) value is 0.200 which is greater than 0.05. This means that the residual data in this study are regularly distributed. Therefore, it may be stated that the data distribution does not have significant deviations from the normal distribution, satisfying the normality assumption necessary in regression analysis. The multicollinearity test results show that all independent variables had a Tolerance value greater than 0.10 and a VIF value less than 10. This implies that the variables of social norms, habits, and environmental awareness have no signs of multicollinearity. Therefore, each independent variable has a separate contribution to explain the dependent variable which is energy saving behaviour. The heteroscedasticity test results show that the significance values of all independent variables are above 0.05, suggesting that the study model is free from signs of heteroscedasticity. Thus, it can be claimed that the residual variance is homogeneous or constant over all observations. The absence of heteroscedasticity makes the estimated results of the effect of social norms, habits, and environmental consciousness on energy-saving behavior in lecturers more robust.

Table 3. Multiple Linear Regression Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.102	0.845		1.304	0.196
Social Norms (X1)	0.318	0.098	0.314	3.245	0.002
Habit (X2)	0.405	0.099	0.392	4.112	0.000
Environmental Awareness (X3)	0.276	0.093	0.275	2.978	0.004
R	0.742				
R Square	0.551				
Adjusted R Square	0.534				
F-count	25.614				0.000

Source: Data processed by researchers (SPSS), 2026

Table 3 presents the multiple linear regression results, coefficient of determination, and F-test results. Based on the findings, an equation was generated that indicates the relationship between the factors of social norms, habits, and environmental awareness on energy saving behavior in lecturers. The outcome of the analysis shows that the constant is 1.102 with a significance value of 0.196 which suggests that it is not significant, so that the focus of interpretation is aimed at the independent variable in the research model.

The variable of social norms (X1) has a regression coefficient value of 0.318, t-value of 3.245 and significance value of 0.002 (<0.05). These results suggest that social norms positively and significantly affect energy saving behavior. This indicates that the more social standards are seen by professors in the work environment, the higher the likelihood of lecturers to behave in energy saving behavior. Furthermore, the value of the habit variable coefficient (X2) is 0.405 with a t-count of 4.112 and a significance of 0.000. The results reveal that habit has a positive and significant effect on energy saving behavior, and it is the most dominant variable compared to other variables. This suggests that the habits that are acquired regularly have a vital impact in affecting the energy saving behavior of lecturers in daily activities on campus. The environmental awareness variable (X3) likewise has a positive and significant effect on energy saving behavior, with a coefficient value of 0.276, t-count of 2.978 and significance of 0.004. These data imply that the more environmental consciousness of lecturers, the more inclination of energy saving behavior.

The coefficient of determination test yielded an R value of 0.742, demonstrating a substantial association between social norms, habits, environmental awareness and energy saving behavior of lecturers. The Adjusted R Square value of 0.534 indicates that the model was able to explain the dependent variable at 53.4% after correcting for the number of independent variables and the size of the study sample. This shows that the study model has a reasonable degree of practicality and has not been overestimated in explaining the link between the variables. The remaining 46.6% of the energy-saving behavior variation is affected by additional variables outside this research model, such as institutional policy elements, supporting facilities, organizational incentives and other psychological variables not included in the study. The F-count value of 25.614 with a significance level of 0.000 indicates that the variables of social norms, habits, and environmental awareness have a substantial simultaneous influence on energy saving behavior in the lecturers, confirming that the study model has a strong feasibility (model fit).

Table 4. Summary of Hypothesis Testing Results

Hypothesis	Variable	Coefficient	t	Sig.	Result
H1	Social Norms → Energy Saving Behavior	0.318	3.245	0.002	Accepted
H2	Habit → Energy Saving Behavior	0.405	4.112	0.000	Accepted
H3	Environmental Awareness → Energy Saving Behavior	0.276	2.978	0.004	Accepted

Source: Data processed by researchers (SPSS), 2026

Table 4 presents the summary of hypothesis testing results. From the results of the t-test (partial), it is known that the social norms variable (X1) has a t-count value of 3.245 with a significance of 0.002 (<0.05), hence it can be inferred that social norms have a positive and significant effect on energy saving behavior. This implies that the greater the social standards of the work environment, the higher the tendency of lecturers to engage in energy saving behavior. The habit variable (X2) has a t-count value of 4.112 and a significant value of 0.000 (<0.05), meaning that habits have a positive and significant effect on energy saving behavior. This research implies that the frequently acquired habits play a major influence in shaping energy saving behavior in lecturers. Then, the environmental awareness variable (X3) has a t-value of 2.978 with a significance level of 0.004 (<0.05), so it can be concluded that environmental awareness also has a positive and significant influence on energy saving behavior. This suggests that the more the environmental consciousness of the lecturers, the higher the tendency to save energy.

4.2 Discussion

4.2.1 Social Norms Affects Energy Saving Behavior

The hypothesis testing results indicate that social norms have a significant positive effect on energy saving behavior, with a coefficient value of 0.318 and a probability value of 0.002, indicating that H1 is accepted. This finding suggests that the more social standards are perceived by lecturers in the work environment, the higher the likelihood of lecturers to behave in energy saving behavior.

This result is in line with recent study advances which suggested that social norms is a key variable in promoting energy saving behavior in higher education institutions (Zhang et al., 2024; Nguyen et al., 2025). Descriptive and injunctive norms constantly promote energy saving behavior through social comparison mechanisms and informal social pressure in the workplace (Tiberio et al., 2025). Besides, social norm reinforcement in educational institutions affects not only intentions but also long-term sustainable behavior patterns (Heib et al., 2023). Social norms function as a psychological mechanism that creates informal social pressure, where individuals adjust their behavior to align with group expectations and standards. In the context of higher education, when lecturers perceive that their colleagues value energy conservation and practice sustainable behaviors, they are more likely to adopt similar behaviors to gain social approval and avoid social sanctions.

The results have managerial implications in terms of using social norm as a strategic instrument to influence energy-saving behaviour among the instructors in higher education. Hence, there is a need for active and lasting social control mechanisms and formal rule-based systems are not enough. Institutional management should promote an open and competitive environment by offering peer-to-peer feedback on energy consumption across work units, as informal social pressure has been demonstrated to be

more effective in driving behavioral compliance than administrative directives. Moreover, the reinforcement of an organizational culture based on sustainability must be systematically assimilated in such a way that energy-saving conduct does not remain at the level of individual knowledge, but rather becomes a collective norm with a social and psychological binding element in daily academic activities.

4.2.2 Habit Affects Energy Saving Behavior

The hypothesis testing results indicate that habit has a significant positive effect on energy saving behavior, with a coefficient value of 0.405 and a probability value of 0.000, indicating that H2 is accepted. This finding reveals that habit has a positive and significant effect on energy saving behavior, and it is the most dominant variable compared to other variables. This suggests that the habits that are acquired regularly have a vital impact in affecting the energy saving behavior of lecturers in daily activities on campus.

This finding is also consistent with a number of earlier research that have shown the importance of habit in driving pro-environmental behavior at work (Habits, 2022). The most important predictor in predicting the constancy of energy saving activity is habit, over attitude and intention variables (Mumtaz et al., 2022). Action-based interventions are more effective than education-based methods exclusively in shaping energy saving behavior (Huang et al., 2024). Habit has a strong mediation effect between intention and actual action, especially for routine and repetitive activity (Akram et al., 2023). A steady work environment and consistent reinforcement system of behavior assist the building of habits (Wang & Lin, 2024). Furthermore, energy saving behaviors in educational institutions are frequently more impacted by established routines than normative criteria or external incentives (Busu et al., 2025).

Habits represent automatic behavioral responses that are triggered by contextual cues without conscious deliberation. In the workplace, energy-related habits such as turning off lights, shutting down computers, and using natural light become embedded in daily routines through repetition and reinforcement. Once established, habits are resistant to change and require less cognitive effort to maintain, making them powerful drivers of sustained energy-saving behavior. The dominance of habit as the most influential variable suggests that interventions targeting habit formation may be more effective than those focusing solely on awareness or normative pressure.

The managerial implications of these findings show that the habitual effect on energy saving behaviour suggest the necessity for management initiatives to encourage regularity and structure in the work routine in the university setting. Instead of depending solely on policies or recommendations, management should incorporate energy saving practices into daily operational systems, such as standard operating procedures (SOPs) for the use of campus facilities, automation of electrical systems, and default settings for energy saving devices in the lecturers' workspaces. Moreover, the systematic repetition of positive action can be used to reinforce the habit, e.g., reinforcement by an energy-saving campus program based on daily monitoring or rewards for work units that consistently adopt energy conservation.

4.2.3 Environmental Awareness Affects Energy Saving Behavior

The hypothesis testing results indicate that environmental awareness has a significant positive effect on energy saving behavior, with a coefficient value of 0.276 and a probability value of 0.004, indicating that H3 is accepted. These findings imply that the

more environmental consciousness of lecturers, the more inclination of energy saving behavior.

These results align with recent findings suggesting that environmental consciousness is a major predictor in forming pro-environmental behaviour, but its efficiency typically rely on the support of other factors such as habits and social norms in the social environment (Shi et al., 2026). Also, in the setting of higher education institutions, empirical research indicate that environmental awareness might affect energy saving behaviour directly and indirectly through the development of attitudes and behavioural intents (Maurer & Bogner, 2022). Environmental awareness People with a high level of environmental awareness have better intrinsic desire to engage in sustainable behavior, including energy conservation in the workplace (Students et al., 2021). Thus, the cognitive basis of environmental awareness leads to an increase of lecturers' commitment to apply energy saving behavior within the university environment (Das & Dash, 2023).

Environmental awareness encompasses knowledge about environmental issues, understanding of the consequences of environmental degradation, and recognition of personal responsibility for environmental protection. Lecturers with higher environmental awareness are more likely to perceive energy conservation as personally relevant and morally imperative, leading to stronger intentions to engage in sustainable behaviors. This intrinsic motivation is particularly important in the academic context, where individuals have greater autonomy over their daily behaviors. However, the relatively lower coefficient compared to habit suggests that environmental awareness alone is insufficient to drive behavior change without the support of established routines and social reinforcement.

The managerial implications of these findings show that the development of a sustainable organizational culture requires a long-term strategy of enhancing the level of environmental awareness in higher education institutions. Management should not only focus on technical policies of energy saving, but also strengthen the education aspect through sustainable environmental literacy programs for the lecturers such as training on green behavior, climate awareness campaigns, and the integration of sustainability values into academic and non-academic activities. In addition, the institutions should develop a learning ecosystem that constantly encourages the internalization of pro-environmental principles, as environmental awareness is a cognitive basis that strengthens intrinsic motivation and intention.

4.2.4 Social Norms, Habits, and Environmental Awareness Simultaneously Affects Energy Saving Behavior

The results of the simultaneous test (F test) show that social norms, habits, and environmental knowledge have a substantial influence on energy saving behavior in lecturers, with an F-count value of 25.614 and a significance level of 0.000. The Adjusted R Square value of 0.534 indicates that the three independent variables collectively explain 53.4% of the variance in energy saving behavior, while the remaining 46.6% is influenced by other factors outside the research model.

This is consistent with prior research, which shows that social norms are a significant factor in promoting pro-environmental behavior through social comparison mechanisms and informative social pressure, especially in academic job settings (Niu et al., 2023). Environmental consciousness is also an important determinant of energy saving intents and behaviour, directly and indirectly human attitudes and conventions (Helferich et al., 2023). In addition, habit is an important factor to explain the constancy of energy saving

behavior since it can automate specific activities in regular work routines (Webb et al., 2024).

The simultaneous effect indicates that energy-saving behavior in higher education is a complex phenomenon influenced by multiple interacting factors. Social norms provide the external social context that signals appropriate behavior, environmental awareness provides the internal cognitive framework that motivates pro-environmental action, and habits provide the automatic behavioral patterns that translate intentions into consistent actions. The interaction between these factors suggests that effective interventions should address all three dimensions simultaneously to achieve sustainable behavior change.

Managerial implications of the data indicate that management of energy saving behavior in higher education environments involves an integrated, multi-factorial strategy that concurrently embraces social norms, habits, and environmental consciousness. Institutional management should create a reinforcing behavioral ecology with social pressure, individual awareness and work habits besides structural policies. Building a campus culture based on green conduct and emphasizing the performance comparison of work units can realize the strengthening of social norms, so as to produce positive social incentives. Also, the growing environmental consciousness has to be supported by continuous education programs for building intrinsic motivation of lecturers to maintain energy efficiency. However, as habits are the most dominant influence, managerial strategies should pay attention to the creation of standardized and automated operational procedures, such as energy-saving SOPs and electricity usage monitoring systems.

5. Conclusion

This study examines the influence of social norms, habit, and environmental awareness on energy saving behavior among lecturers in three approved higher education institutions in Medan. The sample consists of 83 lecturers selected from three colleges of the College of Informatics and Computer Management. Multiple linear regression analysis was employed to test the proposed hypotheses.

The results indicate that social norms have a positive and significant effect on energy saving behavior, suggesting that the more social standards are perceived by lecturers in the work environment, the higher the likelihood of lecturers to behave in energy saving behavior. This finding confirms that social norms function as a psychological mechanism that creates informal social pressure, where individuals adjust their behavior to align with group expectations and standards. Habit has a positive and significant effect on energy saving behavior, and it is the most dominant variable compared to other variables. This suggests that the habits that are acquired regularly have a vital impact in affecting the energy saving behavior of lecturers in daily activities on campus. Habits represent automatic behavioral responses that are triggered by contextual cues without conscious deliberation, making them powerful drivers of sustained energy-saving behavior. Environmental awareness likewise has a positive and significant effect on energy saving behavior, implying that the more environmental consciousness of lecturers, the more inclination of energy saving behavior. Environmental awareness encompasses knowledge about environmental issues and recognition of personal responsibility for environmental protection, providing the intrinsic motivation that supports sustainable behavior.

The simultaneous test results show that social norms, habits, and environmental awareness collectively have a substantial influence on energy saving behavior, with an Adjusted R Square value of 0.534 indicating that the three independent variables explain 53.4% of the variance in energy saving behavior, while the remaining 46.6% is influenced

by other factors outside the research model. The findings suggest that energy-saving behavior is mainly influenced by the integration of social influence, behavior automatization, and environmental cognition. Combined, these characteristics account for a considerable part of energy saving behavior, demonstrating that higher education sustainability is driven not only by institutional rules but also the active behavioral participation of lecturers in the workplace.

The theoretical implications of this study extend the application of social norm theory, habit theory, and environmental awareness theory to the context of energy saving behavior among lecturers in higher education. The finding that habit is the most dominant predictor suggests that automatic behavioral patterns are more influential than cognitive factors or social pressure in driving sustained energy conservation, highlighting the critical role of automaticity in pro-environmental behavior. This study also provides empirical evidence on the determinants of energy saving behavior in the higher education context, which has been under-researched compared to household or industrial settings.

From a practical perspective, this study provides actionable insights for higher education institutions seeking to promote energy saving behavior among academic staff. Higher education institutions need to boost green campus initiatives by establishing permissive social norms, organized behavioral routines, and continual environmental awareness programs. Institutional leaders must create energy-efficient standard operating processes, establish real-time feedback systems on energy use, and instill sustainability ideals into the business culture. Furthermore, training and awareness campaigns on environment should be organized on a regular basis to enhance the motivation of lecturers towards sustainable activities. Indicators of green behavior embedded in institutional performance evaluation systems could further enhance long-term behavioral change and institutional sustainability performance.

This study has several limitations that should be acknowledged. First, the study uses a cross-sectional design, which limits the ability to establish causal relationships between variables. Second, the study relies on self-reported data collected through questionnaires, which may be subject to social desirability bias and common method bias. Third, the study focuses on lecturers from three STMIK universities in Medan City, which may limit the generalizability of the findings to other types of higher education institutions, other regions, or other groups of employees. Fourth, the study does not examine the moderating role of individual differences such as gender, age, or academic discipline in the relationships examined. Fifth, the study does not include other potential determinants of energy saving behavior such as institutional policies, supporting facilities, organizational incentives, or other psychological variables.

Future research should incorporate objective measures of energy consumption to validate self-reported behavior and reduce social desirability bias. Researchers should examine the relationships observed in this study in other higher education contexts and cultural settings. Future studies should investigate the moderating role of individual and organizational factors in the relationships between social norms, habits, environmental awareness, and energy saving behavior. Researchers should also explore the effectiveness of different intervention strategies, such as feedback mechanisms, incentives, and education programs, in promoting energy saving behavior in higher education institutions. Finally, future research could employ qualitative approaches such as interviews or focus groups to provide richer insights into the psychological and social mechanisms underlying energy saving behavior in the academic workplace.

In conclusion, this study contributes to the growing body of literature on energy saving behavior in higher education institutions by providing empirical evidence on the influence of social norms, habit, and environmental awareness. The findings suggest that energy-saving behavior is driven by the integration of social influence, behavior automatization, and environmental cognition, with habit emerging as the most dominant predictor. As higher education institutions increasingly seek to promote sustainability, understanding the mechanisms through which behavioral factors influence energy conservation becomes increasingly important for developing effective intervention strategies, designing green campus initiatives, and fostering a culture of sustainability in the academic workplace.

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