Sustainability Reporting Practiceses In Energy Companies With Topsis Method

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ABSTRACT

Nowadays, the concept of sustainability appears in all branches of science and is used in every field. Sustainable growth, sustainable development, concepts of sustainable development began to place quite a lot in our daily lives. Environmental and social disasters that lead some companies, social media can spread quickly and public pressure on companies to create environmental destruction and social adversities to be responsive to consumers, businesses and observing their ways of doing business to intervene when necessarily enforced companies to be included in corporate sustainability activities.

To support Turkey's sustainable development and renewable energy will play a key role in the transition to a low carbon economy. For this reason, energy companies of the manufacturing sector that provide the main entry and reporting their activities should become a leader in sustainability. In the implementation section of the study, TOPSIS method examined contribution to the sustainability of the energy companies based on the different criteria; in the light of this information above, Zorlu Energy in Turkey was determined as the most contributed company to sustainability.

Keywords: *Sustainability, Sustainability Reporting, Sustainability in Energy Companies.*

Jel Classification*: O13, P48, Q5.*

ÖZET

Sürdürülebilirlik Raporlaması ve Enerji Şirketlerinin Sürdürülebilirliğe Katkısı ve TOPSIS Yöntemi ile Ölçümü

Günümüzde sürdürülebilirlik kavramı tüm bilim dallarında karşımıza çıkmakta ve her alanda kullanılmaktadır. Sürdürülebilir büyüme, sürdürülebilir kalkınma, sürdürülebilir gelişim kavramlar günlük hayatımızda oldukça çok yer etmeye başlamıştır.

İşletmelerin yol açtığı bazı çevresel ve sosyal felaketlerin, sosyal medyada hızlı bir şekilde yayılarak işletmeler üzerinde kamuoyu baskısı oluşturması, tüketiciler çevresel tahribatlara ve sosyal olumsuzluklara tepkisiz kalmaması, işletmelerin iş yapış şekillerini gözlenmesi ve gerektiğinde müdahale etmesi; işletmeleri kurumsal sürdürülebilirliği faaliyetlerine dâhil etmelerini zorunlu kılmıştır.

Yenilenebilir enerji Türkiye'nin sürdürülebilir kalkınmasını destekleyecek ve düşük karbon ekonomisine geçişte kilit rol oynayacak sektörüdür. Bu sebepten üretim sektörünün ana girdisini sağlayan enerji şirketleri sürdürülebilirlik faaliyetlerinde ve raporlamasında da öncü olmak durumundadır. Çalışmanın uygulama bölümünde TOPSIS yöntemi kullanılarak enerji şirketlerinin sürdürülebilirliğe katkısı farklı kıstaslar baz alınarak incelenmiş olup; Türkiye'de sürdürülebilirliğe en çok katkısı olan şirket Zorlu Enerji olarak belirlenmiştir.

Anahtar Kelimeler: *Sürdürülebilirlik, Sürdürülebilirlik Raporlaması, Enerji Şirketlerinde Sürdürülebilirlik.*

JEL Sınıflandırması: *O13, P48, Q5.*

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1. INTRODUCTION

Recent studies clearly show us the known effects and hazards of global warming in different reports. These reports emphasized the necessity of stopping global warming and vitality of radical precautions for a sustainability word.

Today's consumers are more aware of the negative effects of carbon emission on earth. Thus, consumers may begin to pay attention to yearly carbon footprints of firms', which they are stakeholders of. Because of that, according to the assumption, the amount of carbon emission of firms will be important as much as the profit figures they indicate on their financial statements. It is obvious that manufacturing firms, which are aware of the benefits of producing low carbon emission, will allocate importance of using renewable energy and these firms will invest to this area.

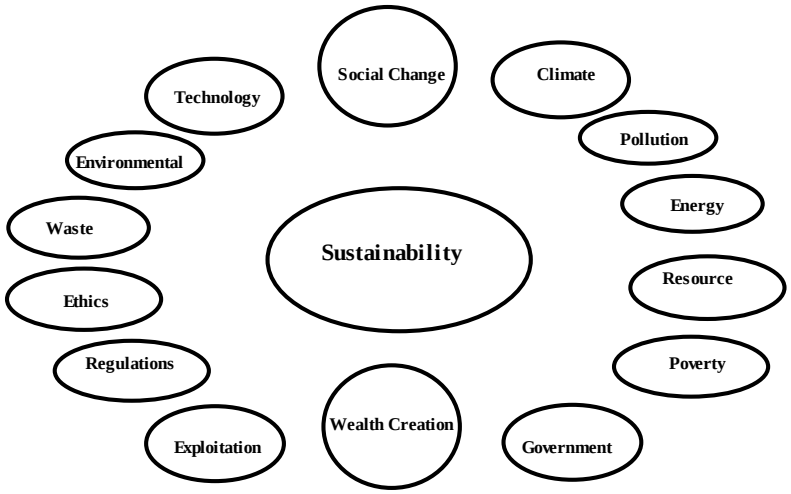
Developing consciousness about sustainability will affect people's choices about having environmental friendly houses and working at offices, which have environmental friendly green certificate. Energy firms, which are aware of the importance of low carbon emission, have started to shape their portfolio and invest to sustainable energy. Moreover, because of effects of Fukushima nuclear disaster which occurred recently, developed countries will turn to secure sustainable sources of energy and their investments are expected to perform in this direction because our world needs more energy and fewer carbon emissions. Renewable energy will support Turkey's sustainability developing progress and it will be a key sector for passing lower carbon emission. Because of this reason, energy companies which are the main input of manufacturing sector should be the leader of sustainability activities and its reporting.

2. SUSTAINABILITY AND SUSTAINABILITY REPORTING

2.1. Sustainability

Nowadays, sustainability confronts every discipline and is observed in every area. Concepts like sustainable growth, sustainable development etc. has started to take significant place into daily life. Sustainability can be defined as ensuring continuity without interruption and using resources efficiently to provide continuity. Technology with an integrated approach between sustainability and wealth creation, social change, environment, waste, ethics, regulations, exploitation, climate, pollution, energy, resources, consist of a combination of poverty and government size (Hawkins, 2006: 3).

Table 1: Sustainability Circle



Resources: (Hawkins 2006,s.3)

Sustainability concept has an active and reactive meaning. Society's skill of continuation without the excess usage of the environment or any other systems continuity, intact, or excess use of main sources is defined as the continued sustainability (Karaman, 1996: 102).

2.2. Corporate Sustainability

According to 'Common Future' report which is also known as Brutland and prepared by development commission, sustainability can be defined as *"meeting your needs without sacrificing future generations' needs"*. (United Nations [UN], 1987) In this context, institutional sustainability is a part of sustainability and institutional sustainability that contain supply and demand process, diminish or remove the negative effect' of business activities on the ecosystem.

Sustainability is not diminishing natural resources. Therefore, sustainable development defined as creating the positive effect for environmental or neutralization of this effect in the perspective of institutions. The institution should move for long term benefits rather than short term benefits (Wilson, 2008).

Corporate sustainability is not an alternative for economic growing and profit maximization. This idea indicates us firms not only grow and forecast their profit but also it has social aims like environmental protection, social justice, equality and economic development (Høgevold and Svensson, 2012: 141) .

Firms obligate use institutional sustainability because of some environmental and social disasters that create public constraints on firms because these environmental and social disasters spread on social media very quickly and public is not unresponsive to working systems of companies (Besler, 2009: 9).

Corporate sustainability can define as firm's all activities work parallel with development. This is clearly shows corporation's importance and their effect for sustainability (Besler, 2009: 10).

Three key corporate sustainability factors are as follows (Dyllick ve Hockerts, 2002: 135).

1. Including economic, social and environmental factors

Economic, social and environmental items of institutional sustainability are related with each other. Because of that, these components should integrate via created complementary structure.

2. Adopt long-term viewpoint.

The relationship between economic, social and environmental performance leads firms to use institutional sustainability for their existence. Furthermore, firms gain long-term viewpoint via institutional sustainability.

3. Spending income rather than capital.

When firms use income instead of capital for their investments that are related with environmental and social areas, these investments strengthen their financial performances. This circumstance, create a loop for implying institutional sustainability component.

When sustainability included in the corporate strategy rather than being a project subject, it will be possible to talk about the sustainable business model, world and society. (Keskin, 2012)

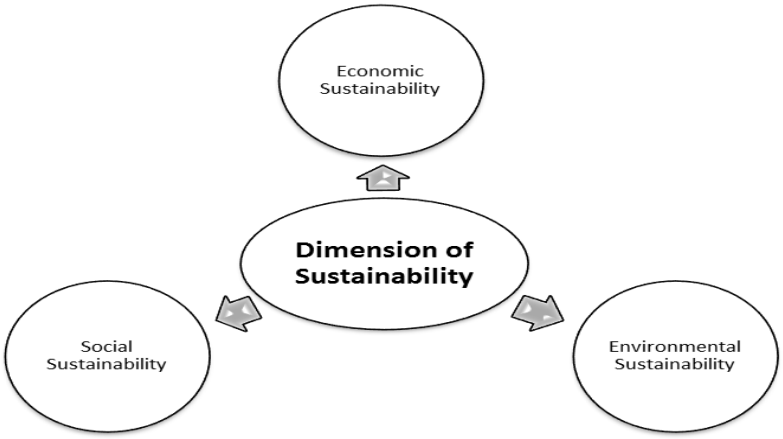
2.3. Corparate Sustainability Principles

For reveal corporate sustainability basic principle, triple bottom line includes planet, human and modelling which is developed by Elkington, should take care. thanks to "Triple Bottom Line" concept, traditional accounting is enlarged as social and environmental performance include. According to this perspective, if one of them slight in three of them, it put in danger all firm's operation and future.

The aim of this is providing the benefit of all society according to the economic, environmental and social area in the long term. As Elkington mentioned that according to this model corporate sustainability include three main perspectives like economic, environmental and social sustainability (Besler, 2009: 3).

The economic, social and environmental dimension of corporate sustainability performs simultaneously with totalitarian viewpoint not prioritized. Firms which are making Companies which corporate sustainability efforts of enterprises engaged in these components complement each other and form an absolute must act at the same time conscious of the need to be considered (Hahn et al., 2014:152).

Table 2: Dimension of Sustainability



Resource: Sustainability Sizes, Besler: 2009; page: 10

2.3.1. Economic Sustainability

Economic sustainability is related with firm's finance, material or non-material capital and using of these capitals types efficiently. According to another definition, there should be harmony between economic sustainability and different types of capitals like equity, debt and financial capital, land, machine, stock and material capital, institutional reputation and technical information and there should be a protection of this harmony. Transparency is one of the most important principles for economic sustainability. Firms should protect shareholder's benefits and maintain stakeholder's economic sustainability, gain more than average profit for its stakeholders. On the other hand, it should create cash flow without crate liquidation problems (Dyllick and Hockerts, 2002: 132-133). The aim of the firm that gives an importance of economic sustainability should not be reaching endless profit, it should be making the profit for its existence with an eye to its stakeholders. There should be developments of implementations against corruption to protect financial sustainability, and these implementations should fit with global ones (UN, 2005:.12).

2.3.2. Environmental Sustainability

The other dimension of institution sustainability is environmental sustainability. It means maintaining continuity of sustainability with natural resources. Bio-diversity, human health, the quality of air, water, land, protecting life of animals and plants should also evaluate as a subject of environmental sustainability (Kaypak, 2011: 26).

When we think environmental sustainability from this point of view, environmental institutions are the ones which degrade environmental pollution to the minimum level. They consider natural resources and their renewal capacities, their business activities that have environmentally pollution effects such as wastes and level down of gas emission (Hernadi, 2012: 25).

Suitable firms which they consume resources and produce waste/emission as much as tolerated by nature. Thereby, environmental sustainable firms do not damage to functions which provided by the ecological system (Dyllick and Hockerts, 2002: 133).

2.3.3. Social Sustainability

Social sustainability is an enhancement of human capital and social capital. Human capital is related to individual features like capability, motivation and loyalty of employers. Social capital is related with quality of education system, supporting public services such as infrastructure and entrepreneurship. In the light of this view, companies which indicated as social suitable firms, improve their stakeholder's capital. They also determine socially targets which cause an improvement of social capital. Stakeholders' who belongs to social sustainability firms enable to understand the goal of companies and they will create a harmony with their company's value system (Dyllick and Hockerts, 2002: 134). This will increase company's social acceptability and their legality. In the social dimension of institutional sustainability occur from series of principles like civil liberties, labor satisfaction etc.

2.4. The Report Of Corporate Sustainability

The report of institution sustainability includes of financial and not financial information, which includes economic, environmental and social aspect related with and without shareholders (Thompson and Zakaria, 2004: 126).

It is a declaration that includes the truthful and accessible table about economic, environmental and social components about companies that have an aim of making profit and non- profit. Published reports add a long-term perspective and provide a risk management to the company. Moreover, published reports are added value to company (Schaltegger et al., 2006:7).

Corporate sustainability reports affect many stakeholders from many different parts of society. Because of that, the information shared in the report presented within the framework of its financial statements to users of financial statements. Worldwide standards about sustainability reporting are prepared by Global Reporting Initiative (GRI), which founded in 1997. GRI has been created to support the implementation of the identical table about sustainability reporting in a wide range and constitute sustainability reporting framework (https://www.globalreporting.org).

Sustainability reports, which is prepared suitably according to GRI Reporting Framework, shows results of the promises they made to the company as of the reporting period, strategy, objectives and management of the sustainability approach.

Sustainability reports can be used for following purposes:

- Comparison of sustainability performance with laws, rules, codes, performance standards and voluntary,
- What are the effects of the company's corporate sustainable development and the response of business expectations against it
- Comparison of performances between current period and prior periods and comparison of the change over time in different businesses (Schaltegger et al., 2006:10).

Sustainability reports with GRI reporting framework are made globally comparable, consistent, reliable statements in accordance with established standards.

Table 3: GRI Reporting Framework

Resource : (GRI, https://www.globalreporting.org)

As shown in Table 3, GRI reporting framework consists of two main parts. (Global Reporting Initiative Reporting Guidelines) These parts are related to how reporting will happen and what will happen in the reporting process. The necessity of reporting consists of principles rules, established guidelines and protocols. The headline of what to report occurs from standard explanations and appendix of the sector. (GRI, https://www.globalreporting.org)

Table 4: GRI Reporting Principle

Principle of Reporting Related to Context
•Subject Prioritization •Participation of Sharer •Frame of Sustainability •İntegrity
Principle of Reporting Related to Maintain to Quality
•Balance •Comparability •Accuracy •İnstantaneity •Disclosure •Reliability

Resource: (GRI, https://www.globalreporting.org)

The first principle of the reporting principles is the content for prioritization. As a required of this principle, firms should report primary issues that affect most of the business. The second principle explains stakeholder participation and company's communication mechanism with stakeholders. The third principle emphasized the need to share of company performance in a comprehensive sustainability framework. The last principle is about the necessity of an establishment of a balanced relationship between other three principles.

The first of the principle is the balance for providing quality. This principle indicates all factors, which affect business positively/negatively performance, should reflect. The principle of comparability gives the opportunity to the analysis of the changes that occur over the years and allows for mutual analysis between the others company. The third principle remark information stated in the report should be correct and have sufficient detail. The principle of timeliness indicates that reports should be submitted in time to take conscious decisions and adhere to the schedule neatly. Openness principle is emphasized information contained in the report should be understandable and accessible for all stakeholders. the principle of credibility explains the information using report, should be collected information which van be subject to review quality way, record this way and explain it.

2.5. Sustainability Reporting Benefits Corporate

Firms should develop the sustainability strategy for business survive in today world that lives globalization. In this way, they provide a sustainable competitive advantage over its competitors and exacerbated competing forces via cater to all segments of society. Business strengthened thanks to reputation in the eyes of society via performing of social responsibility activities and the idea that is "Yes, an entity acting for society" (Coşkun, 2014: 16).

Corporate sustainability should not be regarded activities as increasing the cost activities. On the contrary, thanks to it, costs fail, as well as allow continuing to strengthen the financial profitability of view (Høgevold and Svensson, 2012: 144).

Also, the reason of a variety of business regulation, be subject to independent audit, be exist, internal control departments, increased the reliability of financial report but due to the technical information and complexity of the report, readers of financial statements has become difficult (Eccles, 2010: 58). Sustainability reports are more understandable by stakeholders because it does not consist of only numbers.

According to the results of researches, companies which have high sustainability performance leading to others to providing funds. The following table describes the possible reasons for this; contacting the first source of accurate information between companies and investors, information asymmetry is prevented (Eccles, 2010: 36) So, investors provide financing thanks to the prudential information in the sustainability report.

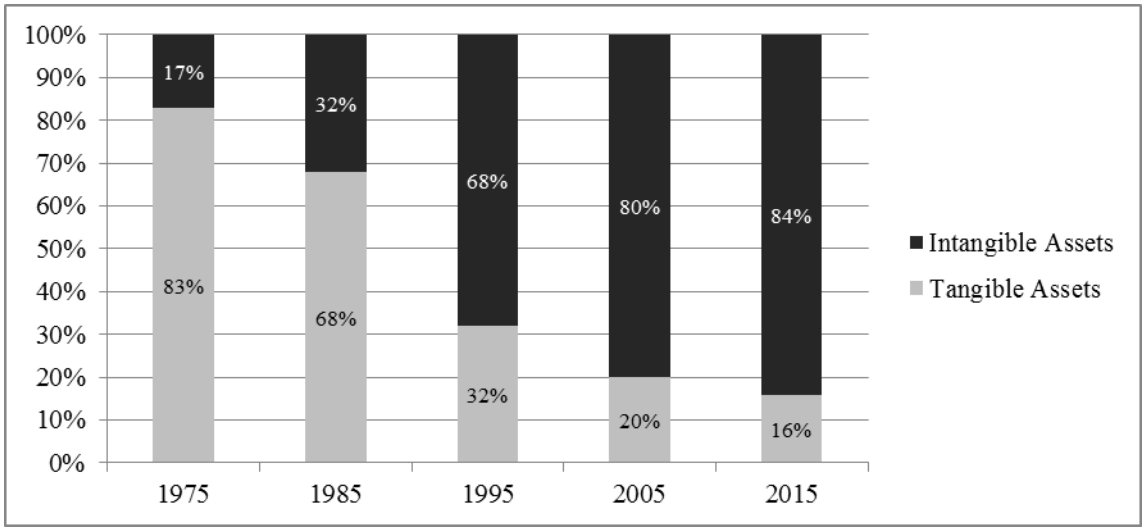
Businesses preparing sustainability reporting can make their marketing position more powerful because when they prepared the report, they have opportunity for seeing long-term

risks, the opportunities, they can determine companies positive and negative action establishing and they can focus areas need to be developed. According to this determination, the company develops a long-term management strategy. Also, establish the link between financial and non-financial performance and provide more reliable information to stakeholders. (https://www.globalreporting.org)

In addition, companies express that they gain competitive advantages thanks to taking as the only aim of sustainability and endeavor about this., so,they create models, products, technologies, processes and innovation (Wilson, 2008). In the light of this information, companies that provide corporate sustainability not only gain competitive advantage but also they can further strengthen their image and reputation (Coşkun, 2015: 20)

Today, one of the major factors effects of financial statements' reader decision is "intangible assets". As shown in Table 4, based on research conducted in 2015 by Ocean Tomo, 84% of market value of the company consists of intangible assets.

Table 6: 500 Company Market Value Components



Resources: (http://www.oceantomo.com/2015/03/04/2015-intangible-asset-market-value-study/)

While detailed descriptions of places associated with the assets of the company in financial reports; this is insufficient to reflect the true value of the company because it is not enough place in the report for an intangible asset which calculated the value but has a great importance for the company (Eccles, 2010: 8).

Today, the reason of there are no any information about past performance, there is no any reflection about competitions, risks and opportunities in the markets which companies belong, financial reporting remains incomplete. Events that occur any place in the world can create risks and opportunities for companies. The reason of the reflection of companies to these risks and opportunities affect the financial data, investors claimed to inform from companies about this (Perrin, 2005: 610).

Besides, being questioned by stakeholders how the profitability of the acquired company. It is observed from researched done above consumer that, more than fifty percent of consumers agreed to have sustainable production buying more than the others. (Nielson, Doing Well by Doing Good, 2014) and companies reporting social environmental and economic impacts when they continued operations with transparent statements make a positive contribution in terms of reputation management provide (Perrin, 2005: 612).

Outside shareholders is responsible to act within the framework of corporate sustainability of a company by accepting the responsibility towards other stakeholders "accountability" of the concept within the framework of social and environmental performance into account the necessity of giving ground reporting malleability and reporting on sustainability as a means of communicating with stakeholders plays an important role (Eccles, 2010:8). A part of the National Grid Carbon Clarity Project constitute Supply Chain program. Cadbury, Dell, National Grid and PepsiCo companies are the ones of the participation of this project. According to this program, analyzing the supply chain and makes sure the suppliers make sustainable production. Almost 56% of the test members have stated that they will continue their relationship with suppliers are adapting to carbon Hunger Project (Deloitte Center for Energy Solutions:4).

Companies ensure the formation of the organization being high-quality workforce by consists of quality and attracted the interest of the young labor force via sustainability report describing the objectives and activities. According to "Global Survey on Corporate Social Responsibility" survey conducted by the Nielson Company, the participation of 67% of respondents in socially responsible companies. In addition, companies that work in an area of sustainability have a significant role under thirty age work preferences to his in performance. It is stated that the significant and increasing employee commitment and satisfaction of employees in the companies included in our social responsibility activities (Nielson, Doing Well by Doing Good, 2014:16). According to a survey of PwC conducted in 2014, companies that create positive value and have a purpose are preferred by new generations (PwC Next Generation Diversity:5).

3. RELATIONSHIP BETWEEN SUSTAINABILITY AND ENERGY

The main agenda topic of world sustainable development summit in 2002 is global warming and greenhouse gas production. 80 % of greenhouse gasses in the atmosphere appear because of energy production and consumption. Based on this data, the sustainable development of renewable energy is an integral part of the reveal (Seyidoğlu 2013:25).

With the development of sustainability awareness in people's choices, it would be preferable for the residential houses or have worked in the office of the environmentally friendly green certificates is foreseen. Recognizing the importance of low carbon energy companies, portfolio investments have begun to intensify work in this direction to shape on renewable energy (Fortune 2011:115).

At the same time, for companies contribute to a low carbon economy, explain how much carbon emissions every year will be as important as profit/loss digit, so people want to make sure use clear energy. Zorlu Energy which is believed that future is in the low carbon economy, so they give ground on energy investments more than the average of Turkey and, more importantly, it is the first energy company involved Carbon Disclosure Project from Turkey in answers 41% of their portfolio renewable energy production. The reason for this is aware that the energy sector is the most important input cost of production and to answer customers who want to sustainable production. Renewable energy is one of the key sectors to support the sustainable development of Turkey (Fortune 2011:116).

These days, the location of the development movement turned into sustainable, there is important the relationship between renewable energy and development. In recent history observed that environment and energy efficiency come to the foreground as well as renewable energy (Dinçer and Aslan, 2008: 25). Using non-renewable energy sources (coal, oil, natural gas, etc.) because negative consequences such as environmental pollution and climate change in terms of economy, social and environmental factors. Renewable energy is the same energy source may be present in the next short period (Aykal et al., 2009). Renewable energy is to support the sustainable development of Turkey and will play a key role in the transition to a low carbon economy sectors. Energy companies, which are the main input of manufacturing, should be a leader in sustainability activities. Energy production from renewable sources removes the economy and environmental effect of production from fossil resources and make easy to reach green energy (Dinçer and Aslan, 2008: 25).

Energy is important in the world agenda because of two reasons: One of them is the lack of energy sources and the other is environmental damage which is given by conversion technology. Green energy is expected to play an important role in the future of sustainable energy production. Another important factor that will determine the role of renewable energy and technology will increase energy demand. (Midilli et al 2005, 256). Population growth and our energy needs due to economic growth will be every day is increasing, which is never infinite resources Given that always increases will not be sufficient and environmental pollution From this cause and inevitable to address the environmental impact of non-renewable energy sources (Seyidoğlu 2013:24).

The use of renewable energy sources has increased rapidly in recent years. In the coming period, it is expected to continue this trend accelerate. Investment of renewable energy sources and biofuels for electricity generation and heating increased. After all, when it excluded classical biomass, renewable energy still have a low share. Resources in 2006 give respond 7% of demand. The production of electricity from renewable sources constitute 18% portion (lEA 2008,:160).

4. MEASURE OF ENERGY COMPANIES OF TOPSIS METHOD BASED ON SUSTAINABILITY CONTRIBUTION

In this part of the study, using TOPSIS method to measure the contribution to the sustainability of analysis for the energy in Turkey.

4.1. Topsis Method

TOPSIS (Technique for Order Preference by Similarity to Ideal Solutions)which is a multi-criteria decision method introduced in 1981. In calculation aim based on specific criteria from among the options and between the ideal solution based on the minimum and maximum values in the calculation. The advantages aspect of this method is that consider very limited subjectivity. The only subjective method is the weights given to the criteria (Janicki 2003, s.503). The system works 7 steps. It is possible to explain these steps as follows (Feng ve Wang 200:.465-466).

Step 1 : Creating a Decision Matrix

The first stage of the method preparing matrix called initiating matrix or decision matrix. In the line of matrix take a place of subject to the decision, the columns will be used in the evaluation included in the decision point.

Table 9: Decision Matrix

	w_1	w_2	...	w_j		w_n
	c_1	c_2	...	c_j	...	c_n
A_1	x_{11}	x_{12}	...	x_{1j}	...	x_{1n}
...	...	...	...	...	...	...
A_i	x_{i1}	x_{i2}	...	x_{ij}	...	x_{in}
...	...	...	...	...	...	...
A_{m1}	x_{m1}	x_{m2}	...	x_{mj}	...	x_{mj}

According to this matrix, it is clearly seen, there are m decision points and n decision points.

Step 2 : Normalization of Criteria Value

Apply Eq(1) data located in the decision matrix. Criteria based on the sum of the square root decision matrix R is obtained.

$$r_{ij} = \frac{X_{ij}}{\sqrt{\sum_{i=1}^{m} X_{ij}^2}} \quad i=1,.....,m;\ j=1,.....,n \qquad (1)$$

R matrix obtains as table (2),

$$R_{ij} = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix} \quad (2)$$

Step 3 : Normalization of Weight Value

Evaluate of factors related to the weighted values for each criterion multiple by weight. For do that used Eq(3).

$$v_{ij} = w_{ij} \cdot r_{ir} \qquad \text{i=1,.....,m; j=1,.....,n} \quad (3)$$

After that the component of R matris column multiple with v_{ij} and this created V matrix.

The related matrix obtains by the help of equation of (4).

$$v_{ij} = \begin{bmatrix} w_1 r_{11} & w_2 r_{12} & \dots & w_n r_{1n} \\ w_1 r_{21} & w_2 r_{22} & \dots & w_n r_{2n} \\ . & & & . \\ . & & & . \\ . & & & . \\ w_1 r_{m1} & w_2 r_{m2} & \dots & w_n r_{mn} \end{bmatrix} \quad (4)$$

Step 4 : Prepare İdeal Positive (A+) and İdeal Negative (A-) Solution

The largest positive V matrix is located in the ideal assessment criteria (5), the smallest of the ideal negative evaluation criteria (6) is determined

$$A^+ = \left\{ \left(\max_i v_{ij} \middle| j \in J \right), \left(\min_i v_{ij} \middle| j \in J' \right) i = 1,2,...,m \right\} = \left\{ A_1^+, A_2^+, ..., A_j^+, ..., A_k^+ \right\} \quad (5)$$

$$A^- = \left\{ \left(\min_i v_{ij} \middle| j \in J \right), \left(\max_i v_{ij} \middle| j \in J' \right) i = 1,2,...,m \right\} = \left\{ A_1^-, A_2^-, ..., A_j^-, ..., A_k^- \right\} \quad (6)$$

Step 5 : Calculating Alternate Between Discrimination Measures

After determining the ideal point, of maximum and minimum values from the ideal point (7) is calculated separately for each of the equation.

$$S_i^+ = \sqrt{\sum_{j=1}^{k} \left(v_{ij} - A_j^+ \right)^2} \quad \text{ve} \quad S_i^- = \sqrt{\sum_{j=1}^{k} \left(v_{ij} - A_j^- \right)^2} \quad (7)$$

Step 6 : Calculated Relative Proximity of Ideal Positive Solution

When calculated relative closeness (C_i^*) , benefit from alternative ideal positive and ideal negative. The positive ideal solution will be calculated the equation of (8).

$$C_i^* = \frac{S_i^-}{S_i^+ + S_i^-} \quad 0 < C_i^* < 1 \qquad (8)$$

Relative closeness value takes a between one and zero. When value gets close of zero, it is showed the absolute closeness of negative ideal solution, and closeness of one indicate proximity to the positive ideal solution.

Step 7 : Making Rankings

In the final step, according to (C_i^*) value, results order smaller to higher compared to the value and making the choice among alternatives.

4.2. Implementation

4.2.1. The Aim of Implementation

The aim of the study made of a sequence of companies, which is in the energy sector of the stock exchange in Istanbul based on performance indicators of the sustainability report in 2013 using TOPSIS method. The reason of ease of implementation and reliability, TOPSIS method preferred. The results were interpreted in terms of sustainable development of energy in Turkey.

4.2.2. Implementation Data Set

4.2.2.1. Companies Include in The Research

The scope of research at the Istanbul Stock Exchange ' will be four companies. The entity is included in Table 5.2.1 below.The scope of research, Istanbul Stock Exchange published sustainability report of the firms which is operating in the energy sector in 2014 accordance with the GRI index.

Table 10: Companies include in the research

	Share Name	**Company Name**
	AKENR	Akenerji Electric Production
	AYGAZ	Aygaz A.Ş.
	TUPRS	Turkey Petrol Refineries
	ZOREN	Zorlu Energy-Electric Production

4.2.2.2. Performance Data Of Companies Include In The Research

The amount of renewable energy produced, investment environment, recycling and the amount of CO2 emissions selected as indicators of sustainability performance of businesses taking the place of Table- 11 which located GRI database sustainability report 2013. In this context, performance data for choosing analysis of businesses are located in Table 11.

Table 11: The Environmental Data of Companies Including the Research

Firm's	Production Renewable Energy (MW)	Environmental Investment (Million)	The Amount of Recycling (Ton)	CO2 Emission (Ton)
Aygaz	--	4,00	12.767	152
Akenerji	387,6	--	--	271
Tüpraş	--	186,00	38.652,00	126
Zorlu Energy	465,60	0,97	10.589,00	12.684

4.2.3. Implementation Of Topsis Method To Data

4.2.3.1. Creating A Decision Matrix

The first stage of the method, determination of decision points and evaluation criteria. In the research Aygaz, Akenerji, Tupras and Zorlu which are prepared sustainability reporting and located in Istanbul Stock Exchange. The decision point determined as 4 units in taking base sustainability assessment criteria.

Tablo 12 : Decision Matrix of 2013

Firms	1	2	3	4
Aygaz	--	4,00	12.767	152
Akenerji	387,6	--	--	271
Tüpraş	--	186,00	38.652,00	126
Zorlu Enerji	465,60	0,97	10.589,00	12.684

Table 12 shows the decision matrix belongs to 2013. In decision matrix, line indicates that decision points which want to compare and columns indicate the evaluation factors. The calculation in the matrix based on environmental performance indicators which are calculated before and published in the sustainability report.

4.2.3.2. Criteria Value Of Normalization

In the second stage of TOPSIS is normalization of decision-making is the director. When to applying formula (1) of data in Table 12, we can get Table 13 values.

Table 13: Normalized Decision Matrix of 2013

Firm's	1	2	3	4
Aygaz	0,0000	0,0215	0,3035	0,0120
Akenerji	0,6398	0,0000	0,0000	0,0213
Tüpraş	0,0000	0,9998	0,9190	0,0100
Zorlu Enerji	0,7685	0,0052	0,2518	0,9997

In Table 13 located 2013's normalized matrix of companies involved the research. The data can be seen in Table 13 is obtained by dividing the sum of squares of the column values in each column. In the TOPSIS method exceed the values in each of the normalized decision matrix delivery milk at the bottom of the total matrix.

4.2.3.3. Normalization Of The Weight Value

There are three stages to create standard decision matrix. In the first step to do that calculated weight value as shown in Table 14. For to this calculation formula (2) used.

The value in Table 14 is calculated as a proportion of the total of the other columns

Table 14: Weight Value

1	**2**	**3**	**4**
0,4	0,2	0,2	0,2

In Tablo 15 consist of weight standard matrix, which is prepared taking care of data belongs to firms which indicate Tablo 12 in 2013. Table 15 create via multiple all the elements of Table 13 with elements of Table 14.

Table 15 : Weight Standart Matrix of 2013

Firm's	1	2	3	4
Aygaz	0,0000	0,0043	0,0607	0,0024
Akenerji	0,2559	0,0000	0,0000	0,0043
Tüpraş	0,0000	0,2000	0,1838	0,0020
Zorlu Enerji	0,3074	0,0010	0,0504	0,1999

4.2.3.4. Prepare Solution Of Ideal Positive (A+) With Ideal Negative (A-)

The next stage of TOPSIS method is create solution set consists an ideal positive (A+) and negative ideal (A-) which is located in Table 16. Elements of the new table contain determining maximum and minimum values in our standard decision pillars.

Table 16: Solution Set of 2013 Positive İdeal (A+) with Negative İdeal

	Aygaz	Akenerji	Tüpraş	Zorlu Enerji
Min	0,0000	0,0000	0,0000	0,0020
Max	0,1838	0,2000	0,3074	0,1999

4.2.3.5. Calculating Alternatives Between Discrimation Measure

The next stage of TOPSIS method is calculate the distance which is indicated by the letter's'. The values shown in Table 16, calculated as determine maximum and minimum points which are the same taking difference between the values given in Table 17 and taking the square root of the sum.

Table 17: Distance between Alternative in 2013

	S*	**S-**
Aygaz	0,4324	0,0609
Akenerji	0,3387	0,2559
Tüpraş	0,3656	0,2716
Zorlu	0,2395	0,3691

4.2.3.6. Calculating Of Relative Proximity According To Ideal Positive Solution

The sixth stage of TOPSIS method is calculated of how close it is to find the place to each alternative of making ideal. The result located in Table 18 obtaining using Formula (5).

Tablo 18: Proximity Relative Value of Ideal Solution in 2013

	C*
Aygaz	0,123388
Akenerji	0,43042
Tüpraş	0,426208
Zorlu	0,606441

4.2.3.7. The Structure of Order

When data include research which located in Table 18 order from smaller to bigger according to c* value, can reach the ranking like that Zorlu - Akenerji - Tüpraş- Aygaz. This research based on environmental performance evaluation of 2014. Zorlu has higher value with 0,606 point. Akenergy is the second firm with 0,430 points, Tupras is third firm with 0,426 points and Aygaz is last company with 0,123 points.

4.3. Result of Implementation

In this work include enviromental performance evaluation of 4 chosen companies taking care of the sustainability report data published in 2013. The value of production of renewable energy, environmental investments, in the amount of recycling and CO2 emissions reduction chosen as determining a factor for firms including research. In the end of this research, these criteria express as a single number using TOPSİS method for four companies.In the end of the study, the conclusion can be reaching is that Zorlu Energy is take the highest number with point 0.606 thanks to renewable energy investment and giving importance sustainability. The 0.443 points differences between Aygaz which has a lowest performance with 0.123 point and Zorlu has a serious importance. The main activity of Aygaz Anonim company's is production and distribution of LPG. It has done some many work about sustainability but these are seems not enough. It should take precaution for minimize business activities negativity effect of firms.

5. CONCLUSION

In today's business, thinking the companies effect on economy,society and environmental is independent, it is not possible. Financial reporting, corporate social responsibility and sustainability reports use to measure the impact on economy, society and the environment. Controlled and reporting of these data are important because the effect which is created by companies on environmental has a role of determination approach of companies.

Companies that publish sustainability report can use their own source efficiently, and they can manage their risk more properly, so their ability of competitiveness improve. Companies give an opportunity to reach more understandable information for their stakeholders.

The reason of sustainability has an importance, when companies built their production and service line; they have to take care of this based. The energy of companies aiming sustainability using should be sustainable because first inputs are energy. In this respect, it is unthinkable that working energy policy and sustainability not together in companies.

When evaluate sustainable energy on a county basis, result of appear in the framework of Trilemma Energy İndex, sustainable world and production sustainable energy is possible

by reducing dependence on foreign sources of energy diversification, domestic and renewable source of evaluating private sector investment planning approach to these resources with the appropriate public policies based on the production.

In the final part of study, companies working on Turkey and published sustainability report examine according to various criteria for measure contribution the sustainability of the private sector and it was found that most contributors business was Zorlu Energy. It has a sustainability strategy and realizes the importance of renewable energy and sustainability while pursuing to be a leader in this area.

There is a necessary cooperation and contribution between the energy sector and business world so aim profit for the sustainable and more livable world including social and community development via applying business models, which involve this perspective.

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