

INDUCING HUMAN BEHAVIOUR FOR SUSTAINABILITY: EXPLORING PSYCHO-SOCIAL ASPECTS DETERMINING ENERGY CONSERVATION BEHAVIOUR

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Abstract: As the consensus has emerged across the globe to promote energy conservation for reducing green-house gas emissions worldwide, achieving low-carbon society and ensuring ecological sustainability have become primary objective for policymakers. To meet these energy conservation targets, energy scholarship has been asking to shift focus from promoting usage of energy-efficient appliances to reduce their usage, terming this as shifting from efficiency approach to curtailment approach. Promoting curtailment behaviour for energy conservation requires inducing pro-social behaviour among individuals, considering which, this study attempts to understand the psychosocial aspects those help determine individual's behaviour towards energy conservation. In the backdrop of Theory of Planned Behaviour (TpB) framework, six psychometric variables, and to capture the socio-economic realities, five socio-economic measures from a representative sample of 550 individuals belonging to urban middle-class households of a city in Madhya Pradesh state of India were measured. Comparative tests to highlight differences in psychosocial measures among different socio-economic groups of individuals, tests to ascertain association between socio-economic and psychosocial measures, along with a linear regression analysis to predict behavioural intention were conducted. Study finds gender having no association with energy-conservation behaviour of individuals and points out certain threshold levels of age, household income, and energy expenditure, above and below which the performance of human behaviour towards energy conservation is likely to change. Further, mediating role of the values, beliefs, and subjective norms on the relationship between energy-conservation attitude and behavioural intention has been suggested along with discussing implications.

Keywords: Energy Conservation Behaviour, Pro-social Behaviour, Sustainability

INTRODUCTION

Mitigation of climate change, reduced dependency on crude oil for energy, and reduction of Green House Gas emissions, aiming to promote sustainable development and energy conservation has become an imperative after the world experienced oil supply shocks of 1970s. To achieve it, pro-social altruistic behaviour has emerged as important vista for energy-conservation research wherein much attention is on promotion of a lifestyle less dependent on electricity and fuel. Pacific Institute of Climatic Solutions (PICS, 2015) identifies four broad categories of motives that make

individuals engage with energy-conservation behaviour out of which altruistic pro-social intent as one of the most promising one. American Council for an Energy Efficient Economy & European Environment Agency provide and encourage research focusing on human behaviour change for energy conservation as being one of the key strategy for sustainable human development.

The impact of liberalization on the energy mix, energy tariff structures, and the *rebound effect* (More usage of energy-efficient appliances actually leading to relatively more use of energy than conservation of it) are counted among the prominent structural factors for achieving energy

efficiency along with energy-efficiency measures through behaviour change. Behaviour shift in energy use leading to lifestyle changes is one of the primary solutions to promote sustainability (IPCC WG III AR 05, 2014). This establishes the growing importance of behaviour change as a strategy to induce energy conservation. Since most of the human action is inside home, human behaviour in households is significant to consider. National Action Plan on Climate Change (NAPCC) by the government of India mentions the energy conservation in residential sector as being very significant in Indian context too; however, negligible attention has been given to research on human behavioural change for obtaining energy-conservation targets in India, which justifies the rationale for this study.

Proposed study focuses on curtailment behaviour that are pro-social in nature, which is also understood in literature as altruistic behaviour. Psychologically, altruism has been defined as 'motivational state with the goal of increasing another's welfare'. Curtailment behaviour of individuals is understood as of any kind of human behaviour where individuals are expected to limit their consumption voluntarily. Schwartz altruism model suggests social and personal norms and awareness of consequences have significant influence on promoting altruism. Schwartz (1977) in popular model suggests that personal norms and attitudes have strong associations. Jansson et al. (2013) suggest that values, beliefs, and norms not only predict low-involvement post-purchase behaviour, but also predict high-involvement eco-innovation behaviour among which we can count energy-conservation behaviour.

This pro-social and altruistic curtailment behaviour is often exemplified by carpooling, using bicycle instead of car, having a walk instead of vehicle wherever feasible, switch off lights when not being use, etc. Here, It can also be defined as 'new-age altruism' as it is required to be performed towards confronting new-age challenges of achieving energy-efficient lifestyle and low-carbon societies ensuring sustainability. This being the core area of investigation for this study, has been primarily paid attention previously by Mcalvey & Midden (2002) as well when they established that an individual can be stimulated to demonstrate larger pro-social behaviour like energy-conservation behaviour. An empirical investigation of 189 Dutch households by Abrahamse & Steg (2009; 2011) examined the relative importance of socio-demographic and psychological variables in exploring household energy use and householders' intention to reduce their energy use using Theory of Planned Behaviour framework (Ajzen, 1985) and Norm Activation Model (Schwartz, 1977).

Another group of scholars have identified five different factors responsible for promotion of household-based energy conservation. First, 'technological developments' (e.g. usage of energy-efficient appliances), second, 'economic growth'

(e.g. increase of household incomes), third, 'demographic factors' (e.g. population growth), fourth, 'institutional factors' (e.g. governmental policies), and fifth, 'cultural developments' (e.g. emancipation, increasing mobility of women) (see Gatersleben & Vlek, 1998). O'lander & Thøgersen (1995) suggest that these factors shape motivation and attitudes and are capable of determining one's ability to conserve energy (M-O-A model).

Scholars have argued to focus on inducing human actions that are pro-social and altruistic in nature, because they have a sizeable effect on reducing greenhouse gas emissions, if large number of people start performing such pro-social actions (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009; Vandenbergh, Barkenbus & Gilligan, 2008). Many studies attempt to investigate the impact of education and awareness of Global Warming (GW) through identifying intention to perform behaviours that cause or mitigate the GW (Barnes & Parks, 2012).

We argue here that conservation of energy is like chasing the mirage, the more we run behind it through energy-efficient appliances, etc., the more we go farther from our goal. Therefore, focus has to be on curtailment behaviour rather than efficiency behaviour. Reviews of Gardner & Stern (2002) also testified the same while classifying conservation behaviour into efficiency and curtailment behaviour. Abrahamse et al., (2005) and categorized as involving either antecedent strategies (i.e. commitment, goal setting, information, modeling focuses predominantly on curtailment behaviour and points out that efficiency behaviours are more output oriented in terms of conservation of energy. Berkhout, Muskens, & Veldhuijsen, (2000) while pointing out the phenomenon of *rebound effect* calls for avoiding too much reliance on energy-efficient appliances.

Many studies presented causal models of one or other kind that provide supremacy to psychological variables over socioeconomic, demographic, or technical variables pertaining to building and construction of household, as far as achieving energy-conservation targets is concerned. For example, Macey (1991) and more recently, Steg (2008) in her seminal work on household-based behaviour change for energy conservation argue that behaviour change will be more effective if they target the most important causes of the behaviour in question and human thinking behind performing those actions. Among psychological variables, 'social norms' in particular have been found to be strong predictors of energy-conservation behaviour intention (see Lingyun, Rui, Hualong, & Xiaohua, 2011), and there is contextual evidence to suggest that stronger sense of environmental responsibility among individuals leads them to stringer energy-saving intent among householders. We call these contextual evidence as these variables may gain or

lose their predictive capacity to predict energy-conservation intention depending upon cultures, economy, policy milieu that govern energy agenda of the nation or region concerned. Certain socio-economic realities have been found to have vital impact on household energy-conservation behaviour, such as 'ownership of the house', 'educational level' and 'family structure' (Wenshun, Xiaohua, & Hualong, 2011).

Norm-activation model (NAM) variables have potential to predict a range of different energy behaviours, including energy use at home (Werff & Steg, 2015). Croucher (2011) explains why despite knowing benefits of it, people usually refrain from performing the energy-conservation behaviour; in other words, the study enlightens us about the gap that exists between 'having a desire or wish' to perform a behaviour and actually performing that behaviour. When we talk about pro-social behaviour, this dimension assumes more importance as lack of stake weakens their intention to perform such a pro-social action. Among low-income public housing residents in the USA, this aspect has been discussed by Langewin, Gurian & Wen, (2013) while exploring the key behavioural tendencies, energy knowledge gaps, and attitudes.

Thus, we include key NAM and TPB, along with few socio-economic household-centric variables to explore their interplay and influence over energy-conservation behaviour intention. Energy-conservation behaviour of individuals in Indian context, therefore, becomes the focal point of this study with three specific objectives of: a) understanding impact of socio-economic conditions of individuals in advancing pro-social energy conservation behaviours, b) exploring the dependency aspect of energy-conservation attitude and energy-conservation intention on socio-economic situations of people, and c) assessing the relative potential of psychosocial and socio-economic aspects of people for influencing of one's energy conservation intent.

To address these objectives and considering the fact that in India, studies based on pro-social behavioural models are scant in nature, this study, therefore, proposes to consider three specific research questions as given below:

Up To what extent socio-economic realities of households and individuals therein make an impact to promote human state of mind for energy conservation.

What is the extent of association between attitude & intention of conserving energy and corresponding socio-economic realities of people?

To what extent socio-economic and psychosocial realities of individuals in urban middle-class households in India predict the energy-conservation behaviour intent of individuals.

HYPOTHESES

In order to look for answers of these proposed questions, eight different hypotheses were proposed that build insights pertaining to matter under consideration. First, the *t*-tests were conducted to ascertain whether socio-economic variables make any impact on psychometric measures. For these, five key socio-economic variables were chosen for hypothesis formation namely—age, gender, educational qualification, household income and household expenditure of energy. It is noteworthy here that household income and expenditure on means of energy like power and fuel, have been assumed to have an impact on psychometric measures of individuals. Initial five hypotheses were tested using this process. Second, in order to ascertain the association between energy-conservation attitude as well as intent, with socio-economic realities of individuals, two hypotheses for test of independence were formed which were tested using chi-square tests. Further, two hypotheses were tested by this process. Finally, in order to ascertain the degree to which psychosocial and socio-economic aspects of humans relatively predict, the energy-conservation behaviour intention (being ultimate dependent variable), a multiple linear regression (stepwise) was conducted to test the last hypothesis formulated. Multiple regression is employed to test the third hypothesis. Thus, eight hypotheses are framed as under:

H_a: There is no significant difference in Psychometric measures because of age.

H_b: There is no significant difference in Psychometric measures because of gender.

H_c: There is no significant difference in Psychometric measures because of educational qualification.

H_d: There is no significant difference in Psychometric measures because of income of households.

H_e: There is no significant difference in Psychometric measures because of expenditure of households on means of energy.

H_f: Energy-conservation attitude is independent of key socio-economic measures.

H_g: Energy-conservation behaviour intent is independent of key socio-economic measures.

H_h: Socio-economic and psychosocial realities of individuals together predicting the energy-conservation behaviour intention.

METHOD

The method of purposive sampling was employed to select 550 households from a metropolitan city of Madhya Pradesh. As per requirement, only energy-sufficient urban households (having government-approved electricity connection and having personal two-wheeler/car) were part of the study. Maximum variation sampling (MVS) and Homogenous sampling techniques were employed considering the range of possible responses for variables under consideration. Online sample-size calculator was used to determine the sample size of 550 respondents (Raosoft Inc., 2004).

MEASUREMENT

Data on five socio-economic variables pertaining to urban households and six psychometric variables in accordance to theory of planned behaviour framework were collected. Six key psychometric variables were measured on either a male or female head of household taken from one home each. Each respondent was measured on value orientation of individual (VoI), energy-conservation beliefs (ECB), subjective norms (SN), energy-conservation attitude (ECA), perceived-behavioural control (PCB), and behavioural intent (BI). Thus, 550 respondents from 550 different types of urban households provided their responses for six key psychometric variables (pertaining to individuals) and selected socio-economic variables (pertaining to both individual and households). Among socio-economic variables, age, gender, and educational qualification were measured at individual level and 'income of the household' and 'average monthly power & fuel expenditure', were measured at the household level.

For measuring all of these, all the tools were prepared on 09-pointer Likert scale. These were subjected to constraint

validation using exploratory factor analysis (EFA) procedure.

Four (04) items each based on altruistic, biospheric and egoistic values were framed to make it a 12-item scale to measure VoI (DeGroot & Steg, 2008). ($\alpha = 0.856$; sample item: *one should engage oneself with working for the welfare of others.*)

ECB indicating extent to which one believes in energy conservation as a measure having to do with welfare of humanity (Stern, Dietz, & Guagnano, 1995). As suggested by DeGroot & Steg (2008), a sixteen (16)-item scale to measure ECB was constructed ($\alpha = 0.951$; sample item: *by not being energy efficient in life I am leaving a dark future for my future generations*). Another ten (10)-item scale was constructed to measure SN indicating the degree to which an individual confirms the normative expectations of people valued by the individual concerned (Schwartz, 1977; Schwartz & Howard, 1981) ($\alpha = 0.941$; sample item: *most people who are important to me, think that I should turn-off the lightening equipment before I leave a room unoccupied*). ECA concerns a person's evaluation regarding the consequences of undertaking a specific energy-conservation behaviour (Ajzen and Fishbein, 1980). A scale with fifteen (15) items was formulated ($\alpha = 0.955$; sample item: *turning-off lightening equipment when leaving room unoccupied, is very important*). PBC refers to people's perceptions of their ability to perform a given behaviour (Ajzen 1991). Ten (10) items leading to measure this were framed ($\alpha = 0.930$; sample item: *If I want I can reduce my expenditure on fuel*). In BI Scale, again ten (10) items were framed measuring degree to which one is willing to perform energy-conserving action ($\alpha = 0.938$; sample item: *I think I will start turning-off the lightening equipments whenever I leave the room unoccupied*). All these scales were developed taking a cue from studies conducted in European and American environments.

RESULTS

Table 1: Key Socio-Economic Features Under Study

Variable	N	Min	Max	Mean	SD
Age (In Years)	550	15	84	38.64	14.709
Power Expenditure Average (Monthly, In Rupees)	550	625	10427	2164.46	1307.567
Fuel Expenditure Average (Monthly, In Rupees)	550	100	6500	2082.93	1049.779
Monthly Income of Household (In Rupees)	550	15658	854769	75486.77	51542.000

The sample of household-based respondents was equally divided based on gender. 294 (53.5%) respondents were male and 256 (46.5%) were females with mean family size

of 3.80. As far educational qualification of respondents is concerned, sample comprised of 63 (11.5%) non-graduates, 176 (32%) graduates, 163 (29.6%) had studied PG and other

advanced courses, 148 (26.9%) had one or the other kind of professional qualification. All of this along with average

of monthly power bills, fuel bills, and monthly income of household together makes the sample truly representative of urban middle class.

Table 2: Key Psychometric Features Under Study

Variables	N	Minimum Obtained	Maximum Obtained	Mean	Standard Deviation	Min score on scale	Max score on scale
Vol	550	17	108	57.37	18.175	12	108
ECB	550	27	143	89.08	26.907	16	144
SN	550	12	89	52.97	19.223	10	90
ECA	550	23	135	83.71	27.094	15	135
PCB	550	17	90	54.93	18.930	10	90
BI	550	15	90	50.21	19.288	10	90

ECA and ECB show about the same amount of dispersion, which establishes the fact that people differ in beliefs and attitudes more than other psychometric measures.

However, generally family heads are concerned about energy conservation as mean values are on higher side. All other measures show about the same dispersion indicating consistency among rest of them.

Table 3: How Psychometric Aspects Differ on the Basis of Socio-Economic Ones

When two groups of people were compared by Age**	t -value	Sig
Value Orientation of Individual	6.620	.000*
Energy Conservation Beliefs	-6.55	.000*
Subjective Norms	4.65	.000*
Energy Conservation Attitude	1.37	.169
Perceived Behavioural Control	1.68	.093
Behavioural Intent	-.677	.418
When two groups of people were compared by Average Power Expenditure***		
Subjective Norms	-3.38	.001*
When two groups of people were compared by Average Fuel Expenditure***		
Energy Conservation Attitude	-2.28	.02*
Perceived Behavioural Control	3.07	.002*
When two groups of people were compared by Monthly Income of Households****		
Value Orientation of Individual	3.07	.002*
Perceived Behavioural Control	3.16	.002*
Behavioural Intent	-2.35	.019*

*Significant at $\alpha=0.05$

** two groups of individuals having age less than & equal to 40 years and more than this

*** individuals from households spending less than & equal to INR 2000/- and more than that

**** individuals from households having reported monthly income of less than or equal to INR 75000/- and more than this

Multiple *t*-tests with different grouping patterns were conducted; however age of 40 years, household monthly income of INR 75000/-, household monthly expenditure on fuel and electricity of INR 2000/- were found to obtain

these significant differences. Therefore, they are termed as threshold points as above and below them individuals differ significantly in many of their psychosocial aspects as indicated by various psychometric variables.

Major results based on hypotheses testing using *t-tests* suggest that PBC differs significantly with age while attitude and intent don't. No significance difference found based on gender. Values, beliefs, and norms for energy conservation differ significantly for the individuals when compared on the basis of age. (Being less and more than 40 years); however, it doesn't directly create any difference

in attitude, the perception of behavioural control and intent for the conservation of energy. When compared with fuel expenditure, individuals differ significantly on values, beliefs and attitude pertaining to energy conservation. Income has impact and potential to influence values, behavioural control and intent to conserve energy, when used as category variable.

Table 4: Inter-Dependency of Key Psychometric and Socio-Economic Variables

Row variable (Category)	Column variable (Category)	Value of Chi-square (χ^2)	Sig.
Educational Qualification	ECA	17.765	0.007*
Gender	ECA	2.83	0.243
Age Category	ECA	13.97	0.007*
Gender	BI	3.12	0.210
Income of household	BI	11.76	0.019*
Age Category	BI	13.18	0.010*
Educational Qualification	BI	03.97	0.681

*Significant at $\alpha=0.05$

To execute the chi-square tests, required variables were recoded to category variables. Major conclusions from hypotheses testing using *chi-square tests* suggest educational qualification of individuals and ECA are not independent of each other. Gender has no association with ECA. ECA is not independent of age. It is quite interesting to learn that gender of the respondent again doesn't seem to have any association ($0.210 > 0.05$) with BI to conserve energy based on the χ^2 statistic (2, 3.123). Income of the household (4, 11.764)

shows evidence for association with BI of the individual ($0.019 < 0.05$). Age is having chi-square (4, 13.186) with BI. ($0.010 < 0.05$), suggesting again an association between age category one belongs to and one having a degree of conservation intent. Educational qualification (6, 3.967) joins the group of gender by not having association with intent to conserve energy ($0.061 > 0.05$); however, this non-association of intent of conserving energy is not as strong as that of it is with gender.

Table 5: Linear Regression (Stepwise): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.377 ^a	.142	.141	17.879	.142	90.883	1	548	.000
2	.430 ^b	.185	.182	17.442	.043	28.846	1	547	.000
3	.470 ^c	.220	.216	17.076	.035	24.698	1	546	.000
4	.484 ^d	.234	.229	16.939	.014	9.840	1	545	.002
5	.495 ^e	.245	.238	16.840	.010	7.476	1	544	.006

a. Predictors: (Constant), Energy Conservation Attitude

b. Predictors: (Constant), Energy Conservation Attitude, Subjective Norm

c. Predictors: (Constant), Energy Conservation Attitude, Subjective Norm, Energy Conservation Beliefs

d. Predictors: (Constant), Energy Conservation Attitude, Subjective Norm, Energy Conservation Beliefs, Aware of EC Efforts

e. Predictors: (Constant), Energy Conservation Attitude, Subjective Norm, Energy Conservation Beliefs, Aware of EC Efforts, Perceived Behavioural Control

f. Dependent Variable: Behavioural Intent

Regression analysis tested different models for their robustness to predict the outcome variable of the interest

'Behavioural Intent'. As soon as variables were entered into model, the model kept most of the socio-economic variables

away and took only psychometric variables to predict the 'Behavioural Intent'. We can see that predictors such as ECA, SN, ECB, Awareness of Energy Conservation Efforts, and PBC put together explains 24.5 % (Table 5) variance

in the dependent variable, i.e., 'Behavioural Intent'. This analysis makes socio-economic measures redundant as far as predicting behaviour intent is concerned.

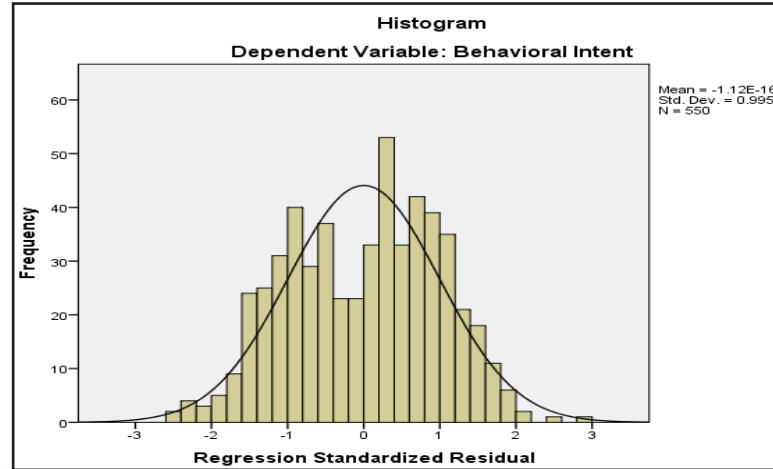


Fig 1: Regression Standardize Residual

This analysis almost rules out any possibility of behavioural intent of individuals being predicted by any of socio-economic variables. Without considering 'individual's awareness of energy conservation' as one of the predictors, the model loses its predictive capacity by one full percent and total variance explained remains at 23.5% only. This drop suggests the importance of awareness being very crucial to predict the energy-conservation behaviour intention of individuals.

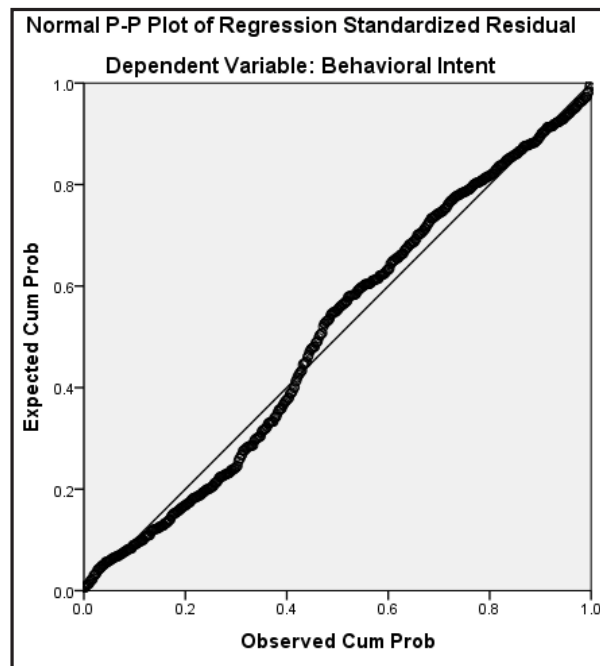


Fig 2: Normal P-P Plot- Data Fit

DISCUSSION

One of the interesting observation is '*Awareness of Energy-Conservation Efforts*' has been found to be a key variable. It enhanced the predictive capacity of the model as well, by 1% (from 23.5 to 24.5%, when we run linear regression model without and with it). Hence, whether an individual knows about the energy conservation efforts beforehand, has a lot of impact on explaining energy conservation behaviour of that individual. In general, gender of any individual has no association and impact in terms of energy-conservation behaviour of an individual. Results of *t*-test (see Table 3) and χ^2 value (2, 2.83) are not significant ($0.243 > 0.05$) at 0.05 level, showing independence of gender from energy-conservation attitude, (2, 3.123) again showing no association ($0.210 > 0.05$) with BI to conserve energy. In regression analysis again, gender is excluded from the list of predictors in the model fit. Many energy-related behaviour-change studies focus gender as key intervention area. However, many studies have contrary findings as well. For example, Datar (2011) talks about need of framework for gender equality in all sustainable development efforts and Parikh (1995) highlights a range of gender issues intertwined with energy policy. Pachauri & Rao (2013) asked whether right questions are being raised as far as gender role is being considered and prior to that, Pandey & Chaubal (2011) has asked questions of women's plight and gender inequality in their seminal work pertaining to rural India's household energy related matters. Meta-analytic review by Ryan (2014) suggests there is whole body of scholarship revolving around gender issues in energy research. Therefore, it was imperative to test the

gender relationship in our study especially when study has the Indian context.

Proven potential to consume energy does not indicate either the intention or attitude to conserve energy among individuals of urban households. In other words, consumption capacity as indicated by 'household income', 'expenditure on energy' and 'age of the person consuming energy', do not have a significant influence either on intention or attitude to conserve energy. Examination done by B. Yu et. al. (2011) where household attributes (Household income, household size, Household space/area, house-type), individual attributes (gender, age, occupational type, education), and usage of in-home appliances were considered, testify this conclusion. Lutzenhiser (1992 & 1993) also draws similar conclusions highlighting cultural, social and behavioural aspects in promotion of individual energy-conservation behaviour among individuals.

It is noteworthy here that this study identifies some crucial socio-economic points those of which have potential to influence energy-conservation behaviour. For example, the age of 40 years for individuals, the household monthly fuel & power expenditure of INR 2000/-, the household monthly income of INR 75,000/- are critical points, above and below which human psyche for energy conservation changes as evident from this study. This establishes the fact that with changes in socio-economic reality although behaviour intention is not getting formed, but other psychological attributes like perceived behavioural control or attitude are likely to change that causes change in individual's approach towards energy behaviour. Similar results obtained by Wei et al. (2007) while discussing the ownership of house and usage of vehicle, with respect to age, income & expenditure of household. Similar threshold points were identified in these researches. Pachauri (2004) and Moll et al. (2005) had identified household income and size as key drivers of energy consumption behaviour. Barr et al. (2005) confirmed the role of age, household income and expenditure, on energy-conservation behaviour of individuals in Swedish context.

There is no evidence to suggest that human attitude for energy conservation has any systemic relationship with either ecological or social views of primary earners of households. Martinsson et al. (2011) establishes a relationship between environmental value system and energy conservation among individuals of Swedish households. Our study doesn't take into account the environmental values in particular. Here, it would be apt to note that environmental values can also be considered for any possible future analysis. However, there are studies to testify the strong links between environmental value system and energy usage behaviour (Abrahamse & Steg 2009; Brandon & Lewis, 1999). There is some evidence

that establishes 'turn-off' behaviour as one of the significant dimensions of energy-conservation behaviour. Warner et al. (2012) have also suggested turning-off lights as a vital behaviour for conservation behaviour through an experiment conducted on a university campus in USA.

DIRECTIONS FOR FUTURE RESEARCH

Because of its limitations, findings and implications this study has many directions to suggest for future research. Data used in the study are collected from one Indian city, which deprives the study of any cross-cultural insights (Dwyer et al. 2014; Ocejka & Berenguer 2009). Since the data in this study has been taken from one city, there is less likelihood of people from multi-cultural backgrounds being part of the study. This results in less variation in norms as they are directly related to native culture. This might have resulted in subjective norms having less predictive capacity. This weakness should be removed in further studies. Some of the variables were measures for household as a whole and others were measures for individual's habits, behaviours and conditions, which constrained the path analysis. Survey has also not been too exhaustive and has its methodological limitations even if conducted extensively. Variables like norms were measured in a generalized manner and there could have been more bifurcations and variations within the scale to measure it. Similarly, instead of measuring value orientation on scale, separate measures of altruistic, egoistic and biospheric measures of values would have allowed deeper understanding of human psyche (Schwartz, 1973).

It is suggested that future research might be conducted on standardising certain tools of measuring the psychometric variables of this study, which will help studies of this nature in future. Methodology that is more sophisticated could have been employed to decipher causal relations, however, the paucity of data did not allow for that. Since the study has relied on fundamental tenet of theory of planned behaviour, most of the analysis has used behavioural intention to predict human behaviour (Ajzen 1991; Steg & DeGroot, 2010). The studies in future should consider theoretical framework compatible with Indian socio-economic and psychosocial realities. More indigenous models should be adopted and explore to conduct similar research in India as suggested by Pachauri (2008). With inputs obtained from this, future research can and should consider some mediation analysis as correlation between key variables is low in quantum thereby suggesting the presence of mediation among variables.

The mediation effect has to be taken into consideration also because the direction of causality is not clear. Therefore, a new set of hypotheses is formulated in order to ascertain the true nature of behaviour intent formation from the behaviour attitude. These could be tested in another study:

Ha: Values mediate the relationship between attitude and intent.

Hb: Beliefs mediate the relationship between attitude and intent.

Hc: Subjective Norms mediate the relationship between attitude and intent.

CONCLUSION

Bureau of Energy Efficiency (BEE) in India has been stressing upon behaviour of urban middle class in India being vital for promoting energy conservation in India to meet the committed targets of climate change, upon which sustainability and human growth is ultimately dependent. For this purpose, attitude and intentions of individuals in household setting towards energy conservation have been attempted to understand here. Awareness regarding energy conservation and motives for doing it have vital connection for sustained conservation behaviour. Since strong intentions sometimes do not translate into action, situational factors affecting perceived behavioural control become very important and that is where cultural factors, and socio-economic constraints have a role to play. Regardless of the socio-economic class one belongs to, one needs to become energy efficient by way of curtailing energy requirements for oneself, is the core solution and argument given here. This calls for an institutional paradigm shift towards energy security and conservation wherein energy efficient lifestyle is at-least acknowledged, if not rewarded.

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