# Psychological Barriers to Renewable Energy Adoption in Developing Countries: An Assessment of Behavioral and Cognitive Factors

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## Abstract

Despite global progress in renewable energy, developing countries like Afghanistan face significant psychological and cognitive barriers to household adoption. This review investigates behavioral and reasoning factors influencing renewable energy uptake, using Behavioral Reasoning Theory (BRT) and the Value-Belief-Norm (VBN) framework. It synthesizes literature to explain the gap between pro-environmental attitudes and actual behavior.

Findings reveal that Afghan households show limited environmental awareness and weak sustainability values, driven by economic hardships and survival-focused priorities. Misperceptions about cost, reliability, and complexity of renewable systems, along with perceived financial risks, distrust in providers, and fear of failure, amplify resistance. Although collectivist cultural norms could encourage communal adoption, they often reinforce conformity and skepticism when successful examples are absent. Institutional distrust due to political instability and cultural restrictions limiting women's participation in energy decisions further hinder adoption.

The study concludes that psychological resistance may outweigh technical or economic barriers, emphasizing the need for culturally sensitive, trust-building, and behaviorally informed policies to enable successful renewable energy transitions in developing contexts.

Kewords: Renewable energy adoption, Behavioral barriers, Cognitive factors, Afghanistan, Behavioral Reasoning Theory (BRT), Value-Belief-Norm (VBN) framework

**Introduction**: Throughout the recent decades of the 20th century, a key concern for the international society is environmental degradation. Our environment is directly affected by energy consumption (1,2). The existing progress model is not sustainable due to our reliance on fossil fuels for energy production. These issues are particularly severe in nations such as Afghanistan,

where restricted access to modern energy services worsens the impacts of reliance on fossil fuels and energy poverty. According to (3), this decline has serious implications for our planet, particularly manifested as climate change. In the last few years, it has become evident that individual activities are among the main drivers of climate change, primarily as energy use and generation of waste are major contributors (4). Therefore, it is crucial to utilize conventional energy sources more judiciously to avoid their ultimate exhaustion. Economic progress, social enhancement, and the wise use of resources to meet current energy demands without compromising future energy availability is encouraged by the principle of sustainable development (5.6.7). according to (8), In the energy sector, sources that can be renewed naturally is called renewable energy. (9.10) reported that energy is produceable as needed from natural, machine-driven, thermal, and growth procedures, serving as an substitute to conventional energy sources. Besides wind and suns energy, geothermal, hydropower, biomass energy, wave energy, and biogas are also called non-conventional energy sources.

This research studies an examination of the psychological and cognitive elements that lead to the attitude-behavior disparity concerning renewable energy adoption in developing nations, with a particular emphasis on Afghanistan. In various developing areas, households play a significant role in the negative environmental impacts associated with energy usage. Afghanistan faces unique challenges in shifting towards renewable energy due to limited access to electricity, reliance on diesel generators, and cultural doubts regarding new energy technologies. Although the country possesses considerable solar resources, the uptake of renewable energy remains sluggish, underscoring the necessity to explore behavioral and psychological obstacles in addition to infrastructural and policy-related concerns. According to (11) and (12), it is essential to conduct additional research to develop a deeper comprehension of consumers' thoughts and motivations for adopting or rejecting solar and wind energy. Although non-conventional energy has achieved considerable victory, its sustainability will largely be contingent on the choices made regarding its upcoming utilization. To understand consumers' beliefs toward innovative clean actions, it is crucial to comprehend their approaches and goals towards renewable energy. Findings by (13.14.15) indicate that numerous studies have recently explored topics related to green products, and environmentally friendly behaviors (16) ,and green creativity (17), (18) state that along with aspects such as sustainable luxury, green skincare items, eco-luxury, and green purchasing intentions. Nevertheless, the majority of these researches focus on developed or upper-middle-

income countries. There is a distinct gap in the literature regarding developing nations such as Afghanistan, where sociocultural factors, limited environmental awareness, and persistent infrastructure issues could create specific psychological obstacles to the uptake of renewable energy. Although these investigations take vital place in interpretation the natural green landscape, applying the behavioral reasoning theory (BRT) can assist in establishing a framework that contributes to the ongoing research in renewable energy. Consequently, this research seeks to recognize the primary factors affecting users' mindsets and future plans concerning non-conventional energy. These times, there has been extensive research on how analyzing end user's performance is influenced by energy knowledge and the accessibility of information (19), yet there has been a shortage of studies focusing on the psychological factors that affect consumer attitudes towards renewable energy. Besides their environmentally friendly actions, academics have also been investigating the green attitudes of consumers globally. (20) found that examining energy usage in Pakistan implemented technological advancements along with BRT constructions to decrease carbon productions among consumers to evaluate consumer value orientation. According to (21), the necessity to understand consumer behavior related to the consumption of renewable energy. (22) states that in developing countries, where energy use is projected to increase by 30% by 2040, there exists limited scholarly work on the consumption of renewable energy.

The choice to concentrate on Afghanistan is driven by the country's persistent energy crisis, delicate infrastructure, and widespread energy deprivation. Although it has considerable potential for solar energy, Afghanistan struggles with low rates of renewable technology adoption. Numerous communities depend on diesel generators or lack electricity access entirely, particularly in rural areas. In addition to financial and technical hurdles, psychological and cognitive obstacles—such as insufficient awareness, perceived risks, resistance to change, and a lack of trust in renewable technologies—impede progress. Tackling these obstacles is essential for fostering sustainable energy development in the long run.

**Literature review**

According to BRT, the reasoning of individuals is shaped by their beliefs and values (23). (24) said that, a theory such as the value-belief-norm model is well-established, indicating that buyers are frequently motivated by their beliefs and values, serving as a basis for their actions . It is commonly acknowledged that one of the challenges consumers face is their occasional inability to express

their needs, desires, and values (25). This difficulty largely stems from the fact that many individuals are not conscious of their motivations or struggle to describe them accurately. The anticipated behavior of individuals is closely linked to how they execute their worth alignment. (26) and (27) found that consumers are likely to adopt products more quickly if they perceive them to be in harmony with their values or compatible with their beliefs. Moreover, the fundamental values of users are likely to affect their reasoning and thought processes (28). The value processing systems of individuals have a direct impact on the types of behavior they are inclined to pursue. Furthermore, consumers who hold strong protected values tend to feel higher pleasure at home while utilizing renewable energy sources. Therefore, based on the preceding discussion, the subsequent theories are proposed.

**Utilitarian advantages and perceptions of renewable energy**

Compare to conventional options, using green products provide extra benefit to the consumers (29.30). (31) found that people often perceive organic goods as more flavorful than standard products, as they have been conditioned to view organic as being healthier. Similarly, home-grown produce is seen as healthier and more delicious than other nutrition varieties. Fan and collegues (32) states that consumers enjoy the fact that water-efficient devices such as dual-flush toilets, can aid in conserving energy and water, which in turn lowers their utility expenses. Users of power-efficient devices are regarded positively by the environment since they consume less energy and have a reduced reliance on external energy supplies (33).

End users are highly driven to utilize renewable energy due to its utilitarian ecological benefits (34). Theoretically, the adoption of renewable energy is expected to eliminate air pollution originating from power plants, enabling natural ecosystems to recover. It is anticipated to enhance public health by decreasing carbon dioxide (CO2) emissions. Research by (35.36.37) investigated this sustainability advantages are believed to be utilitarian in character. The existing literature highlights various other favorable aspects of environmental products, although consumers usually prefer those that provide a utilitarian advantage. Therefore, in light of the previously mentioned points, we propose the foundational hypothesis.

(38) finds out that, collectivism refers to a social characteristic where strong and unified groups exist, with individuals forming connections from an early age that foster constancy in exchange for protection. (39) research indicate that people who recognize with collectivist values often sight

themselves as member of a family, friendhood, or community collective. (40) found that collectivism positively affects consumer perceptions regarding recycling .Due to their cooperative tendencies, collectivists are more likely to engage in recycling behaviors. They also demonstrate a greater readiness to assist others and prioritize the group's interests over their own.

Studies have indicated that collectivism encourages an environmentally friendly mindset (41). Previous research indicates that concerns about the environment, such as climate change, increase positive views for non-conventional energy initiatives. Energy policies enjoy significant public backing, driven by environmental worries (42). Furthermore, different kinds of climate improvement technologies garnered different levels of public support in their study. (43) investigated an analysis of 1,462 individuals revealed that 77% of participants favored the increased use of renewable energy technologies. (44) suggested that ecological problems, like climate change, have heightened community and public interest in renewable energy sources. Previous studies (45) illustrate that, consumers who engage in eco-friendly practices hold a favorable view of non-conventional energy options and are prepared to invest more in them. Consequently, foundational hypothesis are proposed.

**Reasons for adopting renewable energy and attitudes towards it**

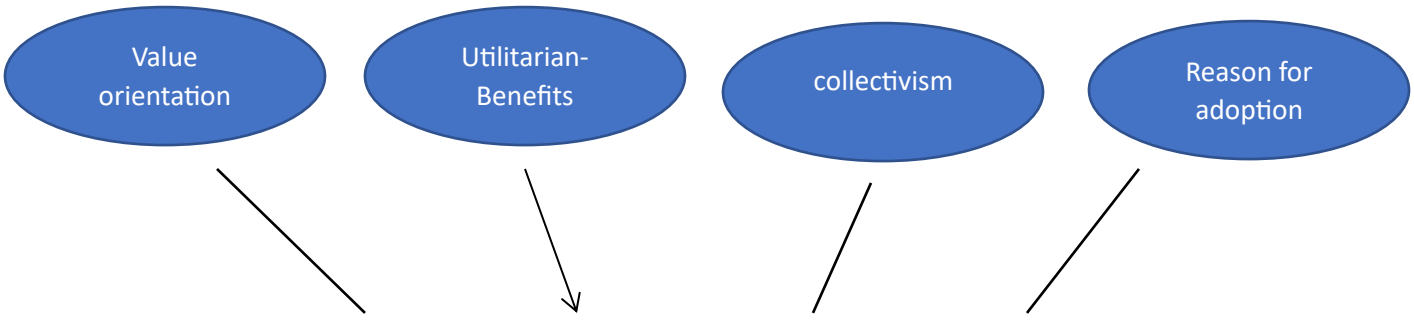
(46) argued that there are several distinctions amid the concepts of reasons and beliefs, that formed the foundations for global purposes in earlier theories such as the Theory of Planned Behavior. It is crucial to recognize causes consist of contextual thought patterns that are directly connected to explanations of behavior. In contrast, reasons outline the subjective likelihood of a specific behavior being part of a consumer’s explanations. For instance, beliefs regarding the adoption of solar panels reflect people's views on renewable energy, whereas reasons for adoption encompass definite features that impact purchasing decisions. It is widely accepted that reasons represent the subjective elements individuals practice to justify their predictable behaviors and serve as a significant predictor of intentions.

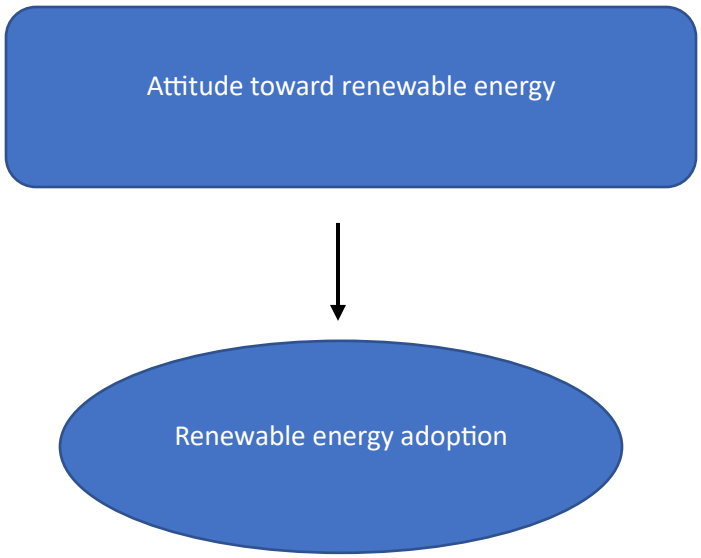
As noted by (47), the key difference between Behavioral Reasoning Theory (BRT) and other theories regarding renewable energy use is that BRT incorporates context-specific reasons for behavior. The assertions made by (48) about the connection between reasons and attitudes have been supported through empirical research within the energy literature over time. In forming the BRT, (49) characterized reasons as “the specific subjective factors that contribute to forming

attitudes and intentions" (p. 100). (50) found that reasoning pertains to the process of deciding on one's subsequent actions. (51) concluded that beyond just reasons for adoption, the existing literature suggests that reasons also encompass behavioral components such as self-assessment. It is commonly acknowledged that individuals depend on reasons to rationalize their actions(52), and when they have sufficient reasonings for their anticipated behavior, they feel significantly more assured in pursuing those behaviors.

The influence of attitude and intention on the implementation of non-conventional energy is significant. Clearly, government policies have been instrumental in the swift advancement of renewable energy technologies in China. According to (53.54), social and psychological elements are also crucial in determining individuals' willingness to embrace renewable energy. Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) are the examples of cognitive framework and attitudes are vital toward them. These frameworks suggest that attitudes significantly influence the formation of specific intentions, which subsequently lead to the execution of particular actions. Attitudes can be categorized as either positive or negative, which directly correlates with the results yielded by certain behaviors, including the adoption of technological innovations. It has been well documented that attitudes are critical in the acceptance of non-conventional energy sources, as reflected in these theories. Several studies have addressed this issue, including those by (55.56.57), investigated multiple forms of attitudes have been examined, such as those related to environmental concerns, energy efficiency, and the financial returns associated with adopting technological advancements, particularly focusing on perspectives toward technology adoption. Furthermore, evidence indicates a positive correlation between attitudes and purchasing intentions within an environmental framework (58.59). (60.61) found that Consumers' intentions to engage in a specific behavior arise when they hold a favorable view of a specific product or service, like the adoption of renewable energy sources. The analysis take us to suggest such a hypothesis. (Fig. 1)

Theoretical representation






## Understanding Psychological Obstacles in Afghanistan

Afghanistan offers a distinctive and difficult landscape for the implementation of renewable energy, where both behavioral and cognitive hurdles are profoundly influenced by the nation's socio-political turbulence, financial struggles, and entrenched cultural beliefs. Although the country possesses immense potential for solar, wind, and hydro energy (62.63), the adoption of renewable technologies remains minimal—not only due to deficits in infrastructure and policy but also because of the public's psychological hesitance to embrace change.

As discussed in the existing literature, frameworks such as the Value-Belief-Norm (VBN) theory and Behavioral Reasoning Theory (BRT) highlight the fundamental influence of individual values, belief systems, and cultural reasoning on environmental actions (64.65). In Afghanistan, many individuals hold onto traditional belief systems that emphasize immediate survival over long-term environmental issues (66), which directly impacts their readiness to invest in or trust renewable technologies. Additionally, a lack of public awareness regarding climate change and the advantages of clean energy fosters a perception that renewables are unreliable, foreign, or not suited to everyday life (67).

Trust in institutions also significantly impacts this situation. Given decades of political unrest and corruption, many Afghans have lost faith in energy initiatives led by the government or supported by donors (68), resulting in skepticism towards even subsidized or free renewable energy solutions. This mistrust

creates a cognitive dissonance between what is proposed and what is accepted. In the Afghan context, behavioral obstacles such as risk aversion, preference for the status quo, and resistance to innovation are therefore intensified (69).

Moreover, gender roles, educational attainment, and tribal traditions often restrict women's involvement in energy-related decision-making at the household level (70). This limitation weakens wider community acceptance, particularly as women frequently serve as the main users of domestic energy systems. Consequently, the transition to renewable energy in Afghanistan must not only focus on technology transfer or improving infrastructure; it must also take into account public perceptions, cultural practices, and value systems.

Grasping these specific psychological and behavioral factors is crucial for creating effective renewable energy policies and programs in Afghanistan. Hence, this paper stresses that the general theories examined must be contextualized and modified when applied to fragile nations like Afghanistan, where behavioral obstacles may surpass economic or technical challenges.

## Methodology

This research examines the psychological and cognitive obstacles to the adoption of renewable energy in Afghanistan, particularly focusing on energy behavior at the household level. Given the logistical, security, and resource challenges in the area, the study employs a qualitative review methodology, relying on secondary data drawn from academic publications, institutional documents, national energy strategies, and international climate evaluations. This approach was selected to investigate the behavioral factors and limitations that affect the uptake of renewable energy by Afghan households, especially in the context of environmental vulnerability and energy poverty.

Afghanistan was chosen as the focal point for this study due to its significant energy issues and climate-related risks. The nation is heavily dependent on imported electricity from its neighboring countries, including Iran, Uzbekistan, and Tajikistan(71.72). Although the development of domestic renewable energy is still limited, a strategic plan spearheaded by (73) aims to establish 10,000 MW of renewable capacity by the year 2032. Furthermore, Afghanistan is ranked among the most climate-vulnerable countries worldwide, frequently facing challenges like droughts, floods, and extreme temperatures (74). These difficulties are further exacerbated by the widespread household dependency on inefficient and polluting energy sources such as coal, firewood, animal

dung, and plastic waste, particularly during harsh winters—leading to significant indoor and outdoor air pollution with serious health effects (75).

Focusing on households is vital as they represent one of the major energy consumers in developing nations like Afghanistan. Unlike countries such as Pakistan, where electrical usage prevails, energy consumption in Afghan households mainly pertains to heating. As highlighted by (76), household consumers contribute significantly to global greenhouse gas emissions, making their willingness to switch to renewable energy—especially solar energy—crucial for achieving sustainable environmental results. Gaining insights into behavioral resistance at this level is key to creating effective, culturally appropriate, and economically feasible interventions.

The data for this study were gathered through a structured review of secondary sources. The search concentrated on locating studies and reports that investigated the psychological, behavioral, or cognitive aspects of energy usage, especially in low-income or conflict-affected environments.

**Results**

This review uncovered various psychological and cognitive obstacles that contribute to the limited uptake of renewable energy in Afghanistan. The analysis, based on Behavioral Reasoning Theory (BRT) and the Value-Belief-Norm (VBN) model, indicated that Afghan households possess limited understanding of environmental issues and weak values related to sustainability. Although renewable resources like solar and wind energy are accessible, the willingness to embrace these technologies remains low due to entrenched perceptions, beliefs, and contextual reasoning.

Many households are unaware of the practical advantages of renewable energy, including cost savings, energy autonomy, and health benefits. Even when these advantages are recognized, significant skepticism exists regarding the reliability, affordability, and suitability of such systems. Misunderstandings surrounding solar energy systems—seen as costly, technically difficult, or unsuitable for local conditions—prevail, creating a notable disconnect between positive attitudes toward environmental concerns and the actual behavior of adoption.

The collectivist nature of Afghan society, which could theoretically facilitate the diffusion of behavioral change, seems to instead bolster opposition to innovation. Community norms, in the absence of visible instances of adoption, typically dissuade individuals from taking initiatives.

Cultural and social expectations prioritize stability and familiarity instead of embracing innovation, further exacerbating the gap between intention and action.

A prominent theme identified in the literature was the specific justifications individuals use to explain their reluctance toward adopting renewable energy solutions. These justifications encompass perceived financial risks, inadequate technical knowledge, fear of system failures, and low trust in service providers and government institutions. The prevalence of these justifications highlights a significant psychological barrier: the inclination to maintain the status quo rather than confront uncertainty.

Another significant finding is the issue of distrust in institutions. Prolonged political instability, dysfunctional infrastructure, and ineffective service provision have fostered public skepticism towards both government-led and donor-supported renewable energy projects. Even when initiatives are economically subsidized or provided free of charge, adoption remains minimal due to a lack of confidence in ongoing support, maintenance, and transparency.

**Discussion**

The results of this research highlight the importance of recognizing behavioral and cognitive barriers as key obstacles to the adoption of renewable energy in developing and unstable regions like Afghanistan. While energy policy and planning often focus on technical and financial constraints, psychological resistance—rooted in values, trust, perceptions, and reasoning—remains a significant barrier to substantial progress.

Behavioral Reasoning Theory serves as an insightful framework for understanding why non-adoption behaviors persist. In Afghanistan, many individuals may possess positive general attitudes toward renewable energy but refrain from adopting it due to specific, subjective reasons that take precedence over broader beliefs. These reasons are not inherently irrational; rather, they are context-specific, emotionally driven, and influenced by cultural memory, risk aversion, and practical considerations.

Although Afghanistan's collectivist culture might theoretically facilitate community-based renewable initiatives, it seems to reinforce a tendency toward social conformity and aversion to risk. This situation indicates that future strategies must extend beyond individual actions and

involve social networks, community leaders, and tribal structures to foster trust and normalize the use of renewable energy within the collective identity.

A significant barrier identified in this study is the distrust of institutions. In societies characterized by historical instability, corruption, or ineffective governance, technically sound and economically feasible energy solutions are frequently rejected due to a lack of confidence in the providers. This mistrust creates cognitive dissonance, where individuals express interest in clean energy while simultaneously avoiding its adoption due to fears of project failure or exploitation. Restoring institutional trust is crucial—achieved through transparent processes, models of local ownership, and sustained community involvement.

Gender dynamics also influence energy decisions in Afghanistan. Although women are the primary users of household energy systems, patriarchal norms often exclude them from decision-making processes. This exclusion hampers awareness and adoption efforts at the household level. Gender-sensitive energy policies that empower women through training, financing, and leadership opportunities could significantly accelerate adoption.

From a policy standpoint, this review indicates that renewable energy initiatives should integrate behavioral insights into their frameworks. Behavioral campaigns ought to be grounded in local languages, symbols, and social references. Demonstration projects showcasing visible, low-risk instances of successful adoption can help reshape community expectations. Additionally, incorporating renewable energy education into school curricula, religious discussions, and social gatherings may assist in transforming entrenched perceptions and values.

This study adds to the expanding body of research promoting a multidisciplinary approach to energy transitions. It underscores the necessity of treating psychological and cultural factors as fundamental elements in energy policy design. In fragile states such as Afghanistan, these behavioral barriers may prove to be more influential than technical or financial challenges. Consequently, existing global models like BRT and VBN must be tailored to local contexts, considering the unique social, cultural, and historical realities of the communities they aim to support.

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