CHAPTER 10

ENERGY EFFICIENCY IN ORGANIZATIONS: POLICIES, STRATEGIES, APPLICATIONS

Assoc. Prof. Dr. Özden AKIN[1]

Assoc. Prof. Dr. Metin REYHANOĞLU[2]

[1] Hatay Mustafa Kemal University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Hatay, Turkey, ozdendogan@gmail.com,

[2] Hatay Mustafa Kemal University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Hatay, Turkey, reyhanoglu@gmail.com, Orcid No: 0000-0003-1769-1867

INTRODUCTION

Businesses have to deal with the unpredictable, uncertain and often the unknown. Even when things are running smoothly and in stable times, important and unexpected events effect on political or market changes, which creates uncertainty and causes problems for businesses. There can be an unforeseen devastating change in businesses at any time through a sudden virus outbreak (for example, for the reflection of Covid19, which emerged in Wuhan province of China in 2020 and was declared a pandemic, on SMEs, see Fairlie, 2020) or a nuclear accident (For the effects of Japan's Fukushima Nuclear Power Plant accident on the operations of the businesses in the region, see Gulati, Casto, & Krontiris, 2014). Whereas, businesses generally tend to maintain their current status and settled to established business models. However, when businesses are subjected to severe pressure, they have to change their current position.

In general, the decrease in energy resources in the world increases the uncertainty and the obligation of change for organizations and requires them to develop new policies for the future. At the same time, it is of great importance to use existing energy resources more effectively and efficiently for all businesses. In the next few decades, businesses may face many consequences, from severe climate impacts to negative energy. Besides to rising global temperatures, rising sea levels, and the rottenness of extraordinarily weather events, there are incremented risks to infrastructure, human health and agriculture (Maiorano, 2019). For this reason, businesses need to determine important strategies in the

field of energy efficiency to gain advantage over their competitors (Angels, Kunkis, & Altstaedt, 2020). These strategies include decreasing the emission of greenhouse gas emissions into the atmosphere, largely associated with the burning of fossil fuels, in order to reduce climate change around the world (Maiorano, 2019).

While there is still a gap in the world in formulating climate mitigation targets and implementing de-carbonization targets, businesses have started to anticipate a phasing out of fossil fuel-based power generation. In these important developments, creating a common vision for the future of businesses is an important strategy. De-carbonization of energy producing enterprises in the energy sector infers renewal carbon-containing fuels with non-fossil alternatives. Fossil fuels are old energy storage vehicles that manufacturers have produced for thousands of years. Economic system is contingent on energy produced from fossil fuels, complete de-carbonization could lead to a radical change in terms of economy and society. It is possible to say that they should be aware of the concept of de-carbonization in their businesses and start taking the necessary measures and applications from this area. Businesses should formulate the carbon-free future in advance, anticipate legal regulations and adjust their corporate goals accordingly. Therefore, climate policy is a basic element in creating future strategies (Angels et al., 2020).

Conventional energy providers show the major changes in energy systems in the coming years as a requirement of the Paris Agreement on Climate Change, and these changes are in an uncertain situation in

affecting profitability and long-term survival of businesses. Electricity generating companies experience management task complexity in this sense and they have to develop important strategies for themselves and their future (Angels et al., 2020).

A traditional economic view suggests that workers are less stimulated to save energy in their job than outside job since monetary rewards are more indirect at job. Nevertheless, leader enterprises have linked the success of the individual to the success of the organization by making energy performance a urgency for everybody. At the same time, they find ways to take advantage of their employees' intrinsic motives to increase productivity, reduce pollution, and innovate by going beyond external monetary rewards. Many employees find that when asked for making a difference in this way, they respond with energetic and creative solutions that result in significant savings in resources and energy (Prindle & Finlinson, 2011).

The increase in environmental awareness due to consumer, society and government regulations, and the concerns of business partners and management for this cause the necessity of energy efficiency because of a sustainable competition. The aim of this chapter is to explain what kind of policies and strategies should be followed in order to ensure energy efficiency for a sustainable environment. Which types of applications should be included in accordance with these strategies constitute the sub-objective of the chapter. In this context, the fight against uncertainty due to the energy transformation of the organizations that follow certainty is explained, and then applications

of the policies and strategies followed for ensuring energy efficiency are discussed. The theories that reflect the perspectives of researchers in the analysis of organizations' practices in relation to energy efficiency are examined in the next heading. Finally, the strategies that corporates can follow in the implementation of energy efficiency are listed as sub-headings.

1. From uncertainty to certainty for organizations?

Energy efficiency can be explained within the scope of uncertainty theory from the perspective of companies demanding certainty in uncertainty. In the theory of uncertainty, there is chaos and cosmos based on ancient roots that resulted to risk awareness of human beings.

Risk is generally defined as an undesirable situation that occurs as a result of decision-making in situations where alternatives and the possible consequences of these alternatives exist (Knight, 1921). The main reason for the occurrence of risk is uncertainty, and the origin of uncertainty is the condition of having more than one consequence. Uncertainties related to energy efficiency applications in businesses involve the reliability of technology, information systems, human error, risks encountered while purchasing new technology equipment, climatic conditions, employee behavior, and the performance of energy service companies (Cooremans, 2012; Maiorano, 2018). At the same time, financial risks and uncertainties associated with energy efficiency projects may include negativities such as future energy price,

implementation failure, hidden costs and rebound effect (Maiorano, 2019).

Energy efficiency investments can also lead to reduced risks of decreasing geopolitical tensions, extreme climate events, energy and carbon prices, energy supply and legal proceedings (Cooremans, 2012). Energy efficiency measures in businesses may require making decisions earlier and a change in the way processes are completed. This situation may require changes in managerial duties in corporates, changed procedures and processes between personnel and teams, and changing work routines. It also includes the development of new skills in employees to adapt to the increasing complexity associated with the application, operation and maintenance of new technologies. The uncertainties include the consequences for these changes.

March (1981) states that in order to manage uncertainty, it is necessary to create a balance between the sensitive change processes of enterprises and certain elements of "foolishness". Some of the unlikely events that would not make sense to ignore may happen in the future. It can be difficult to predict whether these events will happen. If it cannot be predicted, it will also make innovations for transformation risky. It can be said that innovations in energy efficiency in the first place may therefore not be worth the risk (March, 1981). But the point is that this is necessary. The solutions that March (1981) proposes for trying and promoting innovation are cross-business collaboration for risk sharing (managerial incentives and allocating additional time and resources).

According to DeCanio (1993), he says that manager compensation is also effective in uncertainties related to energy efficiency. According to him, in risky situations involving energy efficiency, it affects the decision-making process and even managers can distort the results. For example, shareholders with varies portfolios of assets may have a large risk desire, while executives may be more risk opposed due to the effects of the personal consequences of failure relative to the return on success.

Maiorano (2018) researched approaches to increase energy efficiency in the service sector. He found that they have different approaches that organizations to deal with uncertainty explain some heterogeneity in practices. To deal with the uncertainty they face when implementing energy efficiency, organizations use two opposing approaches. These approaches also provide a framework for the form of uncertainty theory in organizations' approach to energy efficiency. These two approaches are “demanding certainty” and “managing complexity”. Maiorano (2018) conducted field research in hospitals to test these approaches. Hospital administrations that feel over budget or patient pressure use energy efficiency to cope with uncertainties. Under the requirement to demand certainty approach, businesses hope they can identify and control uncertain resources associated with energy efficiency. This approach is based on the fact that the external environment can be controlled, and the uncertainties in the environment can be evaluated and understood. Some uncertainties arise from the responsibility of the business management, even out of control. In the managing complexity

approach, management understands the uncertainty in processes and accepts the inherent risk and reward trade-off in a reasonable manner. Management accepts to absorb the risks and unwanted consequences.

2. Policies and strategies implemented by corporates for energy efficiency

Leading businesses in the world have begun to take action to reduce energy and carbon consumption. Public pressure on this issue is increasing. [3]. Corporate sustainability programs and innovations in energy efficiency are spreading.[4] A study involving heavy industry manufacturers, computer and chip manufacturers, finance and textile enterprises shows that while enterprises' energy use accounts for less than 5% of their revenues, the vast majority of them are corporate energy use (Prindle & Finlinson, 2011).

This awareness reveals the emerging perception among business leaders that the era of cheap energy and free GHG emissions is over and that they are facing the era of carbon-constrained energy markets (Prindle & Finlinson, 2011). Energy use has shifted from a low cost problem to a major environmental and sustainability problem in the eyes of top managers. In a study, reducing carbon emissions is the most important reason for companies to initiate efficiency strategies (Prindle, 2010). In addition, the research revealed that CEOs are the segment that struggles most for the success of the efficiency efforts of businesses.

[3] For example, ElectricChoice.com (2020) ranks the top 100 companies in energy efficiency in the United States.
[4] For the most innovative energy companies see fastcompany.com (2020).

The Pew Center's report, which is experienced in corporate energy management, lists the measures taken by leading companies to reduce their energy use as part of their energy efficiency and greenhouse gas reduction strategies. In this project, which was carried out by surveying businesses and conducting in-depth case studies, it demonstrated the seven criteria of high-efficiency businesses. These are (Prindle, 2010):

a) **Efficiency as a core strategy:** Energy efficiency is an integral part of corporate strategic planning and risk assessment for businesses with pioneering strategies. This situation should not be seen as another cost management problem or a simple sustainability strategy. Energy efficiency has been part of the corporate culture for successful initiatives this century.
b) **The requirement of leadership and organizational support in sustaining efficiency:** When energy efficiency is truly an essential part of the organization, managers can talk about it without thinking. CEOs and executives frequently voiced their commitment to efficiency in their speeches.
c) **Having energy efficiency missions:** The corporates has SMART energy efficiency missions that are Special, Measurement, Account, Responsibility, Real, Time. These occur when the energy efficiency of organizations is really a part of the business. The factors that make energy efficiency strategies type and unique to these goals are that they are organization-wide, translated into business unit goals, specific enough to be measured, specific target dates, linked to action plans to achieve

these strategies in all business units, and have features that are updated and strengthened over time.

d) **Relying on strong route and performance measurement system:** Establishing an effective energy monitoring and performance system requires the collection of many different and excess data. In a sample system, data should be collected regularly from all business units. Data collection and reporting should be done in detail. It should include a feedback mechanism that supports the correction. Energy performance data should be widely shared internally and externally. The system must be constantly improved.

e) **Transformation major and sustained resources into efficiency:** Effective effort in a business requires resources, people and capital. One of the three basic ways leading businesses invest resources in efficiency strategies is to have an energy manager and a team with adequate operating resources. The second is that business leaders find capital to finance projects. Finally, businesses need to invest in human capital.

f) **Requiring performance objectives and mesasures for energy efficiency:** Leading businesses not only designed their strategies but also followed their applications with energy metering performance systems. By setting energy performance targets, they rewarded the successful employees.

g) **Evaluating the results of energy efficiency:** The best companies in this field make energy efficiency a living part of their story. They use their productivity achievements prominently in both

internal and external communication. Energy efficiency becomes part of the story, identity and culture the company tells about itself. The best programs include both an awareness-raising internal communication plan and external efforts documenting employees and commitments and achievements.

3. Theories of corporates' perspectives on energy efficiency

König (2020) argues that industrial enterprises should create a culture related to energy efficiency. He also says that they should develop a multi-level perspective in organizational decisions related to energy efficiency. These perspectives developed will both facilitate the understanding of decisions to be taken regarding energy efficiency and provide a multi-level model for empirical research. König (2020: 2) focused on how these companies decide on energy efficiency issues and what they direct or constrain in his study in small and medium-sized enterprises in Germany. For this purpose, by combining multidisciplinary concepts and theoretical approaches such as sociological neo-institutional theory, the translation perspective on diffusion, the attention-based view of the firm, barriers to energy efficiency and energy culture tried to come to a conclusion. These approaches, which determine the perspectives of enterprises on energy efficiency, are given below.

3.1. Neo-institutional organizational theory

Neo-institutional theory describes the actions and structures of organizations by implying to norms, and models outside of organizations. The theory states that many programs, structures, and practices in organizations gain legitimacy through the social construction of reality. Suchmann (1995) defines legitimacy as a generalized perception or assumption that an entity's actions are appropriate within some socially constructed norm, value, or belief system. Therefore, when a business is measured against the social values, norms and beliefs of its environment, its decisions and actions are considered legitimate if they seem desirable and appropriate. According to Scott (2008), the expectations of the enterprises consist of regulatory, normative and cultural-cognitive elements and add stability and meaning to social life with resources and activities. According to him, new norms, energy laws, government or organizational measures are perceived and interpreted with a specific cultural-cognitive eye.

The determination of certain applications and structural elements by businesses are indicators of an increasing institutionalization process. The diffusion of organizational practices such as energy efficiency measures is based on internal and external resources (Strang & Soule, 1998). There are a number of influential actors in the formation of legitimacy, such as government and political groups, professions, associations, social movements and networks (Walgenbach & Meyer, 2008). Within the framework of this theory, promoting energy efficiency can be defined as an institutionalization project. In particular,

government and policy makers seek to drive the spread of energy efficiency through taxes, policies and grants. In addition, businesses are not passive actors here, but can offer interactive policies and perspectives on the spread of energy efficiency.

3.2. The translation perspective on diffusion

This approach is inspired by actor network theory and developed in the context of science history and technology studies. Theorists with this point of view assume that organizational practices and structures do not propagate in any original form, but that they are adapted and translated in the local conditions of the enterprises. In this sense, diffusion socially mediates the spread of practices within a population. In this sense, diffusion makes it meaningful and valuable by developing a collective understanding of the appropriateness and value of energy efficiency practices (Strang & Meyer, 1993). Strang and Meyer (1993) determine spreading both culturally and relationally. Diffusion can be accelerated and reoriented by theorizing and modeling ideas. Energy efficiency applications are theorized in certain events such as professional, political and organizational discourses and provide application models (Maguire & Hardy, 2009). Theorizations on energy efficiency in organizations can include appropriate measures to be taken regarding energy efficiency, strategic or investment decisions. Efforts to increase energy efficiency do not only mean innovation, but also the adoption of new practices and the abandonment of old practices. Maguire and Hardy (2009) state that abandonment of applications is due to the problem. Viewing as a problem undermines the current meanings of

practices and cognitions. Accordingly, enterprises consider energy efficiency issues such as energy saving behavior of employees, energy costs, organizational structures or management practices as a problem. Theorizing and problematizing processes require the attention of businesses and their members (Maguire & Hardy, 2009).

3.3. The attention-based view of the corporates

Ocasio (1997) developed the attention-based theory of view to explain the strategic decisions and behaviors of businesses. This theory seeks an answer to the question of how businesses behave and adapt to environmental changes, and how they pay attention to particularly important issues. Meaning is more important than recognizing and paying attention, and it refers to coding, interpreting, and focusing by spending effort and time on a set of issues (problems, threats, and opportunities) and answers (solutions and programs) facing the business. Attention-based view explains the selectivity of organizational attention, the variability of attention processes and the nature of organizational decisions and actions with three basic principles. Those are (Ocasio, 1997):

a) **Attention focus**: What actions the decision makers of an enterprise take depends on the issues and the answers they focus on.
b) **Attention to situations**: The issues and responses that decision makers focus on are limited to the specific context or situation they are in.

c) **Structural allocation of attention**: The situation in which decision makers in the business find themselves depends on how the business regulates its attention to the issues and the answers they give. The company structures and distributes its attention in different situations with the organization of resources, social relations, formal and informal rules.

4. A model proposal for the implementation of energy efficiency in the corporations

Barriers to energy efficiency practices are generally classified as institutional barriers, organizational barriers, behavioral barriers and barriers conditioned by the market (Sorrell, Schleich, Scott, O'Malley, Trace, Boede, Ostertag, & Radgen, 2000). Thollander, Palm and Rohdin (2010) classified these obstacles as technical system, technological system and socio-technical system. The classification of barriers to energy efficiency is often the result of different theoretical perspectives. Economic perspectives generally follow neo-classical theory. While behavioral perspectives are based on transaction cost economics, psychology and decision theories, organizational perspectives are based on organizational theories (König, 2020).

The point to be considered in the implementation of energy efficiency in businesses should cover all processes of the organizations. This means that all activities from input to output are carried out with a common awareness of energy efficiency. For this, firstly it needs the creation of a culture for energy efficiency. The most important element in the creation of this culture is leadership. On the other hand, due to

the different features in its processes, it is necessary to establish a special system for the purchase of raw materials and supplies, as well as energy efficiency in production. In order to ensure the financial sustainability of enterprises, energy efficiency must be harmonized with marketing practices and public relations, and thus they must announce to the public what they performed. In order to obtain the results of energy efficiency, a series of recommendations are listed under the following sub-headings for enterprises.

4.1. Creating a culture for energy efficiency

Culture can be broadly defined as a mixture of knowledge, ideology, values, norms, laws, and daily rituals that characterize a social system (Hatch, 1997). Energy culture emerges through interactions between material culture, practices and norms. Schein (2004) defines organizational culture as a model of common fundamental premises embedded in norms and structures for mastering external adaptation and internal integration. In general, organizational approaches make it possible to establish principles related to energy culture. These principles can be listed as multilevel perspective and interdependence, problematization and theorizing of responses as a link between levels, organization as a cultural attention processing system, individual characteristics of institutional employees (Ocasio, 1997).

Creating culture should include raising awareness of energy efficiency of CEOs, mid-management, shareholders and employees. Creating a culture for energy efficiency should encompass all stakeholders, from

suppliers to dealers. In this context, a total quality management perspective can help.

4.2. Energy efficiency in raw material and supplies purchase

The selection of environmentally friendly raw materials and semi-manufactures is important in the use of supply materials in production. Because energy efficiency starts with supply. In addition, if the environmentally sensitive supply goods are not used, there will be negativities in the public and consumer perceptions about the energy efficiency of the enterprises.

4.3. Creating a system for energy efficiency in production

In ensuring energy efficiency in the manufacturing process, first of all, the selection of the machines should be started. Machines that use the least amount of energy should be selected. In addition, a lean production system should be established as much as possible, a system that will provide mass customization should be used. Industry 4.0 applications should be followed for this. Factory, smart buildings and office designs that will bring energy efficiency should be preferred. Renewable energy should be selected as energy, a system should be established for this purpose, or energy companies that generate renewable energy should be preferred.

4.5. Reflecting energy efficiency in products and services and corporate relations

The increasing competitive environment causes changes in the structure of production and consumption, which encourages companies to focus on high total factor productivity. Total factor productivity can be achieved by investing more in intangible assets. In short, economies enjoy higher growth performance as intangible assets are concentrated (Ökten, Okan, Arslan, & Güngör, 2019). The most important area where intangible assets are used as competitive power and evaluated as positive image on the society is the field of marketing and public relations.

Within the scope of marketing, it should be designed to emphasize the energy efficiency of the marketing mix (price, promotion, distribution and product). Image studies should be conducted on the necessity of energy efficiency in public and corporate relations. For example, a positive image should be created in order to enter the sustainable index.

CONCLUSION

Three dimensions that make up the energy efficiency climate in businesses are very important. The first dimension is how the problems related to energy efficiency and the answers given to these problems are perceived in groups within the organization. The second dimension is how these perceptions are evaluated and the third dimension is future expectations. These dimensions generally shed light on the careful processing of the enterprise regarding energy efficiency (König, 2020).

It is important to determine which normative and cultural influences arise in the decisions that businesses make or will take regarding energy efficiency. The impacts that hinder the successful implementation of energy efficiency programs need to be revealed. Knowing which actors determine the problematization and conceptualization of energy efficiency is important in terms of perceiving the issue as legitimate and reliable. In addition, it is necessary to know why businesses that use less energy follow energy efficiency more closely than businesses that use more energy. It is important to know what and what factors motivate these businesses.

Energy efficiency practices can create complexity in businesses. Businesses should conduct further research to outline how employees and senior management deal with uncertainty. It should also be able to see the impact of complexity on processes and, consequently, how it can affect organizational practices (Maiorano, 2019).

Finally, it is recommended that government and policy makers use multi-stakeholder, collaborative, open-system approaches to research, identify and consensus across different contexts and levels of analysis that inform about rationality, risks and benefits. These approaches ensure that the policy is in the best position to not only encourage innovation, but also contextualize the risk taking required to achieve their goals (Maiorano, 2019).

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Edited by
Assoc. Prof. Cemil Serhat AKIN
Assoc. Prof. Cengiz AYTUN

Authors
Prof. Dr. Okyay UÇAN
Assoc. Prof. Cemil Serhat AKIN
Assoc. Prof. Cengiz AYTUN
Assoc. Prof. Ismet Murat HASEKI
Assoc. Prof. Basak Gul AKAR
Assoc. Prof. Füsun Çelebi BOZ
Assoc. Prof. Metin REYHANOĞLU
Assoc. Prof. Özden AKIN
Res. Assist. (Ph.D.) E. Efecan AKTAŞ
Res. Assist. (Ph.D.) İpek TEKİN
Res. Assist. (Ph.D.) Ömer Faruk GÜLTEKİN
Res. Assist. Tuba YILDIZ
Res. Assist. İsminaz ÇINAR
Ind. Researcher Kubra GÖGER

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Edited by

Assoc. Prof. Cemil Serhat AKIN
Assoc. Prof. Cengiz AYTUN

Authors

Prof. Dr. Okyay UÇAN
Assoc. Prof. Cemil Serhat AKIN
Assoc. Prof. Cengiz AYTUN
Assoc. Prof. Ismet Murat HASEKI
Assoc. Prof. Basak Gul AKAR
Assoc. Prof. Füsun Çelebi BOZ
Assoc. Prof. Metin REYHANOĞLU
Assoc. Prof. Özden AKIN
Res. Assist. (Ph.D.) E. Efecan AKTAŞ
Res. Assist. (Ph.D.) İpek TEKİN
Res. Assist. (Ph.D.) Ömer Faruk GÜLTEKİN
Res. Assist. Tuba YILDIZ
Res. Assist. İsminaz ÇINAR
Ind. Researcher Kubra GÖGER

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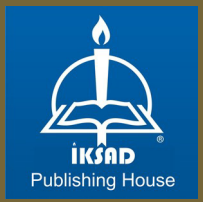
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Yayın Grup Başkanı