

Psychological Predictors of Sustainable Energy Conservation Behavior among Employees of Educational Institutions

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Abstract

Energy conservation in the workplace is a vital approach to achieving environmental sustainability and lower organizational expenses. Even though businesses use technology to cut energy use, employee behavior is crucial to the success of these programs. The current study looks at the psychological factors that influence employees' energy-saving practices at work. The study emphasizes attitude toward energy saving, environmental awareness, self-efficacy, and intrinsic motivation as important psychological factors. A descriptive correlational research design was adopted. Data were collected from 120 employees working in educational institutions using structured questionnaires. Descriptive statistics, correlation, and regression analysis were used to analyze the data. The results indicated that environmental awareness, positive attitudes toward energy conservation, and intrinsic motivation significantly influence energy conservation behavior in the workplace. The study highlights the importance of psychological interventions and awareness programs in promoting sustainable workplace practices.

Keywords: *Energy conservation behavior, environmental awareness, attitude, intrinsic motivation, self – efficacy & employees*

Introduction

Increased industrialization, technological advancement, and population growth have made energy consumption one of the world's most urgent problems (International Energy Agency, 2023; Steg, 2008). In order to reduce energy consumption and lessen environmental deterioration, organizations worldwide are being advised to follow sustainable practices (Ones & Dilchert, 2012). According to Siero et al. (1996) and Lo et al. (2012), workplace spaces,

including workplaces, educational institutions, and corporate settings, account for a significant portion of energy consumption through lights, water coolers, Pantries, labs, and electronic equipment. As a result, encouraging energy-saving practices among staff members has emerged as an imperative component of corporate sustainability plans (Griskevicius et al. 2012). Research shows that technological solutions alone are insufficient to achieve sustainable energy outcomes, even though technological advancements like energy-efficient appliances and smart energy systems significantly reduce energy consumption (Abrahamse et al. 2005; Steg & Vlek, 2009). The success of energy-saving programs in official settings/work place are largely dependent on human behavior (Dietz et al. 2009). Workplace energy use is influenced by employees' daily actions, such as turning off lights, cutting back on unneeded equipment use, and modifying temperatures according to the climatic conditions (Lo et al. 2012).

The significance of comprehending the psychological factors that influence pro-environmental behavior in the workplace has been highlighted by researchers in recent years (Ones & Dilchert, 2012; Norton et al. 2015). Pro-environmental behavior (PEB), which is defined as acts that support resource preservation and environmental sustainability, includes workplace energy conservation (Steg & Vlek, 2009). Environmental awareness; attitudes toward energy conservation, perceived behavioral control, and intrinsic motivation are examples of individual psychological characteristics increasingly recognized as important determinants of such actions (Bamberg & Möser, 2007).

Theoretical Perspectives

The Theory of Planned Behavior, which contends that attitude of a person towards the behavior, subjective norms, and perceived behavioral control all influence behavior, is one theoretical framework commonly used to explain pro-environmental behavior (Ajzen, 1991). Employees are more expected to adopt sustainable practices in the workplace if they have favourable attitudes about energy conservation and think they can significantly reduce energy use (Greaves et al. 2013).

Moreover, the Value-Belief-Norm Theory suggests that people's personal norms are influenced by their environmental values and beliefs, which in turn spur ecologically conscious behavior (Stern, 2000). Thus, employees are more likely to integrate energy-saving practices into their everyday work routines if they have stronger environmental values and personal norms (Steg et al. 2014).

Organizational sustainability research stresses the interplay between individual psychological characteristics and organizational environments, offering another related viewpoint (Norton et al. 2015). Employees' desire to act in an ecologically responsible manner can be influenced by organizational culture, leadership support from the team and management, and green HRM practices (Renwick et al. 2013).

Even though environmental sustainability in businesses is receiving more scholarly attention, there remains a dearth of research on the psychological mechanisms underpinning workplace energy savings, especially in low-income nations and educational institutions (Paille et al. 2014). Designing successful behavioral interventions and sustainability initiatives in the workplace requires an understanding of these psychological factors.

With an emphasis on environmental awareness, attitudes toward energy conservation, self-efficacy, and intrinsic motivation, the present study attempts to investigate the psychological factors influencing employees' workplace energy conservation behavior.

Operational Definition

- **Attitude Toward Energy Conservation**

Attitude toward energy saving refers to the degree to which employees hold positive or negative evaluations regarding the importance and benefits of conserving energy in the workplace. In this study, it is measured by employees' responses to items assessing their beliefs, feelings, and support for energy-saving practices using a 5-point Likert scale ranging from strongly disagree to strongly agree.

- **Environmental Awareness**

Environmental awareness refers to the extent of employees' knowledge and understanding about environmental issues, the impact of energy consumption, and the importance of conserving energy. In this study, it is operationalized through participants' scores on questionnaire items measuring awareness of environmental problems and energy conservation practices, rated on a 5-point Likert scale.

- **Self-Efficacy**

Self-efficacy refers to employees' belief in their ability to perform behaviors that contribute to energy conservation in the workplace. In this study, it is measured by participants' perceived confidence in adopting energy-saving actions, assessed through

self-report items rated on a 5-point Likert scale. This concept is grounded in Social Cognitive Theory, which emphasizes that individuals' belief in their capabilities influences their behavior.

Intrinsic Motivation

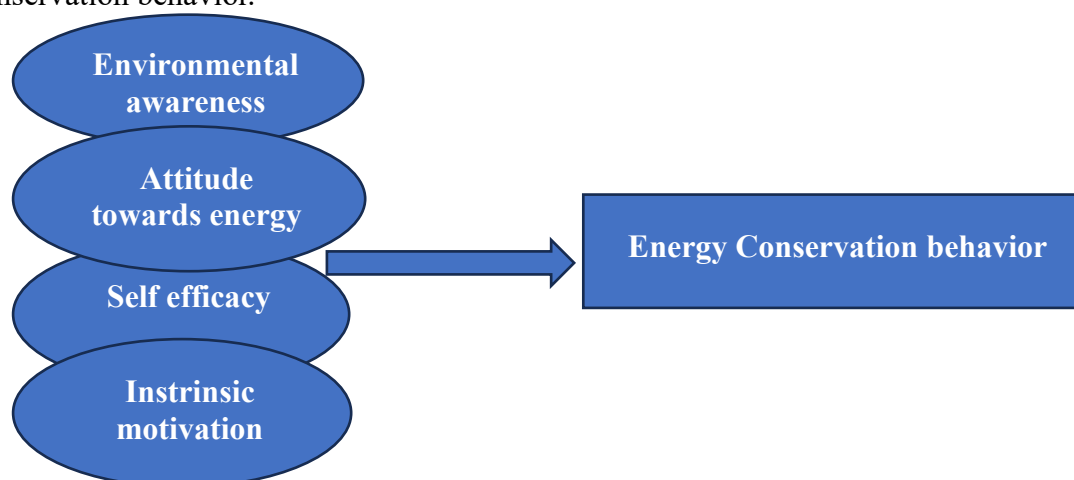
Intrinsic motivation refers to the internal drive of employees to conserve energy because they personally value environmental protection and sustainability rather than because of external rewards or pressures. In this study, intrinsic motivation is measured through questionnaire items evaluating personal satisfaction, responsibility, and internal commitment toward energy conservation using a 5-point Likert scale.

Energy Conservation Behavior

Energy conservation behavior refers to the actions performed by employees to reduce energy consumption in the workplace, such as switching off lights, minimizing unnecessary use of electrical devices, and promoting energy-saving practices among colleagues. In this study, it is measured through self-reported responses to behavior-related items using a 5-point Likert scale, where higher scores indicate greater engagement in energy conservation practices.

Conceptual Model

Workplace energy conservation behavior is influenced by multiple psychological determinants that shape employees' environmental actions. Drawing from the Theory of Planned Behavior (TPB), Social Cognitive Theory, and Value-Belief-Norm (VBN) theory, the present study proposes a conceptual model in which psychological variables influence Faculty's energy conservation behavior. The model suggests that environmental awareness, attitude toward energy conservation, self-efficacy, and intrinsic motivation significantly influence workplace energy conservation behavior.



Literature Review

According to Ones and Dilchert (2012) and Lo et al. (2012), workplace energy conservation behavior is the term used to describe actions taken by employees to reduce energy use in organizational settings, such as turning off unused devices and implementing energy-efficient procedures. Employees' behavior is crucial to the success of energy conservation programs since daily routines can help or hurt technical interventions (Siero et al. 1996; Abrahamse et al. 2005). Increased participation in sustainable behaviors is closely linked to psychological variables, including environmental awareness (Kollmuss & Agyeman, 2002; Bamberg & Möser, 2007). According to the Theory of Planned Behavior, favorable attitudes on energy conservation also affect behavioral intentions and actual behaviors (Ajzen, 1991; Steg & Vlek, 2009).

Additionally, employees' confidence in their capacity to conserve energy is increased by self-efficacy and perceived behavioral control (Bandura, 1997; Abrahamse & Steg, 2013). Through moral responsibility and internal values, self-determination theory-supported intrinsic motivation and personal norms further promote pro-environmental behavior (Deci & Ryan, 2000; Stern, 2000; Steg et al. 2014). Although contextual obstacles like comfort preferences and workload may restrict employees' participation, organizational elements like leadership support, culture, and sustainability policies are crucial in promoting these behaviors (Ramus & Steger, 2000; Delmas & Pekovic, 2013; Lo et al. 2012).

Research Gap

Despite growing interest in workplace energy conservation behavior, more empirical research on the psychological factors influencing employees' energy-saving behavior is still needed, especially in educational institutions. Individual psychological aspects have not received as much attention as organizational policy or technology solutions in much prior research.

Thus, by investigating the impact of environmental awareness, attitudes toward energy conservation, self-efficacy, and intrinsic motivation on workplace energy saving behavior, this study aims to complement the body of existing literature.

Research Objectives

The present study aims to:

1. Assess the level of workplace energy conservation behavior among Employees.

2. Examine the relationship among attitude toward energy conservation, environmental awareness, self-efficacy, intrinsic motivation, and energy conservation behavior.

Hypotheses

1. There would be no significant relationship between environmental awareness and workplace energy conservation behavior among Employees.
2. There would be no significant relationship between attitude towards energy conservation behavior among employees.
3. There would be no significant relationship between self-efficacy and energy conservation behavior among employees
4. There would be no significant relationship between intrinsic motivation and energy conservation behavior among employees
5. Environmental Awareness, Attitude Toward Energy Conservation, Self-Efficacy, and Intrinsic Motivation will not significantly influence the energy conservation behavior among employees

Research Methodology

Research Design

The study adopted a descriptive correlational research design to examine the relationship between psychological factors and workplace energy conservation behavior.

Sample

The sample consisted of 120 employees working in various arts and science colleges in Chennai, Tamil Nadu, India. Participants were selected using a purposive sampling method.

Tools Used

The following self-constructed questionnaires were used for data collection. All tools were structured using a 5-point Likert scale format.

1. Environmental Awareness Scale
2. Attitude Toward Energy Conservation Scale
3. Self-Efficacy Scale
4. Intrinsic Motivation Scale
5. Workplace Energy Conservation Behavior Scale (developed by the researcher)

Reliability Analysis

Cronbach's alpha values greater than **0.70** indicate acceptable internal consistency.

Variable	Cronbach Alpha
Environmental Awareness	0.82
Attitude toward Sustainability	0.86
Self-Efficacy	0.80
Intrinsic Motivation	0.84
Energy Conservation Behavior	0.88

Data Collection Procedure

Participants were informed about the purpose of the study and assured confidentiality. Questionnaires were distributed through Google Forms.

Statistical Techniques

Both descriptive and inferential statistical methods: Mean and Standard Deviation, Pearson Product-moment Correlation, and Regression Analysis were used to analyse the collected data

Results and Discussion

When analyzing the study results from table 1 using percentage analysis, the demographic profile of the respondents (N = 120) shows that female respondents were predominantly present, with 56 males (46.6%) and 64 females (53.4%). In terms of age, the majority of respondents (47.6%) are between the ages of 36 and 40 years, followed by those between the ages of 31 and 35 years (26.6%). The percentages for those over 40 (18.3%) and those between the ages of 26 and 30 (7.5%) are smaller. According to this distribution, the majority of the respondents are in their mid-career stage, which is commonly related to increased organizational involvement and professional experience.

In terms of faculty type, teaching faculty make up the vast majority of respondents (81.7%), whereas non-teaching staff make up only 18.3% of the sample. This disparity implies that the results are more representative of the attitudes and practices of teaching faculties. Teaching staff members may be more exposed to institutional regulations and sustainability

programs due to their pivotal role in academic institutions, which may have an impact on their energy-saving practices.

Overall, the sample is distinguished by a substantial presence of teaching professors, a concentration of mid-career professionals, and a reasonably balanced gender composition. These traits should be taken into account when extrapolating the findings since they could influence the patterns of energy-saving behavior in the workplace.

Table 1: The descriptive statistics of respondents

Variable	Group	Number of Respondents N=120)	Percentage (%)
Gender	Male	56	46.6
	Female	64	53.4
Age (years)	26-30	9	7.5
	31-35	32	26.6
	36-40	57	47.6
	Above 40	22	18.3
Faculty Type	Teaching faculty	98	81.7
	Non-teaching faculty	22	18.3

Table 2: Frequency Distribution of Level of Energy Conservation Behavior among Respondents

	Frequency	Percentage (%)
Low	20	16.7
Moderate	78	65
High	22	18.3
Total	120	100.0

From Table 2, it is clear that the majority of respondents (65%) demonstrate a moderate level of energy-conservation behavior. This shows that most employees engage in energy-saving efforts to some extent, although their behaviors may not be consistently strong or fully optimized.

A smaller segment of respondents, 22 (18.3%), display a high level of energy conservation behavior, indicating that they consistently use energy-saving measures in the workplace. This group may be more ecologically aware, motivated, or impacted by workplace support and sustainability programs.

However, 16.7% of the employees fall under the **low level of energy conservation behavior**, indicating that a notable minority of employees engage minimally in energy-saving practices. This may be due to a lack of awareness, motivation, or perceived control over such behaviors.

Overall, the results indicate that although employees exhibit energy conservation behavior, it is primarily at a moderate level. This underscores the need for focused interventions, awareness campaigns, and organizational strategies to improve and maintain the energy-saving practices in the workplace.

Table 3: Mean and Standard Deviation

Variable	Mean	Standard Deviation
Environmental Awareness	3.95	0.62
Attitude toward Sustainability	4.02	0.58
Self-Efficacy	3.78	0.66
Intrinsic Motivation	3.85	0.64
Energy Conservation Behavior	3.90	0.60

Table 4: Correlation between Variables

Variables	1	2	3	4	5
1 Environmental Awareness	1				
2 Attitude toward energy conservation	0.54*	1			
3 Self-Efficacy	0.47*	0.49*	1		
4 Intrinsic Motivation	0.51*	0.56*	0.48*	1	
5 Energy Conservation Behavior	0.62**	0.68**	0.58**	0.60*	1

Environmental awareness has a somewhat lesser but still significant link with self-efficacy ($r = 0.47^*$), as well as a moderately favorable correlation with attitude toward energy saving ($r = 0.54^*$) and intrinsic motivation ($r = 0.51^*$). This suggests that people who are more conscious of environmental issues tend to have more positive attitudes, higher levels of internal motivation, and more self-assurance in their capacity to adopt energy-saving practices (Table 2).

Additionally, self-efficacy ($r = 0.49^*$) and intrinsic motivation ($r = 0.56^*$) are positively connected with attitude toward energy conservation, suggesting that personnel with favorable views are more likely to feel capable and internally motivated to conserve energy. Similarly, there is a moderate correlation ($r = 0.48^*$) between self-efficacy and intrinsic motivation, indicating a connection between internal motivational drives and self-confidence in one's capacity to act.

Key psychological aspects taken for the study, namely Environmental awareness ($r=0.62$), Attitude toward energy conservation ($r=0.68$), self-efficacy (0.58), and intrinsic motivation ($r=0.60$) are significantly related to workplace energy saving behavior.

Among these, attitude toward energy conservation demonstrates the strongest relationship, highlighting its critical role in influencing employees' sustainable actions.

Overall, the findings suggest that higher levels of awareness, favourable attitudes towards energy conservation, with greater self-efficacy, and intrinsic motivation are all important determining factors of workplace energy conservation behavior, supporting the relevance of psychological factors in promoting sustainable practices within organizations. The results of the present study are supported by Lo et al. (2012), who found that employees' environmental awareness, positive attitudes towards energy conservation behavior, and perceived behavioral control (self-efficacy) significantly predict workplace energy-saving behavior. Hence, the hypotheses 1, 2, 3 & 4 were rejected.

Table 5: Multiple Regression Analysis of Psychological Predictors on Energy Conservation Behavior

Dependent variable	Energy Conservation Behavior (Y)
Independent variable	1. Environmental Awareness(X_1) 2. Attitude toward energy conservation(X_2)

	3. Self-Efficacy (X ₃)
	4. Intrinsic Motivation(X ₄)

In this study, the dependent variable is Energy Conservation Behavior. The independent variables, Environmental Awareness, Attitude toward energy conservation, Self-Efficacy, and Intrinsic Motivation, are discussed as follows.

Table no 5.a Multiple Regression Analysis of Psychological predictors and Energy Conservation Behavior of employees

Model Summary						
Model	R	R Square	Adjusted R-Square	R-	Std. Error of the Estimate	Durbin-Watson
1	.882 ^a	.777	.776		.18630	1.828
a. Predictors: (Constant), Environmental Awareness, Attitude toward energy conservation, Self-Efficacy, Intrinsic Motivation						
b. Dependent Variable: Energy Conservation Behavior						

The model reveals that the R (Multiple correlation coefficient) value was 0.882. It measures the degree of relationship between the Energy Conservation Behavior and Psychological predictors. R square (Coefficient of Determination) value was 0.777. It means that about 77.7% of the variation in Energy Conservation Behavior is explained by the variation in the independent variables (Environmental Awareness, Attitude toward energy conservation, Self-Efficacy, Intrinsic Motivation).

The adjusted R-squared value was 0.776. It adjusts the statistic based on the number of independent variables in the model. That is the desired property of a goodness-of-fit statistic. Durbin-Watson statistics show 1.828 indicates no auto correction.

Table 5.b ANOVA of Variables in Multiple Regression Analysis of Psychological Predictors and Energy Conservation Behavior

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F value	Sig.
1	Regression	78.050	4	19.513	562.225	.000 ^b

	Residual	22.385	645	.035		
	Total	100.436	650			
a. Dependent Variable: Energy Conservation Behavior						
b. Predictors: (Constant), Environmental Awareness, Attitude toward energy conservation, Self-Efficacy, Intrinsic Motivation						

Source: Primary Data

The F value was 562.225, and the p-value was significant at 1% level. Hence, there is a significant relationship between dependent and independent variables.

Table no. 5c. Variable in Multiple Regression Analysis of Psychological Predictors on Energy Conservation Behavior

Energy Conservation Behavior					
Select Influencing Factors	Unstandardized Coefficients		Standardized Coefficients	t value	P value
	B	Std. Error	Beta		
(Constant)	2.217	.054		40.766	<0.001**
Environmental Awareness X ₁	.151	.019	.283	7.953	<0.001**
Attitude toward energy conservation X ₂	.161	.021	.249	7.808	<0.001**
Self-Efficacy X ₃	.083	.015	.176	5.478	<0.001**
Intrinsic Motivation X ₄	.172	.019	.278	9.253	<0.001**
R	.882				
R square	.777				
Adjusted R-squared	.776				
F	562.225				
P value	.000				
Note: ** denotes significant at 1% level					

Source Primary Data

Regression Equation

- The regression equation derived from the unstandardized coefficients is:

$$\begin{aligned} \text{Energy Conservation Behavior (Y)} \\ = 2.217 + 0.151X_1 + 0.161X_2 + 0.083X_3 + 0.172X_4 \end{aligned}$$

The coefficient of X_1 shows that a 1 unit increase in the value of Environmental Awareness would result in a 0.151(15.1%) increase in Energy Conservation Behavior, other variables being held constant. This coefficient value is significant at 1 % level, and the t-statistic of Environmental Awareness also accounted for significant positive variation in the dependent variable, which is Energy Conservation Behavior

The coefficient of X_2 shows that a 1 unit increase in the value of attitude towards energy conservation would result in a 0.161(16.1%) increase in Energy Conservation Behavior, other variables being held constant. This coefficient value is significant at 1 % level, and the t-statistics of attitude towards energy conservation also accounted for significant positive variation in the dependent variable, which is Energy Conservation Behavior

The coefficient of X_3 shows that a 1 unit increase in the value of self-efficacy would result in a 0.083 (8.3%) increase in Energy Conservation Behavior, other variables being held constant. This coefficient value is significant at 1 % level, and the t-statistic of self-efficacy also accounts for significant positive variation in the dependent variable, which is Energy Conservation Behavior

The coefficient of X_4 shows that a 1 unit increase in the value of intrinsic motivation would result in a 0.172 (17.2%) increase in Energy Conservation Behavior, other variables being held constant. This coefficient value is significant at 1 % level, and the t-statistic of intrinsic motivation also accounted for a significant positive variation in the dependent variable, which is Energy Conservation Behavior. Hence, hypothesis 5 was rejected.

Based on the standardised coefficient value, Environmental awareness was found to be the strongest factor to predict energy conservation behavior (0.283), followed by intrinsic motivation (0.278). This could be attributed to the fact that creating awareness towards energy conservation enhances the knowledge and moral responsibility towards energy conservation behavior. According to the theory of planned behavior, attitude, which is cognition towards some

event or object, would enable conscious decision making, resulting in behavior favoring the attitude. Hence, from the results, it is evident that an individual, driven by personal values and internal satisfaction, ensures sustained and voluntary engagement rather than external pressures.

Conclusion

Psychological factors, including intrinsic motivation, environmental awareness, attitudes toward energy conservation, and self-efficacy, significantly influence workplace energy conservation behavior. The Environmental Awareness and internal drive of employees to conserve energy (Intrinsic motivation) was found to be the highest predictor of energy conservation behavior, whereas self-efficacy was found to be the least predictor. The study demonstrates that promoting positive environmental attitudes and awareness among employees can significantly enhance sustainable workplace behavior. Organizations should integrate psychological and behavioral strategies along with technological solutions to achieve effective energy conservation.

Limitations of the Study

The study has certain limitations:

- The sample size was relatively small.
- Data were collected only from selected institutions.
- Self-report questionnaires may introduce response bias.

Implications of the Study

The findings have important implications for organizations aiming to promote sustainability.

Organizations can:

- Conduct environmental awareness programs for employees.
- Encourage green workplace policies.
- Provide training programs on energy conservation.
- Promote organizational culture that supports environmental responsibility.

Suggestions for Future Research

Future research may explore:

- Researchers can apply advanced statistical techniques such as Structural Equation Modeling (SEM), mediation analysis, and moderation analysis to better understand complex relationships between psychological variables.

- Other psychological variables like personality traits, personal norms, and habit formation could also be studied.
- Effectiveness of behavioral interventions in promoting energy-saving habits.

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