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Le Thanh Tiep; Ngo Quang Huan; Tran Thi Thuy Hong

## Article

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## Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics

Düsternbrooker Weg 120

24105 Kiel (Germany)

E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)

<https://www.zbw.eu/econis-archiv/>

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## **Role of Corporate Social Responsibility in Sustainable Energy Development in Emerging Economy**

**Le Thanh Tiep<sup>1\*</sup>, Ngo Quang Huan<sup>2</sup>, Tran Thi Thuy Hong<sup>3</sup>**

<sup>1</sup>Ho Chi Minh City University of Economics and Finance, Vietnam, <sup>2</sup>University of Economics Ho Chi Minh City, Vietnam,

<sup>3</sup>International School of Business, University of Economics Ho Chi Minh City, Vietnam. \*Email: [tielpt@uef.edu.vn](mailto:tielpt@uef.edu.vn)

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### **ABSTRACT**

This research aims to evaluate the impact of corporate social responsibility (CSR) on sustainable energy development (SED) by developing the role of mediating variables such as usage of renewable energy resources (URR) and sustainable energy supply (SES). We use qualitative and quantitative technique such as Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the data of collection from experts, economists, executives in Vietnam in 2020. The study has proved the corporate social responsibility (CSR) affecting directly to the sustainable energy development (SED). Besides, the findings suggest a positively significant impact of both sustaining energy supply (SES) and the usage of renewable energy resources (URR) on sustainable energy development (SED). Thus, the research brings the whole view of corporate social responsibility affects to the sustainable energy development (SED) through the URR and SES. This study contributed empirical work in the literature of corporate social responsibility, renewable energy, sustainable energy supply (SES) and sustainable energy development (SED). The outcomes of this study can be used by policy makers, economists, top management in the governmental office and even the corporate. A mediating role of SES as a value-added contribution to this study and can be consolidated and strengthened more in coming research.

**Keywords:** Corporate Social Responsibility, Renewable Energy, Sustainable Energy Development, Renewable Energy Resources, Sustaining Energy Supply

**JEL Classifications:** M14, Q21, Q25, Q43, Q56

### **1. INTRODUCTION**

Corporate social responsibility (CSR) and sustainable development are general terms which are concerned more and more by economists, entrepreneurs and economical-related policy makers over the world. In recent years, organizations and business community have come to realize that they are responsible for the environment and the communities in which they operate, placing more responsibility than just making profits for their shareholders as before. This growing awareness in the entrepreneurial community leads to an increased concept of corporate social responsibility (CSR) in relation to importance and meaning (Carroll and Shabana, 2010). Enterprise is considered as a cell of society and is one of the most powerful forces of change possibility

in the 21<sup>st</sup> century, however, one of the major challenges facing business today is determination of their potentials for changing and precisely allocating resources where they will be most effective and make the biggest difference (Carroll and Shabana, 2010). McGuire et al. (1988) analyzed fortune 500 companies and found that companies with no social responsibility are often unable to execute their strategies effectively and stock value will hardly increase up. On the other hand, socially responsible businesses often interact well with customers, shareholders and communities, whereby they can reduce business risk and improve their credit to customers. As a result, customers will continue to support those businesses, meanwhile, easily to accept new products or services that created by those businesses. This will help those businesses to stay sustainable and competitive. As Porter et al.

(2011) pointed out that, if a corporation succeeds in achieving both economic and social goals at the same time, it will gain a competitive advantage compared to the competitors. A good strategy, advanced technology and innovation are considered important factors to enhance competitiveness of organization, however putting ethics and responsibility into action is same priority in relation to enhancement of competitive advantage of enterprise. By applying CSR in practice, a corporation not only assures its obligations and responsibilities towards society and the environment, but also, according to relevant strategic studies, enhances its competitive advantage and sustainable development.

Additionally, according to Wani and Mir (2015), “Energy is the engine of economic growth, as all production and consumption activities involve energy as basic input. It is considered to be the crucial element in the socioeconomic development of a country as it helps to improve the living standards of the society through the increase in economic growth.” Accordingly, on the production side point of view, energy is considered as important as other input factors of economic activities such as labor, capital and land while on the consumption point of view, energy consumption and income has a significant correlation or in other words, any forms of energy consumption can drive economic productivity. Those lead to economic growth and prosperity that drive enhancement of gross domestic product (GDP) and GDP per capita. However, economic growth and prosperity should not simply rely on the energy input availability but how energy be utilized. In the current global competition, it matters that resources are efficiently used, same true for energy input. Sustainable energy is energy that is consumed in a negligible proportion to its supply and with manageable side effects, especially environmental impacts. Sustainable energy is an energy system that serves the needs of the present without harming the needs of future generations. This key principle for sustainability is sustainable development, which encompasses four interconnected areas such as ecology, economy, politics and culture. Sustainable energy development aims to advance economic development, improve energy security, improve access to energy, and mitigate climate change. The major sources of sustainable energy are renewable such as hydroelectricity, solar energy, wind energy, wave energy, geothermal energy, bioenergy, tidal energy. To that effect, promoting the use of renewable energy and ensuring access to affordable, reliable, sustainable, and modern energy for citizens enable driving sustainable development (Rajesh and Majid, 2020). In addition, according to REN21 (2019), renewable energy is determined as a source of energy which is not exhausted by use. Sources of renewable energy typically include wind, solar, water, biomass and geothermal heat. As a result, “Renewable energy plays a significant role in sustainable and inclusive economic growth.”

According to Vietnam Business Council for Sustainable Development (2020), numerous countries have recently realized that the present development paradigm is not sustainable from an environmental and energy point of view. The growing awareness of the population regarding environmental issues is pushing governments worldwide more and more to promote policies aiming at limiting harmful effects of human development. In particular, the rapid increase of the global temperature, especially

in the polar region, and the management of human wastes, mainly plastic in seas, are some of the main points to be addressed by these novel policies. Several actions must be implemented in order to limit such issues. As a forecast by Vietnam Business Council for Sustainable Development (2020), the world will face the risk of serious energy shortages by 2030 and need about 10.5 trillion euros of investment in this industry. Therefore, it is extremely important to efficiently use energy and environment friendly to ensure energy security and sustainable development. However, doing this is not easy. With the current rate of energy consumption, the world’s traditional energy sources are predicted to be quickly depleted. According to forecasts, by 2035 global energy consumption will increase by 53%, and businesses around the world are constantly researching to find clean energy sources. Also according to the APEC report, if the energy consumption intensity is not reduced, energy demand in the region will increase equivalently to economic growth, about 225% until 2035.

In addition, nowadays, the habit of using fossil fuels has increased environmental concerns. The burning of fossil fuels generates about 21.3 billion tons of carbon dioxide annually. Carbon dioxide is one of the greenhouse gases that increase radioactivity and contribute to global warming, causing the average surface temperature of the earth to rise. The world is moving towards using renewable energy sources as one of the ways to help solve the problem of increasing energy demand and environmental related problems (Steve, 2011). In addition, a study of more than 190 countries shows that Vietnam ranks 23<sup>rd</sup> among the most vulnerable economies to climate change. This shows the negative impact that environmental problems can have on low-income people and their livelihoods. The current imbalance between energy supply and demand is a direct threat to the economy and society. However, Vietnam has abundant renewable energy sources such as bioenergy, hydropower, solar energy, wind or geothermal energy and so on which can be transformed into the sustainable energy supply to meet the increased demand of energy for economic growth and life qualification. However, along with potentials of sustainable energy development and increased demand of energy, still exist numerous challenges that energy companies are facing in relation to finance capacity, lack of synchronous alignment, technology, infrastructure, governmental policy and mechanism. These challenges need motivation to be properly addressed so it’s necessary to discover that dynamic as a catalyst for driving these challenges (Industry and Trade Magazine, 2020). Energy industry and energy related industries are known sensitive in relation security, economy, environment and society. Weder et al. (2019) implied that most companies those are operating in the energy industry and energy-related industries still struggling in finding ways to deal with sustainable development goals while stay friendly to environment. In addition, most of them have perception of CSR differently in relation to the practical significance of CSR and how it’s correlated to the sustainable development in relation to demand and supply points of view. Consequently, degrees of attention and intensity vary, most companies are struggling in linking CSR to their core business.

Additionally, REN21 (2019) reported that the global energy demand trend has been moving from fossil fuel-dependent base

to renewable resources. The problem now is the speed and ability of energy providers to respond to this change to succeed and be competitive. Thus, a depth and consistent perception and the speed of this conversion is set to the high priority level for global sustainable development of socioeconomy and environment. Accordingly, restructuring of global energy by increasing the transition to renewable energy is an urgent requirement for every country in relation to the mission to protect the environment, reduce emissions into the atmosphere and reduce global warming. Therefore, a comprehensive understanding of the CSR related driving factors for increasing in the use of renewable energy resources and its impact on sustainable energy supply and sustainable development is critical for the relevant stakeholders such as policymakers, innovators, project developers, investors, industries, associated stakeholders and departments, researchers, and scientists for the proper strategic actions in the future. This paper aims to contribute to the existing literature in relation to the impacts of CSR on transformation process of renewable energy supply and demand and the roles renewable energy to the socioeconomic growth and sustainable development in emerging country like Vietnam.

This study is subjected with the research questions included (1) *“How do the existing energy companies perceive of CSR in Vietnam context?”* (2) *“How do the existing energy companies perform CSR in Vietnam context?”* (3) *“How does CSR performance of the existing energy companies impact on the transformation process of sustainable energy in Vietnam?”* and (4) *“How sustainable energy development be achieved in Vietnam context?”*

This study is structured with abstract as the beginning part, followed by introduction. The main body of this study includes different sections presented in order such as literature review, research model and hypothesis, research methodology, results and discussion, conclusion. The last part is the references.

## 2. LITERATURE REVIEW

### 2.1. Co-operate Social Responsibility (CSR)

The concept of CSR varies from different perceptions, different approaches and in different contexts. Andronie et al. (2019) defined that “corporate social responsibility is a mean for companies to voluntarily integrate social and environmental responsibility into their business plan and relationship with stakeholders in society.” While Márquez and Pérez (2015) determined that CSR is an important supportive tool in promoting environmental sustainability by improving the perception of a company in terms of CSR practical significance and improving the behavior of a company to adapt effectively to the socioeconomic context of the country and of the region to ensure environmental sustainability and sustainable socioeconomic development. In addition, Lloyd (2018), “business has a unique role to serve social needs in that they utilize a large portion of resources (environmental, human capital, financial). As such businesses are expected to responsibly process resources in a way that does not harm society. This means that they make explicit considerations for their work force, political environment, physical environment, special interest groups, the rights of citizens, and consumers.”

Furthermore, according to Weder et al. (2019), on the practical point of view, CSR concept is differently determined and perceived by different global energy companies regardless of size and market position (Wicks, 2001). Those are some cases of large energy supply companies operating at the international scale whose perceptions of CSR is headed on their own view and that effect their strategic CSR activities and their ways of implementation of CSR activities such as RWE whose perception of CSR as “responsibility” (RWE, 2018); EON whom perceives CSR concept as “sustainability” (EON, 2018); Gazprom which employs the terms “environment and social responsibility” for CSR strategic activities (Gazprom, 2018b); ENEL whose operation is governed by the four core principal based which are “responsibility, innovation, trust and proactivity” (ENEL, 2016) and its CSR activities are governed by the terms “sustainability” (ENEL, 2018); AEP with CSR activities are obviously focus on environment section by spending efforts to reduce pollution and enhance energy efficiency by increasing the use of renewable sources towards “environment sustainability” (AEP Energy, 2018); Engie SA whose CSR strategy orientated as a leader in the new “low-carbon economy,” “for which it paints the future scenario of access to and security of sustainable energy as well as climate-change mitigation and adaptation” while towards diverse stakeholders such as children, employees or the society in general (Engie, 2018); KEP whereby CSR strategy towards “sustainability” which is broadly categorized into 4 divisions such as sustainability management, ethical management, environmental management and social contribution that create the company around full-circle which combines all relevant aspects of CSR in its sustainable strategy (KEP, 2018); Vattenfall with CSR strategy towards sustainability concept which is typically based on major pillars such as “sustainable energy consumption, sustainable energy production, empowered and engaged organizations, and high performing operations” (Vattenfall, 2018b); Kelag that defined its CSR strategy towards “sustainability” concept which emphasizes four areas in particular such as environment and climate protection, product and innovation, region and society, company and employees (Kelag, 2018); EVN whose CSR strategy oriented on “responsibility” concept towards employees, other stakeholders and society (EVN, 2018) and OMV with CSR strategy towards “sustainability” concept focus on its own conceptualization of sustainability as responding to society and environment related matters. This heads to stakeholder engagement, business management towards health, safety, security and environment; human rights; eco-innovation; eco efficiency; skills to succeed (OMV, 2018).

Besides that, on the researching point of view, Weder et al. (2019) found that CSR has been widely recognized and implemented by energy industry companies and energy related energy industries around the world. However, the magnitude and intensity vary from different contexts, different industries and different companies. At the company level, the varying depends on the company’s perception of CSR and company’s strategy of alignment level between corporate social responsibility and their core business operations. In many cases, companies are struggling to link their CSR projects back to their core businesses. However, the apparent politicization tendency that can be described as a close correlation between the energy providers’

communication strategies and the respective national political programs becomes obvious.

## 2.2. Increasing in the Use of Renewable Energy Resources (URR)

The concept of increase in the use of renewable energy resources is perceived as a type of transition of consumption behavior in the increasing direction from traditional energy resources such as fossil fuels to renewable energy resources such as wind, solar, biomass, water, geothermal which are regenerative and not depleted over time (REN21, 2019). Weder et al. (2019) state that energy transition is one of the key statements in most political strategies and related agendas of either national wide or regional wide not just those of the green parties. Transformation is considered an evolving process over time and characterized by structural and non-linear changes (Geels and Schot, 2010). It can be defined as a long-term transition from one economic system to another and depends on a specific set of resources (Carley et al., 2018). Changing the energy structure by increasing the use of renewable energy resources and reducing the use of non-renewable important is very important in relation to security, economy, environment and society. According to Saad and Taleb (2018), consumption of non-renewable energy resources has negative impacts on economy, environment and society in many forms. It's proved that using non-renewable energy resources will harm not only to environment, public health by pollutant emitted from burning fossil fuels but economy as costs from air emissions that lead to environment and health costs at the multilevel such as personal, local, regional, national and global. An example that showed the negative contribution at a significant level as a consequence of using non-renewable sources to environment that approximately 78 percent of the USA's emissions were energy related emissions of carbon dioxide in 2014. This causes negative impacts on the environment in general such as air pollution, land pollution, water pollution; global climate change; that destroy biological system, ecosystem, cause ecological imbalance, harm public health, social life quality and future economic sustainability (Saad and Taleb, 2018).

## 2.3. Sustaining Energy Supply (SES)

Emodi and Boo (2015) stated that "sustainable development has dramatically increased in our modern times and this raises the issues of a sustainable economic development and growth." In that process, sustainable energy plays a very important role and becomes "one of the most promising means of handling the challenges of energy demand problems of many consumers worldwide" (Hvelplund, 2006). Moreover, sustainable energy supply is a top concern in relation to energy security, energy efficiency and environment protection of countries, regions and the globe as a whole. "Energy sustainability involves the sustainable use of energy in the overall energy system which includes processes and technologies for harnessing of energy resources, their conversion to useful energy forms, energy transport and storage, and the utilization of energy to provide energy service like lighting in homes, office, streets and cooking." James et al. (2015) imply that sustainable energy supply is determined when the type of energy consumed at a negligible rate compared to its supply and at manageable side effects, especially the environmental effects. On the other hand, sustainable energy supply is defined as an

energy system that serves the needs of the present day without compromising the needs of future generations. The key principle for achieving sustainability is sustainable development which cover four interconnected areas such as ecology, economy, politics and culture (Rotmans et al., 2010). Renewable energy sources play a significant role to promote sustainable energy supply which include hydro energy, solar energy, wind energy, wave energy, geothermal energy, bioenergy, tidal energy and technologies designed to improve energy efficiency.

## 2.4. CSR and the Increasing in the Usage of Renewable Energy Resources (URR)

Lu et al. (2019) implied that the better CSR strategy and implementation by energy companies the better contribution to protect the environment by increasing in the use of renewable energy resources, reducing in the use of traditional energy resources such as fossil fuels that leads to reduce greenhouse gas emissions into the atmosphere. Besides that, according to Mezher and Tabbara (2010), as CSR performance related, innovation of energy-related products for saving energy consuming is also important as the outcome generated is not only meaningful with environment but also society and economy in terms of energy efficiency.

Based on the above reviews, hypothesis of relationship between the increasing in the use of renewable energy resources (URR) to sustainable energy supply (SES) created as follows:

H1. "CSR has positive relationship with the increase in the use of renewable energy resources (URR)"

## 2.5. CSR and Sustainable Energy Supply (SES)

Lloyd (2018) implied that CSR has been getting known more and more in the last two decades since "as a result of the plenitude of major corporate scandals from the early 2000s, increased media coverage, emphasis in business education, academic literature on the subject, self-promotion of early adopters of CSR, catastrophic environmental disasters such as Exxon Valdez and Deepwater Horizon." This leads to increasing in pressures from stakeholders of businesses such as customers, employees, investors, and social institutions within the public sector in relation to practical CSR actions and meaningful contribution to satisfy the expectations of its stakeholders by businesses. The expected practical contribution of CSR is related to sustainable energy supply to meet the growing energy demand for socioeconomic development while protecting the environment and improving the quality of social life as the growth of world populations will result in increased demand for all areas of energy. Accordingly, energy firms will have to find ways to supply this increased demand in a context where stakeholders expect that businesses do using sustainable practice (Vaona, 2016). To achieve that, Mezher and Tabbara (2010) offer ideal proven solution that improving processes to enhance efficiency and utilizing renewable resources together with taking advantage of government policy in relation to sustainable energy boosting for sustainable energy supply.

Based on the above reviews, hypothesis of relationship between CSR and sustainable energy supply (SES) created as follows:

H2. “CSR has positive relationship with sustainable energy supply (SES)”

## 2.6. Usage of Renewable Energy Resources (URR) and Sustainable Energy Supply (SES)

When applying the concept of transformation in the search of new value systems, the idea of a sustainable transformation can be helpful. Sustainable transition refers to a fundamental transition towards a sustainable society, which can lead to the restructuring of systems of production and consumption (Smith et al., 2010) and can be understood as a responsive change of contemporary problems (Grin et al., 2010). These issues manifest during crises, such as energy and climate crises, are interconnected and require a drastic transition from conventional energy to sustainable resources (International Energy Agency, 2008). The transition from using fossil fuels to renewable sources towards the goal of providing sustainable energy, it is therefore put forward with growing public concerns about energy security, energy efficiency as majority of sustainable energy supply (Philo and Happer, 2013). In addition, according to Vasile and Camelia (2015), increasing in the consumption transition from traditional energy resources like fossil fuels to renewable energy resources help to reduce environment pollution, save costs of dealing with environment and health related problems and sustain energy supply (Dawn, 2011).

Based on the above reviews, hypothesis of relationship between the increasing in the use of renewable energy resources (URR) and sustainable energy supply (SES) created as follows:

H3. “The increasing in the use of renewable energy resources (URR) has positive relationship with sustainable energy supply (SES)”

## 2.7. Sustainable Energy Development (SED)

Lu et al. (2019) defined that “sustainable energy development is one of the most important issues linked to global risks and uncertainties such as climate change, fuel poverty, hunger, and instability” and its achievement contributes to “address affordable and clean energy, industry, innovation and infrastructure, responsible consumption and production, smart cities and communities, and climate actions.” In addition, Weder et al. (2019) state that energy transition is one of the key statements in most political strategies and related agendas of either national wide or regional wide not just those of the green parties. Transformation is considered an evolving process over time and is characterized by structural and non-linear changes (Geels and Schot, 2010). It can be defined as a long-term transition from one economic system to another and depends on a specific set of resources (Carley et al., 2018). Sustainable energy development goals are set by EU’s for 2020, 2030 and 2050 as interlinked between the three major criteria include (1) enhancing energy efficiency; (2) increasing in using renewable energy sources and (3) reducing emissions; and technological innovation (Vasile and Camelia, 2014).

## 2.8. Usage of Renewable Energy Resources (URR) and Sustainable Energy Development (SED)

Sustainable development was defined as “the development that meets the needs of the present without compromising the ability

of future generation to meet their own needs” (World Commission on Environment and Development, 1987). In addition, according to Saad and Taleb (2018), replacement of using nonrenewable energy resources with renewable energy resources will help to not only sustain the energy supply, enhance the capacity of energy supply to meet the increased demand but also conserve important primary resources for sustainable energy development for the future generations while protect environment.

Based on the above reviews, hypothesis of relationship between the increasing in the use of renewable energy resources (URR) and sustainable energy development (SED) created as follows:

H4. “The increasing in the use of renewable energy resources (URR) has positive relationship with sustainable energy development (SED)”

## 2.9. Sustainable Energy Supply (SES) and Sustainable Energy Development (SED)

According to determination and arguments of Emodi and Boo (2015) and Saad and Taleb (2018), sustainable energy supply is in equation with the sustainability of use of energy in the overall energy system that involves sustainable energy resources, processes and technologies. Those together with technological innovation, variety of renewable resources, consuming access possibility and price affordability are fundamental for sustainable energy development.

Based on the above reviews, hypothesis of relationship between sustainable energy supply (SES) and sustainable energy development (SED) created as follows:

H5. “Sustainable energy supply (SES) has positive relationship with sustainable energy development (SED)”

## 2.10. CSR and Sustainable Energy Development (SED)

Márquez and Pérez (2015) determined that CSR is an important supportive tool in promoting environmental sustainability by improving the perception of a company in terms of CSR practical significance and improving the behavior of a company to adapt effectively to the socioeconomic context of the country and of the region to ensure environmental sustainability and sustainable socioeconomic development. While Lu et al. (2019) implied that corporate social responsibility helps to deal with major concerns in relation to environment, society and economy and drives for sustainable energy development due to its positive impacts on climate, environment, communities, and economy as a whole. Measuring and managing the corporate social responsibility issues that are linked to sustainable energy development can help to provide both energy industries, energy-related industries and investors a clear pathway to keep consumer costs low while shifting to new energy saving technologies and a renewable energy portfolio. In addition, according to Lu et al. (2019), sustainable energy development is influenced by CSR related “energy efficiency improvements, usage of renewable energy sources, and GHG emission reduction.”

Based on the above reviews, hypothesis of relationship between cooperate social responsibility (CSR) and sustainable energy development (SED) created as follows:

H6. “CSR has positive relationship with sustainable energy development (SED)”

Table 1 summarizes the literature which show research context, research methodology, findings and limitations.

Table 2 presents the theories that majorly related to energy efficiency and sustainable development in this research context.

### 3. RESEARCH MODEL AND HYPOTHESIS

As shown in the Table 1, studies on CSR and sustainability related were taken from different perspectives, different context and different prospect expectations. However, it mainly focused on CSR either implementation, practices or strategies and its impacts on either firm’s performance or sustainability but not a holistic model that accounts for CSR related for sustainable energy development by restructuring energy resource consumption to sustain energy supply as a holistic solution for sustainability towards society, economy and environment. In addition, there is a lack of studies for energy sector as a whole while this is considered as a leading force in the energy revolution towards a modern and sustainable energy economy especially in emerging country like Vietnam. The research model of this study is proposed as the Figure 1 based on the above literature reviews. This model used to explore the relationships between cooperate social responsibility (CSR) and sustaining energy development (SED) with the increase in the use of renewable energy resources (URR) and sustaining energy supply (SES) as meditating factors. Overall, this model consists of CSR as independent variable, URR and SES as mediators and SED as dependent variable.

The variables of this study were constructed that CSR has 8 items, URR has 5 items, SES has 5 items and SED has 4 items. In overall, this model has 1 independent variable, 2 mediating variable and 1 dependent variable and totally 22 items. Table 3 summarizes the constructs of this model.

In overall, hypotheses of this model are developed as follows:

H1. “CSR has positive relationship with the increase in the use of renewable energy resources (URR)”

H2. “CSR has positive relationship with sustainable energy supply (SES)”

H3. “The increasing in the use of renewable energy resources (URR) has positive relationship with sustainable energy supply (SES)”

H4. “The increasing in the use of renewable energy resources (URR) has positive relationship with sustainable energy development (SED)”

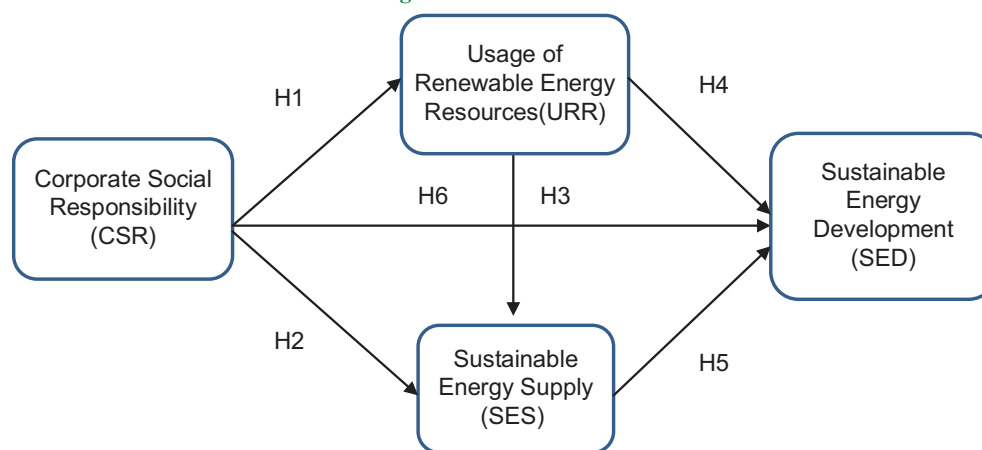
H5. “Sustainable energy supply (SES) has positive relationship with sustainable energy development (SED)”

H6. “CSR has positive relationship with sustainable energy development (SED)”

### 4. RESEARCH METHODOLOGY

The research methodology is used in this study as combination of qualitative and quantitative methods to utilize the advantages of the both research methods for the comprehensive assessment of the relationships of variables of the research model. Qualitative research method enables us to approach in-depth and detailed information about the views, visions and the relationship of CSR and sustainable energy supply (SES), increase in the use of renewable energy resources (URR) and sustainable energy development (SED). In addition, qualitative research with the form of in-depth expert interviews at face to face model that enables authors to collect different attitudes and behaviors potentially lead to the same action or a decision. Authors prepared interview questions at an open-ended mechanism to encourage interviewees to answer at the most comfortable, realistic and unrestricted way within a certain framework. The selected respondent types for interview are energy experts, economists, energy services providers, entrepreneurs and firms’ executives. There were 36 respondents participated this interview, in which, there were 10 energy experts, 10 economists, 6 founders of entrepreneurs and 10 executives. The expected outcome of this phase is the final questionnaire which is suitable with research context and ready for quantitative research performing. The questionnaire was built using 7 Likert scale point which indicates that the point range from 1 (strongly disagree) being ascending to 7 (strongly agree).

Figure 1: Research model



**Table 1: Summary of literature review**

Author	Context	Methodology	Findings	Limitations
Lu et al. (2019)	Energy utilities in Baltic states: Comparative review of CSR and sustainable energy development trends	Analyze sustainable energy development indicators and approach comparative assessment	CSR plays an important role in implementing sustainable energy development targets in the country that promote energy efficiency, increase in use of renewable energy sources and reduce GHG emission	Approach application that related to subjectivity issue of drivers, influencers for sustainable energy development which may effect on the overall result of research
Weder et al. (2019)	CSR related in terms of practices and communication: “Antagonistic framing of sustainability by energy suppliers”	Adopted a qualitative content analysis using public information. Samples included 12 case studies from selected countries which are Austria, Russia, Germany, the USA, France and Korea	It’s found that most energy companies aware of the importance of CSR to achieving sustainability, however, it’s still struggled in terms of linking CSR strategy with their core business	Data collection, research context and research method.
Krishnamurti et al. (2018)	CSR and corruption risk from a global perspective	Analyzed multinational firms for their CSR practices and internal factors, external factors that possibly impact on corruption risk	CSR has a significant role in relation to sustainable development by mitigating corruption risk	Subjects related to the research.
Lloyd (2018)	CSR and firm’s performance in energy sector	Adapted regression analysis model by using the public information of 243 energy leading companies globally	CSR significantly impact on the firm’s performance towards financial results (ROA, ROE, EBITDA)	Research context
Saad and Taleb (2018)	Renewable energy consumption and economic growth in 12 EU countries	Applied a multivariate panel vector error correction model (VECM) based on annual data which is available from 1990 to 2014 on 12 European Union countries	Economic growth and renewable energy consumption has positive mutual relationship in the long run towards sustainable development	Research context
Emodi and Boo (2015)	Sustainable energy development in Nigeria from a perspective of overcoming energy poverty	Analyzed the data of energy related in relation to energy consumption, energy generation capability, energy resource availability, etc.	Sustainable energy development is a decisive factor that helps solve energy poverty, this is especially true in the context of Nigeria	Research method and research context
Vasile and Camelia (2014)	Sustainable energy for sustainable development with empirical approach for Romania	Applied method multifactor regression analysis for a panel dataset	There is a positive significant relation between economic growth and consumption of renewable energy towards sustainable development orientation	Research method and research context
Andronie et al. (2019)	CSR implementation related and its impact on sustainability in EU countries	Applied a linear regression model to primary productions of renewable energy in the EU as well as in Romania. Data collected from Eurostat (2019) for a period of 2005 to 2018	CSR implementation positively and significantly impact on achieving sustainability towards society, environment and economy with taking benefits of all firms’ stakeholders into account and future generations	Research context and data collection method.
Dupire and M’Zali (2018)	CSR and strategic positioning concerns of firms	Applied both univariate and multivariate analyses on firm’s reports in both Compustat and KLD data from 1995 to 2009 and whose industry-level fitted HHI is available in Hoberg and Phillips’s (2010, 2011) data, using ordinary least squares (OLS) estimation	CSR positively and significantly associated with sustainability towards competition orientation	Data collection scale.
Mapelli et al. (2016)	CSR initiatives and its role on long term strategy for development in energy sector in Italy.	Conducted case study methodology concerning three Italian energy company	CSR initiatives has a positive and significant association with sustainable development especially towards market expansion in developed countries	Research context and research method.

Source: Authors’ review



**Table 2: Theories majorly related to corporate social responsibility and sustainability for this study context**

Sources	Theory	Description
Dunfee (2008)	Stakeholder theory	Managing corporate social responsibility in a multiple actor context which majorly explore the management challenges of CSR. It examines the role of the concept of stakeholders in helping managers to make discretionary allocation of spending for social responsibility
Freeman et al. (1984; 2010)	Stakeholder theory	Considering the distinction between moral goodwill and business success to be false and in vain. Instead, effective stakeholder management is a necessary strategic practice for business success as it adds value to stakeholders including shareholders and ensures long-term survival and firms' sustainability
Nelson and Winter (1973)	Evolutionary theory	This theory has great potential to study problems of energy saving and energy consumption
Aoki (1986)	Information theory of firms	Provisions on special use of different information to reduce energy dependence and enhance energy security of firms
Michael and William (1976)	Firm's managerial theory	Energy consumption and energy efficiency are areas of manager's activity and are an integral part of planning and forecasting activities
Bowen and Johnson (1953)	Corporate social responsibility (CSR)	"CSR describes the responsibilities of a firm for economic gains, society and the environment"
Steurer et al. (2005)	Sustainable development	Emphasizes the importance of meeting the needs of stakeholders of firms; and balance economic, environmental and social aspects of business operations

Source: Authors' review

**Table 3: Constructs**

Constructs	Items	Description	References
CSR	CSR1	The extent of reporting in the usage of renewables	Sartori et al., 2017; Sidhoum and Serra, 2017; Talbot and Boiral, 2018; Bahari et al., 2016; Camargos et al., 2014; Kraft et al., 2018; Traxler and Greiling, 2019; Vasile and Camelia, 2014
	CSR2	The extent of reporting in the reduction of greenhouse gas emissions	
	CSR3	The quality of reporting in the usage of renewables	
	CSR4	The quality of reporting in the reduction of greenhouse gas emissions	
	CSR5	Results achieved in the usage of renewables	
	CSR6	Results achieved in the reduction of greenhouse gas emissions	
	CSR7	Actions planned in the increased usage of renewables	
	CSR8	Actions planned in the continuing reduction of greenhouse gas emissions	
SED	SED1	Reduction of greenhouse gas emission compared year based	
	SED2	Share of renewable energy resources in the final energy consumption	
	SED3	Increase of usage of renewable energy resources	
	SED4	Increase energy efficiency, saving	
SES	SES1	Access to consumption of sustainable energy	
	SES2	Affordable price	
	SES3	Manufacturing capability of sustainable energy	
	SES4	Distributing capability of sustainable energy	
	SES5	Ability to meet the increased demand of sustainable energy	
URR	URR1	Increase of usage of wind resource	
	URR2	Increase of usage of biomass resource	
	URR3	Increase of usage of solar resource	
	URR4	Increase of usage of geothermal resource	
	URR5	Increase of usage of water resource	

Source: Author's construct

This study used 2 types of data categorized as primary and secondary. In this research, the collected secondary data is related to CSR, energy consumption and renewable energy related globally as a whole and Vietnam specific, besides that, production-related capacity and potential-related data of renewable energy was also collected through various sources such as professional energy report (REN21), online energy-related magazines of Vietnam Ministry of Industry and Trade (MoIT). The primary data was collected by survey using questionnaire with initial sample size is 265. Hair et al. (2010) proposed the principal for sample size computation which is based on the number of items of the proposed research model. Accordingly, the sample size should be calculated 5–10 times more than the defined items in the study. This study has totally 22 items thus a needed size of sample should be 220. However, to avoid risk potential may occur during the survey process such as missing

responses from the target respondents, unsatisfied responses given, ect, so authors decided to initially proceed with 265 samples at the simple method of collecting random probability samples. Survey subjects include experts (about 35%), firms' executives (about 35%), and management levels (about 30%), with no age limit for respondents. The target areas that survey applied were cities and provinces such as Ho Chi Minh City, Binh Thuan, Ninh Thuan, Khanh Hoa, Tay Ninh, Ca Mau as those are considered as typical and emerged in relation to industrialization and modernization in the current context of Vietnam. The survey was implemented by distributing questionnaires to the target respondents through email and direct delivery. The collected questionnaires were reviewed for the satisfied questionnaires. As a result, there was 247 met the specification as indicated criteria. Those data were then used for analysis using Smart-PLS.

## 5. RESULTS AND DISCUSSION

### 5.1. Assessing Reliability of the Scale

Reliability assessment is to check the consistency levels between multiple measurements of a variable (Hair et al., 2010). This study assesses the consistency of the entire scale and its overall reliability of each factor of productivity values by simultaneously using Cronbach's Alpha and composite reliability indexes with expect to bring all necessary basis into consideration for the most appropriate conclusion to the study context. The analysis results show that Cronbach's alpha coefficient of all variables are greater than 0.8 from 0.833 of SED, 0.840 of SES, 0.857 of URR and 0.939 of CSR. Thus, it can be concluded that the measurement scale of this research model is good. However, authors would like to continue further investigation to strongly affirm the reliability of the scale, therefore composite reliability value was used for this purpose. The analysis result show that all composite reliability values are greater than 0.8 from 0.886 of SES, 0.889 of SED, 0.897 of URR and 0.949 of CSR. According to Hair et al. (2016), the aggregate reliability between 0.7 and 0.95 represents a satisfactory level of reliability. Therefore, in overall, these results confirm that the reliability of this scale is good and acceptable. Table 4 is summary of these results. In addition, the indicator reliability was checked by assessing outer loading' results.

Table 5 shows the results of outer loading where all values are greater than 0.7. It means that all individual indicators are reliable.

### 5.2. Assessing Validity

Hair et al. (2010) defined that the purpose of assessing validity is to determine how well is the construct explained the variables under the construct. In addition, it's to assess practicality of the data collected and its reflection on the study context. According to Anderson and Gerbing (1988), the validity of research concepts includes convergent validity and discriminant validity of scales.

### 5.3. Convergent Validity

According to Fornell and Larcker (1981), the convergence value is used to illustrate the full convergence of the measurement items on their respective structures. Götz et al. (2010) determined that the evaluation of convergence is typically calculated by means of average variance extracted (AVE) and external loading factor (outer loading). While Hair et al. (2010) suggested that the AVE index should be over or equal to 50%, the extracted factors could be more explainable than any other extract combinations. Table 6 shows the results of EVA and external loading factors. In which external loading factors values are all greater than 0.7 and EVA are all greater than 0.5. These values exceed the level mentioned, it indicates a sufficient degree of convergent validity, which means that a specific latent variable explains more than half of the variance in comparison to their corresponding indicators (Hair et al., 2011). Accordingly, we can conclude that the observed variables are focused on the research concept that it is involved in or convergent validity is supported.

### 5.4. Discriminant Validity

According to Fornell and Larcker (1981), the distinction is satisfied when the square root of AVE of each structure in the research model is greater than all the internal correlation values of the

**Table 4: Cronbach's alpha and composite reliability results**

Variables	Cronbach's alpha	Composite reliability
CSR	0.939	0.949
SED	0.833	0.889
SES	0.840	0.886
URR	0.857	0.897

Source: Authors' analysis

**Table 5: Results of outer loading**

Variables	CSR	SED	SES	URR
CSR1	0.815			
CSR2	0.840			
CSR3	0.890			
CSR4	0.842			
CSR5	0.805			
CSR6	0.826			
CSR7	0.847			
CSR8	0.830			
SED1		0.780		
SED2		0.859		
SED3		0.841		
SED4		0.782		
SES1			0.732	
SES2			0.750	
SES3			0.760	
SES4			0.813	
SES5			0.844	
URR1				0.764
URR2				0.768
URR3				0.820
URR4				0.832
URR5				0.800

Source: Authors' analysis

**Table 6: Convergent validity**

Variables	External loading factors	AVE
CSR	0.805–0.890	0.701
SED	0.781–0.859	0.667
SES	0.732–0.844	0.610
URR	0.764–0.832	0.636

Source: Authors' analysis

remaining structures. Table 5 has confirmed that the square root of AVE values are all greater than the inter-construct correlation so the discriminatory test of research concepts is satisfied. The research can move on to analysis of the next steps. Distinctive assessment is a method of independently evaluating the scales of different concepts to prove that these concepts are not correlated with each other. The following Table 7 shows the values in the discriminant analysis table, in which the diagonal value in bold is the square root value of the factors. The values shown on the lower left of the diagonal value in bold are the partial correlation values. This result shows that the square root value of the average of the factors is greater than the partial correlation value. Therefore, it can be concluded that the distinctiveness of the research concepts is determined satisfactorily.

### 5.5. Evaluation of Structural Model

According to Falk and Miller's (1992), the model is called good when the  $R^2$  index is satisfactory, meaning that the  $R^2$  index are both greater than 0.1. The Table 8 shows the results that both

$R^2$  values and  $R^2$  adjusted values are greater than 0.1. In which,  $R^2$  value of sustainable energy development (SED) is 0.353;  $R^2$  value of sustainable energy supply (SES) is 0.388, and that of the increase in the use of renewable energy resources (URR) is 0.139. Therefore, the structural model is considered satisfactory.

In addition, Table 9 shows path coefficients of variables of the research model. It indicates that out of the associations of CSR with other variables, CSR on URR has the strongest positive impact at 0.373 as path coefficient between those variables while that between CSR and SES is lower at 0.283 and its lowest at 0.187 between CSR and SED. Regarding associations of the remaining variables, results shows that URR has the most strongest positive impacts on SES at 0.459 as coefficients, the next one is SES on SED at 0.299 and the last one is URR on SED at 0.246. It implies that for cases of energy companies in Vietnam context, utilize renewable energy resources is the most important for achieving energy efficiency and sustainable energy development. In addition, CSR implementation has an important role as an independent factor to promote utilization of renewable energy resources and energy efficiency. As a cause-effect relationship, energy companies in Vietnam should consider CSR as strategic activity that generates values towards firms' stakeholders, society, community and government, meanwhile it motivates utilizing renewable for energy efficiency and sustainable development to stay proactive and competitive. Figure 2 below is the analysis result of the research model of this study.

The next step was taken in this procedure was checking multicollinearity for each of the predictor latent variable by assessing VIF (variance inflation factors). Collinearity is a condition in which some of the independent variables are highly correlated. There is much divergence exists in the literature in relation to the VIF value to be used as the threshold for collinearity (Cenfetelli et al., 2009; Kline, 1998; Petter et al., 2007). It is commonly recommended values are 10, 5, and 3.3; meaning that a VIF equal to or greater than the threshold value would suggest the existence of collinearity among the variables or called in other word multicollinearity. Hair et al. (2009) defined that a common threshold is a VIF value above 10. In this study, VIF values presented below 10 so it can be concluded that there is no multicollinearity problem among variables of the research model. Table 10 summarizes VIF values of this model.

Further, the significance of path coefficient analysis was conducted using Bootstrap method using 1000 emulators. Bootstrapping assigns measures of accuracy (bias, variance, confidence intervals, prediction error, etc.) to sample estimates" (Efron and Tibshirani, 1993; Efron, 2003). "This technique allows estimation of the sampling distribution of almost any statistic using random sampling methods" (Varian, 2005). The bootstrapping result shows that the statistical value  $t > 1.96$  and P-value  $< 5\%$  which confirm hypotheses of this research model. On the other hand, this result determines the suitability of the research model with research data while the acceptance of hypotheses determines the practical meaning for sustainable energy development. In conclusion, the positive impacts of CSR on SED, CSR on URR, CSR on SES, SES on SED and URR on SED are confirmed in this study. The below Figure 3 and Table 11 presented results of bootstrapping.

**Table 7: Fornell and Larcker criteria**

Variables	CSR	SED	SES	URR
CSR	0.837			
SED	0.415	0.817		
SES	0.454	0.523	0.781	
URR	0.373	0.485	0.565	0.798

Source: Authors' analysis

**Table 8: R square values**

Variables	$R^2$	$R^2$ adjusted
SED	0.353	0.345
SES	0.388	0.383
URR	0.139	0.136

Source: Authors' analysis

**Table 9: Path coefficient**

Variables	SED	SES	URR
CSR	0.187	0.283	0.373
SES	0.299		
URR	0.246	0.459	

Source: Authors' analysis

**Table 10: Variance inflation factors values**

Variables	VIF values	Variables	VIF values	Variables	VIF values
CSR1	2.491	SED1	1.612	SES5	2.117
CSR2	3.133	SED2	2.006	URR1	1.611
CSR3	3.607	SED3	2.027	URR2	1.655
CSR4	3.002	SED4	1.674	URR3	2.095
CSR5	2.611	SES1	1.576	URR4	2.168
CSR6	3.187	SES2	1.633	URR5	1.936
CSR7	3.079	SES3	1.620		
CSR8	2.681	SES4	2.010		

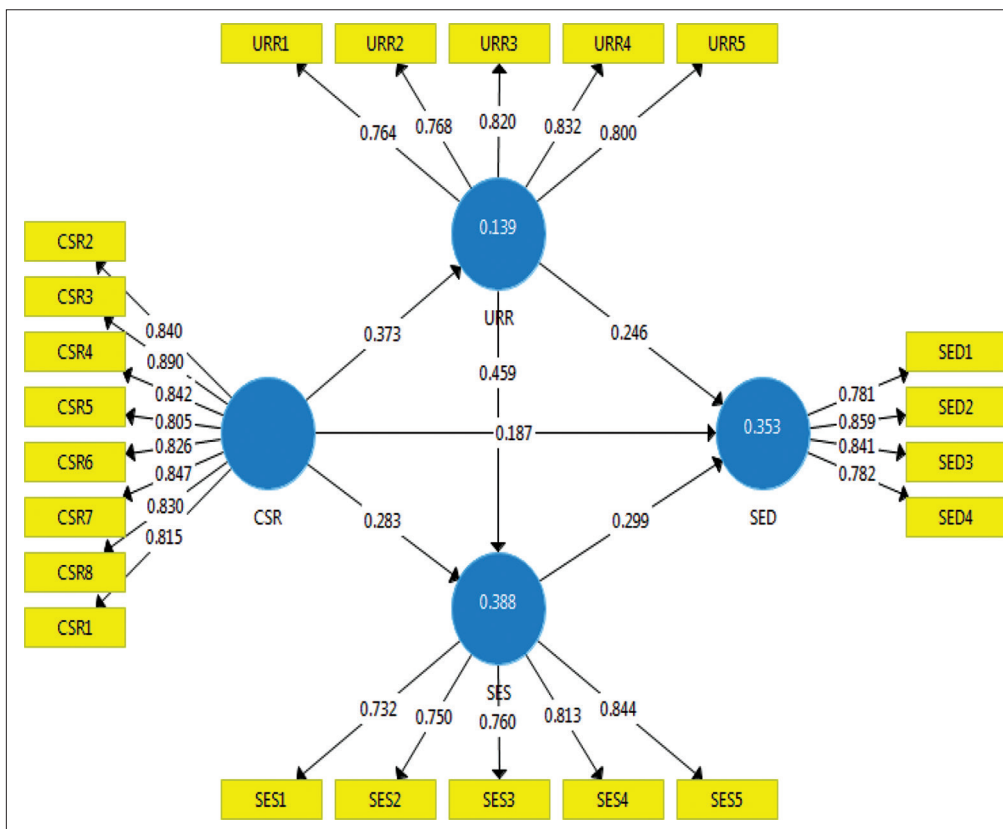
Source: Authors' analysis

The results of this study confirmed the hypothesis 1 (H1) that CSR has positive relationship with the increase in the usage of renewable energy resource. It implies that when a firm in energy industry aware of their social responsibility and the practical benefits of CSR to its stakeholders (primary and secondary), environment and national economy in some ways, they actively have CSR strategy as part of their core business activities by restructuring energy resource composition towards green energy supply. This finding coincide with that of Lu et al. (2019); Mezher and Tabbara (2010).

Next, the hypothesis 2 (H2) is accepted in this study that confirmed the positive and significant relationship of CSR and sustainable energy supply. It implies that when an energy firm well performs CSR strategy, it enables sustaining energy supply toward security point of view. This finding supports the study results of Lloyd (2018); Vaona (2016); Mezher and Tabbara (2010).

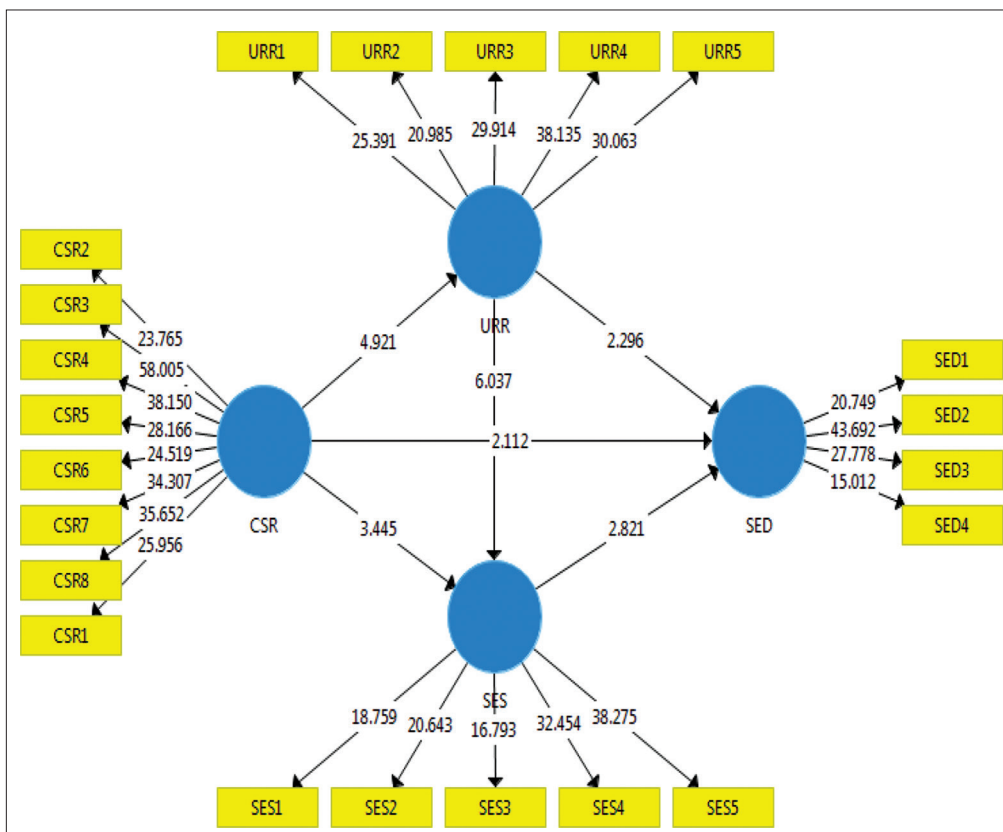
In addition, the hypothesis 3 (H3) of this study is confirmed that the increase in the usage of renewable energy resources has a positive relationship with sustainable energy supply. It's reported that actions to increase in the usage of renewable energy resources by energy firms will enhance ability of sustaining energy supply.

Figure 2: Result analysis of research model



Source: Authors' analysis

Figure 3: Bootstrapping's results



Source: Authors' analysis

**Table 11: Bootstrapping's results**

Path of variables	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T Statistics ( O/STDEV )	P-values
CSR→SED	0.187	0.192	0.087	2.144	0.032
CSR→SES	0.283	0.282	0.084	3.383	0.001
CSR→URR	0.373	0.379	0.073	5.125	0.000
SES→SED	0.299	0.304	0.106	2.824	0.005
URR→SED	0.246	0.244	0.103	2.382	0.017
URR→SES	0.459	0.463	0.078	5.853	0.000

Source: Authors' analysis

This is an extreme important matter of any nation in relation to development. This result gets aligned with the findings and arguments of Smith et al. (2010); Grin et al. (2010); (International Energy Agency, 2008); Philo and Happer (2013); Geels and Schot (2010).

Continuously, this study results confirmed the hypothesis 4 (H4) which determined the positive association of action to increase in the use of renewable energy resources and sustainable energy development. It implies that as energy companies switch to renewable energy for their operation and their business as energy supply, this will contribute to sustainable energy development, towards the elimination of dependence on traditional energy for sustainable economic development as a ultimate goal of any country, region and the world. This result supports the findings and arguments of Saad and Taleb (2018); Vasile and Camelia (2014).

Next, the findings of this research accepted the hypothesis 5 (H5) that sustainable energy supply has positive relationship with sustainable energy development. It confirmed that as energy supply capacity of energy firms is sustainable, it will stabilize development of energy. This finding aligned with the determinations and arguments of Emodi and Boo (2015); Saad and Taleb (2018).

Lastly, this research result confirmed the hypothesis 6 (H6) that CSR has positive relationship with sustainable energy development. It determined that as energy firms have proper CSR strategy which is well integrated into the core business of firms on the base of taking benefits of firm's stakeholders into account and balancing social, environmental and economic aspects, and as CSR strategy is well performed by firms, sustainable development can be achieved. This finding supports the result of Márquez and Pérez (2015); Lu et al. (2019); Andronie et al. (2019).

In overall, the current literature exists researches on CSR related topic on the energy sector. It is presented quite popular. However, research on the associations of CSR and sustainable energy development (SED) with meditating roles of renewable energy resources and sustainable energy supply is very few. Furthermore, it's rare for emerging economy, for instance, Vietnam. The overall findings of this research found that CSR has a positive relationship with SED and significantly impacts on utilizing renewable energy resources (URR) and sustainable energy supply (SES). Additionally, URR and SES significantly play meditating role among this associated relationship. The originality of this study is a holistic finding of the relationship of CSR, URR, SES and SED which is very few and aimed to be a significant contribution to the existing literature, moreover, for emerging economy like

Vietnam. The results of this study can support the findings of the previous studies on the perception of CSR and sustainability or sustainable development such as Lu et al. (2019); Krishnamurti et al. (2018); Andronie et al. (2019); Dupire and M'Zali (2018).

## 6. CONCLUSION

This study has remarkable contributions to the literature. The first one is addressing a comprehensive concept of CSR in the energy sector in an emerging economy like Vietnam. The second contribution is in relation to prospects of sustainable energy development on the supply and demand point of views. By that, it shows potentials of renewable energy resources and increased demand of energy as a whole by period in Vietnam. The third contribution is important at most which is associated relationship between CSR and sustainable energy development (SED); utilization of renewable energy resource (URR) and sustainable energy supply (SES) with the meditating roles of URR and SES between CSR and SED.

Our results corroborate with findings of Lu et al. (2019) which indicates that CSR has the strongest positive impact on URR while URR has significant impact on SES. These associations are also strongly supported by the literature (Weder et al., 2019; Geels and Schot, 2010; Carley et al., 2018) that social responsibility helps achieve sustainable energy development goals. It implies that if an organization those operating in energy sector that succeeds in CSR implementation, its outcomes can promote utilizing renewable energy resources, as a cause-effect relationship, that will ensure sustainable energy supply that lead to achieve sustainable energy development goals. In addition, results confirmed all the hypotheses of the models, it implies that any success in implementing CSR activities, success will be progressive towards renewable resources utilization, sustainable energy efficiency and sustainable energy development. The deliverable of this research addressed the research questions and covered beyond the findings of Rimsaite (2019); Krishnamurti et al. (2018) that indicated "the importance of CSR for dealing with the major risks and challenges that the energy sector is facing like corruption risks" or CSR is important divers of "competition" as of Dupire and M'Zali (2018); Runhaar and Lafferty (2009); Mapelli et al. (2016); "reputation" as of Lu et al. (2019) and Lloyd-Smith and An (2019); "customers loyalty" as of Lu et al. (2019); Przepoierka and Horne (2019) and "policies" as of Lu et al. (2019).

Besides the above findings, this research has an important remark that energy companies in Vietnam are more and more increasing their awareness of its responsibility for society and environment,

however, to have a good CSR strategy and linked to the core business is still in question. Thus, this research outcomes is meaningful and practical not only on the business operation point of views but also on the governance point of views in energy sector in Vietnam. Accordingly, entrepreneurs can have a comprehensive understanding of CSR, URR, SES and their influences on SED and executive of firms and high management levels of firms can understand that they should perceive CSR from the strategic perspectives. Having strategic thinking of CSR activities to be able to utilize the outcomes of CSR to utilize URR to improve SES for achieving sustainable energy development goals. In addition, it's implied that sustainable development cannot be achieved by an individual or an organization or a nation alone but it needs necessary associations of all. In this context, that is meant to achieve sustainable development goals, it's important that firms raise their awareness of the practical benefits of CSR for the sustainable development of themselves, society and environment, from which enterprises will strive to incorporate CSR into their core business activities. At the same time, the role of government is very important in policy making to support and encourage firms to perform well CSR as an essential part for achieving sustainable development goals for firms, its stakeholders and the country.

## 7. LIMITATION

The major limitation of this study may relate to data collection, research geography and research context as this study was conducted in Vietnam context. The first limitation may occur in relation to data collection which was collected from random chosen companies so its representative might not be high if taking into consideration of a specific industry category. The second limitation may happen in relation to geography that it's similar with the given status of data collection. In this study, areas were chosen are emerged and emerging cities, provinces so its relevant findings might not be representative for the other regions. The third limitation in relation to research context that presented similarly to the above two stated limitations as different context might provide different conditions that effect differently the research findings. In overall, the findings might not provide support at best to different context natures or on the other hand, it might not be practical and applicable for different context. In general, those limitations provide room for future researches continue to contribute to the literature of CSR and its influence on the SED in different context and different research subject.

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