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ENERGY EFFICIENCY AWARENESS AND PRACTICES BASED ON ISLAMIC PERSPECTIVES

Nurul Hadirah Muszaffarsham¹, Mohd Zin Kandar², Elina Mohd Husini³

^{1,2,3} Faculty of Engineering and Built Environment
UNIVERSITI SAINS ISLAM MALAYSIA

Abstract

Currently, the main environmental concerns encountered by most countries are energy and its consumption. A green lifestyle and energy efficiency (EE) could reduce daily energy consumption. Nevertheless, low awareness and knowledge of EE prevent proper green lifestyle practices to save energy and the environment. Thus, the study aims to examine building occupants' EE and energy conservation awareness and practices based on Islamic perspectives. The study objectives are to examine the level of EE awareness and practices among Malaysian building occupants and incorporate the potential of Islamic teachings from al-Quran concerning energy consumption and conservation in the EE awareness campaigns. The study used the qualitative research method, which involved a literature review, observation, and narrative study. As a result, the significant relevance of EE awareness and practices along with Islamic teachings is explained further in this study. Moreover, instilling knowledge, creating awareness and encouraging occupants to implement EE practices, which consequently reduce energy demand and energy consumption, hence, mitigating the detrimental environmental impacts. The study is crucial in raising public awareness of the Islamic perspectives linked with energy conservation and provides a framework for future development plans that embody EE elements aligned with Islamic teachings.

Keywords: energy efficiency, energy conservation, Islamic perspectives

¹ Student. Email: nurulhadirah@raudah.usim.edu.my

INTRODUCTION

Climate change and various other environmental issues are alarming. Immediate actions should be taken to prevent the worst consequences. Proper solutions at a global scale are necessary but several strategies can still be implemented in daily lives to minimise environmental impacts. The global energy consumption has grown by 30% and approximately 7.8 million were registered as electrical users under Tenaga Nasional Berhad (TNB) Malaysia, with home users accounting for 82%, 17% were commercial users, 0.4% were industrial users, and 0.6% were other users (TNB, 2014).

The Association of Water and Energy Research stated that EE improvements could mitigate environmental issues, boost economic development, and reduce energy demand and consumption (S. Mekhilef et al., 2012). Nonetheless, Abdul Majid and Ibrahim (2011) listed three major EE challenges: issues regarding architectural design, appliances or services (technological efficiency) and behavioural concerns. Although human behaviour is an issue in improving EE, behaviour-based approaches are a rewarding strategy for EE and energy conservation (Twumasi, Elvis et al., 2017). Sustainable ecology ideas are related to ‘nature and technology’, where individuals are conscious of the need to protect the environment despite their actual behaviours (Bakar et al., 2017).

Finlay and Palmer mentioned that the ecological worldview of 11 main global religions could encourage effective environmental policies development. Meanwhile, Jaelani et al. (2017) suggested that incorporating religion in organisations that outline development and the environment promotes conservational approaches including humanity programmes. Considering that human behaviour is closely connected to energy usage, reducing energy consumption could be more effective once occupants are aware and understand the concept of energy and EE (Zhao, Song & Wang, 2019; Kasavan, S. et al., 2021).

The study examined building occupants’ EE and energy conservation awareness and practices based on Islamic perspectives. The study objectives include: (1) To study the level of EE awareness and practices among Malaysian building occupants and (2) To incorporate the potential of Islamic teachings from al-Quran regarding energy consumption and conservation in EE awareness campaigns. Hence, the study is essential in raising public awareness of the importance of Islamic teachings incorporated with EE practices to minimise energy consumption and encourage energy conservation. Moreover, the study enhances the literature by constructing a framework for future development plans that embody EE elements aligned with Islamic teachings.

RESEARCH METHODOLOGY

The study applied the qualitative research method by reviewing past literature on users' awareness and EE practices in buildings. Secondly, an observation was conducted on building occupants' current behaviour and practices on energy consumption. Thirdly, a narrative study was performed on Quranic verses to incorporate Islamic teachings into energy use, EE, and energy conservation. Fourthly, the study conducted a content analysis of energy concepts, use, EE, and energy conservation based on Islamic perspectives. Data triangulation involved incorporating Islamic perspectives with EE knowledge and practices. Lastly, conclusions were drawn from the findings and discussions.

SYSTEMATIC LITERATURE REVIEW

Scope	Energy efficiency	Obstacles in Implementing Energy Efficiency	Incorporation of Islamic Perspectives into Energy Use & Energy Efficiency
Objectives	- To study the level of EE awareness and practices among Malaysian building occupants.	- To study the level of awareness and practices of energy efficiency (EE) among building occupants in Malaysia.	- To incorporate the potential of Islamic teachings from al-Quran regarding energy consumption and conservation in EE awareness campaigns.
Keywords	Energy efficiency, Energy conservation, Islamic perspectives.		
Author(s) & Year	Murray G. Patterson (1996), International Energy Agency (IEA) (2014), Reshmi Banerjee (2015).	Cleary & Palmer (2020), Gillingham & Palmer (2014), Sorell et al. (2014), Thollander et al. (2010), Galarraga et al. (2011), Castellazi et al. (2017), Gupta & Gregg (2017), (Langlois-Bertrand et al. (2015), Bithas and Nijkamp (2017), D'oca et al. (2018), Cattaneo (2019), (Lah (2015), Frederiks et al. (2015), Gupta & Gregg (2017), Labanca & Bertoldi (2018), Gillingham & Tsvetanor (2018), Biresselioglu et al. (2018), Ebrahimigharehbaghi et al. (2019).	Finlay & Palmer (2003), Jaelani et al. (2017).
Discussion	Definition of Energy Efficiency <ul style="list-style-type: none"> - Consuming lesser energy to achieve the same number of tasks, services or useful output (Murray G. Patterson, 1996). - An action that provides more services for the same or less amount of energy input [International Energy Agency (IEA), 2014]. - The assessment on the amount of energy needed in providing the same degree of 	Energy Efficiency Gap <ul style="list-style-type: none"> - Consumers tend not to invest in purchasing energy-efficient appliances despite the potential to save money (Cleary & Palmer, 2020). - Cleary and Palmer (2020) stated that theoretically, 'energy efficiency gap' denotes investment in energy efficiency should be larger than the present condition. - The gap in EE is mainly due to the impediments to EE policies and 	Importance of Ecological Worldviews <ul style="list-style-type: none"> - Finlay and Palmer (2003): <ul style="list-style-type: none"> ➤ Examined the ecological worldviews of eleven major global religions and investigated how the matter facilitates in the development of effective environmental policies. ➤ World religions could become powerful and influential contributors in various conservation programmes

<p>comfort, performance or convenience by a similar type of product, building or transportation with technological change (Reshmi Banerjee, 2015).</p> <p>Significance of EE Implementation (Reshmi Banerjee, 2015)</p> <ul style="list-style-type: none"> - The EE promotes monetary safeguarding and greater savings on monthly utility bills. - The EE minimises the environmental and social impacts regarding energy production and consumption (acid rains, air pollution, loss of wilderness areas and global warming). - The EE mitigates global warming and preserves the ecosystems by reducing greenhouse gas emissions, improving EE technologies and practices, reuse or recycling products. - The EE increases the life of equipment and lowers maintenance costs by reducing operating hours and at a lower capacity. 	<p>practices (Gillingham & Palmer, 2014).</p> <p>Categories of EE Constraints</p> <ul style="list-style-type: none"> - Economic constraints: Obstacles in obtaining credit, shortage and unreliable funding, comprising a significant risk for investors and financial institutions (Sorell et al., 2014; Thollander et al., 2010; Galarraga et al., 2011; Castellazi et al, 2017; Gupta & Gregg, 2017). - Institutional impediments: Contradictory guidelines in the administrative bodies, weakness of policy coordination (Langlois-Bertrand et al., 2015; Bithas and Nijkamp, 2017; D’oca et al., 2018, Cattaneo, 2019). - Behavioural obstacles: Low awareness in EE including non-energy advantages, insufficient knowledge or behavioural aberration in interpreting information, lack of confidence, consumers’ attitude and lifestyle (Lah, 2015; Frederiks et al., 2015, Gupta & Gregg, 2017; Labanca & Bertoldi, 2018; Gillingham & Tsvetanor, 2018; Biresselioglu et al., 2018, Ebrahimigharehbaghi et al., 2019). 	<p>globally through narrative, rituals, education, religious advice, civic engagement and campaigning.</p> <ul style="list-style-type: none"> - Jaelani et al. (2017): ➤ Addressed how religion could be incorporated in organisations that emphasise the environment and development to promote multiple conservation approaches and organise humanity campaigns in general. ➤ As Muslims, Quran verses constantly act as a reminder to encourage practicing energy conservation and EE.
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FINDINGS AND DISCUSSION

Observation at one local higher institution demonstrated low EE awareness, thus weak EE and conservation practices among occupants. Figure 1.0 illustrates the occupants’ behaviour in keeping the windows open while operating air-conditioning. Moreover, occupants tend to keep the electrical lightings on despite bright and sufficient daylight. This explains the low awareness and knowledge of the impact of energy on building management and the environment. This lack of EE knowledge and practices among occupants will eventually have an impact on the high energy demand in faculty buildings, raising the energy cost of utility bills. Besides, towards the environment, inefficient use of energy will contribute to an increase in carbon emissions into the atmosphere, resulting in many environmental issues such as global warming, climate change and extreme natural disasters.



Figure 1.0: Lack of awareness and knowledge in EE practices among students

Various environmental concerns have prompted many studies to investigate the role of religious teachings in forming environmental views. For instance, Islam could play a vital role in resolving problems between development and the environment. Table 2 describes the moral values learnt from the Quranic verses and the Tafsir or explanations and the incorporation of the verses with energy concept issues.

Table 2: The EE principles and how Islamic teachings can be integrated for greater impact on the EE Campaign

The EE Principle on knowledge and practice	Source of Islamic Principle	Explanations
<p>Justice must be served for the benefit of all.</p> <ul style="list-style-type: none"> - By establishing a framework on energy policy, production and 	<p>Al-Quran - Surah Al-Nisa', (4:135): "O you who have believed, be persistently standing firm in justice, witnesses for Allah, even if it be against yourselves or parents and relatives. Whether one is rich or poor, Allah is worthier of both.¹ So follow not [personal] inclination, lest you not be just. And if you distort [your testimony] or refuse [to give it], then indeed Allah is ever, with what you do, Acquainted."</p>	<ul style="list-style-type: none"> • The verse informs us that everyone in their scope of responsibility or leadership should adopt justice as a trait. • Every human being is commanded to fulfil the demands of justice by being firm personally while making initiatives to ensure that others view that justice is served.

<p>distribution, energy security and mitigating climate change.</p>	<ul style="list-style-type: none"> • The world situation cannot improve by waiting for someone to come along and rectify the problem, the issues should be resolved proactively. • Therefore, energy management should be fair and just in an equitable manner.
<p>Everyone should be responsible for their energy use.</p> <p>- Every individual in the government or any organisation should engage in participating and benefiting both (multiple and external) stakeholders in the efforts to reduce energy use as a societal obligation, thus protecting and preserving the environment.</p>	<p>Al-Quran - Al-Baqarah (2:195): “And spend in the way of Allah and do not throw (yourselves) with your (own) hands into destruction (by refraining). And do good; indeed, Allah loves the doers of good.”</p> <p>Al-Quran - Al-Qasas (22:76-77): “Indeed, Qarun was from the people of Moses, but he tyrannised them. And We gave him of treasures whose keys would burden a band of strong men; thereupon his people said to him, ‘Do not exult. Indeed, Allah does not like the exultant.’”⁷⁶</p> <p>“But seek, through that which Allah has given you, the home of the Hereafter, and (yet), do not forget your share of the world. And do good as Allah has done good to you. And desire not corruption in the land. Indeed, Allah does not like corrupters.”⁷⁷</p> <ul style="list-style-type: none"> • One requirement of human actions is to complete the duty that has been assigned to them. • Another requirement is to conduct the duty reasonably, giving all of one’s capabilities and resources towards the duty. • A man’s fear of God is sufficient for the first level of conventional obedience. • <i>Ihsan</i> is a higher level that requires a great love for God and a deep commitment to Him. • Energy is used for the benefit of the community as a type of worship (Taqwa) and utilised to protect the environment from destruction (pollution) and to conserve energy (<i>Ihsan</i>). • The Quranic verses remind humans not to gloat with their possessions or be arrogant and proud of their wealth. • Instead, man should utilise the tremendous riches and great vast blessings bestowed by Allah to love, worship Him and be closer to Him by committing a range of good deeds which will bring rewards in this life and the hereafter. • Therefore, the human goal is not to propagate corruption and damage the creations of Allah. • In terms of energy use and conservation, humans are prohibited and condemned for causing harm to the Earth (overexploitation of energy resources, pollution and squandering energy).
<p>Selflessness in conserving and preserving the Earth.</p> <p>- Researchers, practitioners and policymakers constantly seek opportunities to increase awareness of EE and conservation</p>	<p>Al-Qur’an - Al-Hashr (59:9): “And (also for) those who were settled in the Home (al-Madinah) and (adopted) the faith before them. They love those who emigrated to them and find not any want in their breasts of what they (the emigrants) were given but give (them) preference over themselves, even though they are in poverty. And whoever is protected from the stinginess of his soul – it is those who will be successful.”</p> <ul style="list-style-type: none"> • The verse explains to Muslims about the Ansar (Muslims in Madinah). • They donated to Muhammad peace be upon him (SAW) their gardens and oases with a request that he distributes them among their emigrant (Muslim brothers). • The Ansar was very selfless as they would work, strive and make the emigrant partners work in the harvest. • Therefore, regarding energy consumption and energy conservation, every individual, community and organisation should encourage and improve by cooperating in constructing energy conservation policies, advancement in EE approaches and energy subsidies.

practices
among
occupants.

Be Grateful and utilise natural resources reasonably.

- Reducing energy consumption could lessen the generation of energy, thus minimising carbon dioxide emissions into the atmosphere.
- Utilise natural daylight and ventilation to obtain optimum comfort and good indoor environment quality.
- Explore new potentials to incorporate passive design elements into homes or building designs.

Al-Quran - Hud (11:61-68): “And to Thamud (We sent) their brother Salleh. He said, ‘O my people, worship Allah; you have no deity other than Him. He has produced you from the Earth and settled you in it, so ask forgiveness of Him and then repent to Him. Indeed, my Lord is near and responsive.’”⁶¹

They said, “O Salleh, you were among us a man of promise before this. Do you forbid us to worship what our fathers worshipped? And indeed, we are, about that which you invite us, in disquieting doubt.”⁶²

He said, “O my people, have you considered: If I should be upon clear evidence from my Lord and He has given me mercy from Himself, who would protect me from Allah if I disobeyed Him? So, you would not increase me except in loss”.⁶³

“And O my people, this is the she-camel of Allah – (she is) to you a sign. So, let her feed upon Allah’s earth and do not touch her with harm, or you will be taken by an impending punishment”.⁶⁴

“But they hamstrung her, so he said, ‘Enjoy yourselves in your homes for three days. That is a promise not to be denied (unfailing)’”.⁶⁵

“So, when Our command came, We saved Salleh and those who believed with him, by mercy from Us, and (saved them) from the disgrace of that day. Indeed, it is your Lord who is the Powerful, the Exalted in Might.”⁶⁶

“And the shriek seized those who had wronged, and they became within their homes (corpses) fallen prone.”⁶⁷

“As if they had never prospered therein. Unquestionably, Thamud denied their Lord; then, away with Thamud.”⁶⁸

Al-Quran - Al-Mukminun (23:18-22): “And We have sent down rain from the sky in a measured amount and settled it in the Earth. And indeed, We are able to take it away.”¹⁸

“And We brought forth for you thereby gardens of palm trees and grapevines in which for you are abundant fruits and from which you eat.”¹⁹

“And (We brought forth) a tree issuing from Mount Sinai which produces oil and food (i.e.: olives) for those who eat.”²⁰

“And indeed, for you in livestock is a lesson. We give you drink from that which is in their bellies, and

- The verses describe the story of Salleh and the people of Thamud.
- Prophet Salleh is entrusted to awaken the people of Thamud from their lack of devotion.
- Nevertheless, they rejected Salleh’s word while Salleh defends his honesty by providing them a she-camel as a sign from Allah.
- They murdered the camel and are threatened with annihilation.
- Only Salleh and his followers were rescued from annihilation while the people of Thamud were utterly annihilated.
- The story of Salleh and the Thamud people teaches about giving thanks for Allah’s blessings and wealth by coming closer to Him and utilising the blessings to make development for the people and environmental benefits.

- Allah explains in the surah (verse 18-22) that He (Allah) brought down rainwater from the sky in the appropriate amounts, not too heavy to produce a flood calamity and not too little to irrigate the gardens or plantations that require it.
- The rainwater provides humankind with milk to drink and as modes of transportation.
- From the verses and with knowledge, humankind should be encouraged to examine technological

	for you in them are numerous benefits, and from them, you eat.” ²¹ “And upon them and on ships you are carried.” ²²	advancement in EE and conservation, such as development through renewable energy resources.
Implementation of passive or green design elements. - Employing a passive design approach to the maximum extent to reduce building energy consumption, increase occupants’ comfort, protect occupants from harmful forms of energy and minimise building energy demands.	Al-Qur’an – Al-Baqarah (1:205): “And when he goes away, he strives throughout the land to cause corruption therein and destroy crops and animals. And Allah does not like corruption.”	<ul style="list-style-type: none"> • Tafsir by Jalalyn describes that the verse explains those who do nothing but propagate and damage crops and livestock (society resources) are classified as ‘corruption’. • Therefore, Allah completely condemns the behaviours. • Regarding energy use and conservation, humankind as caliphs is prohibited to exploit and waste energy but should instead promote the preservation of the environment, utilisation of energy, EE and energy conservation.

The ultimate aim of human existence is to fulfil two essential roles: to serve Allah as His caliphates and His servants. Although humans are inclined to savagery and destruction, Allah has delivered groups of prophets, as-Siddiq (honest people), as-Syuhada’ (witness to truthfulness of Islam), Mukminin (strong believer), and Islamic scholars (Tafsir Ibn Kathir). The groups of people serve as guides for all human beings in managing the Earth following Allah's will. Allah has allowed humankind to perform duties as His caliphates through these specific people. As caliphates, one of the responsibilities He has assigned to mankind is to protect and preserve the environment, which are critical components in giving lives and maintaining existence. Hence, in the present day and age, Islamic scholars and authority bodies, the government, and environmentalists should continuously be aware and nurture knowledge of energy use and conservation to raise public awareness in practising proper energy management, efficiency, and reducing energy use.

Based on the analysis made above in Table 2, from the Qur’anic verses, we are outlined with many references, guidance and advice for humankind to live

on earth and manage its resources, which benefits all humankind along with other living things. From these Qur'anic verses regarding energy use and energy conservation, we have been taught to be responsible, selfless, just and grateful in our energy use. As a result of the lessons learned from Islamic teachings, everyone is encouraged to get involved in finding initiatives to use, sustain and protect natural resources from depletion. For example, every individual should utilise energy to its fullest in everyday routines, like preferring to sun-dry their laundry instead of using a dryer at home or in the office, workers can be encouraged to use laptops instead of desktops as laptops are more energy efficient; make sure to unplug the chargers when not in use. Besides, these Qur'anic verses have created awareness in humankind on how to be grateful for the benedictions that Allah has given and how we are responsible as khalifah to manage our consumption. For instance, as a home-owner or a designer or even an individual, we can try many ways in order to minimise building by implementing passive design elements in our buildings, like installing solar panels and favouring investing energy-efficient appliances, so that, energy is utilised wisely without any wastage.

People who value the Earth should utilise and pray to Allah to protect the environment and perform initiatives to maintain optimal preservation of the environment. Tafsir al-Misbah outlined that in response to Allah's admonition to humankind not to harm Earth, humans must preserve environmental sustainability and cleanliness. The initiatives could decrease environmental impacts given that a cleaner environment could benefit mankind in preventing unwanted implications, such as disease, sickness, pollution, global warming, and climate change. Summarily, Muslims are equipped with life-long guidance and teachings from the Quran, which constantly remind of energy use and conservation. The Quranic verses are the examples of warnings (awareness) and knowledge needed by mankind to enable practices on proper energy management, EE, and energy conservation, therefore mitigating the detrimental environmental impacts to benefit mankind, other living beings, and the environment.

CONCLUSION

The study emphasised the critical relevance of EE awareness and practices to reduce energy use, hence minimising detrimental environmental impacts. Past studies highlighted the importance of awareness, knowledge, and understanding of energy concepts that could aid in the implementation of EE practices. Low awareness contributes to the lack of knowledge and lowers EE investment costs, causing high monthly electrical utility bills, failure to achieve target reduction of energy consumption, and hinders energy conservation efforts.

Referring to the Quranic verses, positive attitudes towards awareness, knowledge, use of energy, and EE practices among consumers can be instilled

and nurtured. Consumers must possess awareness, in-depth knowledge, and direct exposure of EE as individuals with a significant role in fostering public awareness and knowledge by incorporating Islamic perspectives based on al-Quran for the benefits of humankind and the environment.

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