Internal and External Determinants of the Adoption Levels of Sustainable Development Policies in the Energy, Industry and Agricultural Sectors of Turkey, the United States, the Russian Federation, and the People’s Republic of China

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A Dissertation Presented to the Graduate Faculty of Annette Caldwell Simmons School of Education Southern Methodist University

In Partial Fulfillment of the Requirements for the degree of Doctor of Liberal Studies with a focus in United Nations Sustainable Development Goals and International Environmental Politics

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For my nieces, Elif Pek and Eliz Pek
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At the time of this study, countries and organizations were not prosperous following the United Nations Sustainable Development Goals and were not taking serious actions to tackle the climate change problem. All the reports and data were showing that developed and developing nations were not making the significant changes in their business as usual attitude, and adverse effects of climate change and the unsustainable path to development were observable as pollution and enhanced environmental disasters. Countries needed to understand the emergence of the problem and have a better grasp of motivations and the obstacles for their primary approach to sustainability.

The primary concern of this research was to provide information on researched countries and provide a broader view of their current environmental sustainability policy applications, opportunities, and obstacles while adding a multidisciplinary approach to literature. The main area of concern in this research was environmental sustainability as a part of the United Nations Sustainable Development Goals. By analyzing the current state of environmental sustainability policies and internal and external factors, this research provided sufficient data for researchers to have a better grasp of governmental decision making and
challenges to the adoption of such policies. Detailed data collection was conducted from governmental reports and the publications of international organizations, along with multiple other resources. The primary purpose of the collected data was to show the current economic characteristics of these countries and their future policy plans and sustainability forecasts.

The results of this study show that the primary concern of all the analyzed countries was continuous economic activity and domestic welfare. International competition and competitive ambition were also the main drivers for countries. Research showed that the countries that are highly self-sufficient and already strong global powers and countries that have been rapidly developing with their current status quo chose not to change their business as usual approach to environmental sustainability. Whereas the countries that are dependent on outside resources are short on domestic resources and see the adverse effect of environmental degradation are willing to adopt a sustainable development approach for efficiency and self-sufficiency. This research also showed the need and the importance of international cooperation for the successful adoption of sustainable development goals, especially for the developing countries.
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CHAPTER 1: INTRODUCTION

The natural resources of our planet have helped humanity to advance and build countless civilizations. We are a fossil fuel civilization, and we have evolved in such a way that today's production and energy use has become the most crucial part of all modern economies. We are not able to function without reliable, resilient, and secure energy sources, which help us to produce continuously. Human history is full of important events, events that have tremendously shaped our experience on this planet. These experiences have sometimes forced us to make quick decisions and change our ways, but some of these changes occurred gradually and gave us time to plan and adapt. Adaptability is an essential virtue of human beings. When we stopped being hunter-gatherers and became farmers twelve thousand years ago, we developed new habits and gained new perspectives on life and survival. We have abandoned many of our previous practices, which have significantly helped us during our long-running hunter and gatherer lifestyle.

Today, climate change, which created the need for sustainable living, is also becoming one of the critical events in human history. The problem of unsustainable and wasteful living is powerful enough that it can affect our experience on this planet negatively. Our advanced development and modern, productive economy have consequences for the planet we live on. For the most part, these consequences are ignored, and their effects are underestimated. Production and development have reached the point that ignoring the consequences of our daily actions can cause severe risks for the wellbeing and survival of human beings. Human-triggered climate change, increasing carbon dioxide (Co2) emissions, our passion for infinite
development in a finite world are all affecting our lives and habitat. Sea level rise, air pollution, water pollution, and severe and frequent, unpredictable natural disasters are some of the results of our increasing Co2 emissions, a waste product of the world economy.

What could be the potential solution to these problems? There is no simple answer. However, we do have some paths to follow to mitigate the adverse outcomes of our profit and production driven economic activities on this planet. International problems require international and interdisciplinary solutions. Hence, the adoption of sustainable development practices and climate change mitigation requires intergovernmental, interdisciplinary, and cooperative work of all nations. The United Nations Sustainable Development Goals are an essential step towards a future where our economic activities change in a way that supports and help every human being on this planet while securing and supporting our survival. An inclusive economic system, which protects the environment and benefits even the smallest communities at the remotest possible locations on this planet, is needed. However, the problems of unsustainable production and the consequences of extreme resource exploitation are being pushed on to the next generations in an irresponsible and inhumane fashion. The United Nations Sustainable Development Goals are critical steps needed to improve communities, cope with global problems, and create a resilient, sustainable future for every single person on Earth.

Investing in sustainable development goals is an essential part of today's world since these investments also promote innovation, new investment, social mobilization, public awareness on world issues, global collective action, and much more. Setting goals is an effective way to success, and setting these goals will help us have a more precise grasp on global issues and create an efficient path towards development that will include every region and every nation on earth. It is essential to state that along with world governments, local and
international companies are also essential players in today's global economy. Hence, governments and companies need to take on sustainable development policies. In today's global economic system, can we say that we have adopted sustainability as the central premise for our consumption and production? Or are we going in the opposite direction, becoming more and more unsustainable and wasteful?

1.1 Purpose Statement

This research aims to explore and compare internal and external determinants and motivations of adopting the United Nations Sustainable Development Goals and elaborate on the obstacles of the countries that are not progressive enough in adopting these goals. The focus will be on the energy, industry, and agricultural policies of Turkey, the United States, Russia, and China. Analyzing a broader field by looking at four different world actors with different levels of wealth, geopolitics, and market characteristics, and considering their positions in the global economy, can help researchers, students, companies, international organizations, and non-governmental organizations to gain a better understanding of where we are in today's policymaking and adoption of UN Sustainable Development Goals. Detailed elaboration of country characteristics and the relations between these characteristics and governmental sustainable development policies with a human rights advocacy approach will add useful resources and overall understanding to the upcoming need for governmental policymaking on corporate social responsibility (CSR) and environmental sustainability.

The purpose of analyzing these countries is that the different characteristics and differences of their development levels provide sufficient examples to understand what plays a role in creating and adopting policies for environmental sustainability and corporate social responsibility. While the United States and China are aiming to remain essential agents of the global economy, Russia and Turkey are mainly looking to increase their role in the global
market by producing more, which will increase their share of global Co2 emissions. It is crucial to analyze these countries, especially the ones that are rapidly growing their share in the global market and aim to continue to do so.

### 1.2 Analyzed Countries and their Characteristics

**Turkey** is an upper-middle-income country, an emerging market, and an advancing economy. Turkey is the 17th largest economy in the world. The main character is a free-market economy with mild government interference yet has been increasing privatization.

**The United States of America** is a high-income, advanced economy. The United States is the world's largest economy. The main character is a free-market economy, with limited government interference.

**Russia** is an upper-middle-income country with an emerging market and advancing economy. The 12th largest economy in the world. The main character is a centrally planned economy with government interference.

**China** is an upper-middle-income country, emerging market and advancing economy. World's 2nd largest economy. The main character is significant levels of state ownership and a centrally planned economy. ¹

### 1.3 Statement of the Problem

Our current economic activities seek short-term goals to bring faster profit. However, while aiming for short-term goals, we are not investing enough in sustainability, hence we are becoming more vulnerable and inefficient. According to recent research, the carbon dioxide level in our atmosphere hit the highest level in 800,000 years as of 2016 and keeps increasing. The study states that this is caused primarily by human activity and is dangerous for the future of our planet. With the industrial age, Co2 and other greenhouse gas emissions

increased tremendously, and global temperatures are rising along with unbalanced seasons and climate.²

Human beings are able to outlive the majority of today's species with the help of modern medicine and technology. We are outcompeting every other species, and we have already started to challenge each other for resources such as oil, water, and land. Since world resources are always limited, we should always maintain enough resources to survive. Throughout our history, thanks to natural resources, nations won wars, created wealth, and gained domination over other regions and nations. Natural resources are so significant that countries and even continents as a whole have suffered due to low natural resources and increasing scarcities as a result. Even today, countries, mostly in Asia, Africa, and South America, are suffering because of limited resources. It can be said that dramatic changes in resources touched every aspect of our evolution and history. For instance, 12,000 years ago, during the Holocene epoch, the climate became very efficient for human beings to settle down, which let us populate more and experience the first food crisis. Hence, we started to improve agricultural interests to provide more food for a growing population.³

Today our planet is crowded, polluted, and exploited on extreme levels. In 1974, the world population hit a new milestone of 4 billion people. The world's Co2 emission was around 350 parts per million (ppm), and we were adding around 1ppm every year. By 2026, the world population will become 8 billion, and we already hit another new milestone in Co2


emissions with 400 ppm, and today we are adding two ppm annually. When the atmosphere's Co2 levels are this high, it is possible to say that humanity is about to enter the sixth great extinction. We are living in very critical times, and our actions in this world are directly changing our near future.4

Radical changes in nature, such as climate and food supplies, directly affected the human lifestyle and the ability to survive.5 Sustainability has always been crucial for the general well-being of individuals and the future of nations. Today we have to ask ourselves how sustainable our economic activities are. We know that radical changes in nature affect us negatively. Nevertheless, we do not seem to acknowledge the potential effects of the extreme levels of Co2 emissions, or we choose to ignore them. However, as history has shown many times, the amounts of consumption and exploitation of natural resources will have severe effects on our future as well.

With the advent of the industrial age, CO2 and other greenhouse gas emissions have increased tremendously, and global temperatures are increasing, causing unbalanced seasons and severe climate swings.6 Human-triggered climate change is also forcing us to adopt new habits and develop new ways of living; it forces us to open a brand-new page on human experience and history. As a result, sustainable development is rapidly becoming one of the

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biggest challenges of today's world. Our natural resources are finite, and our economic activities are significantly affecting the habitability of our planet. Environmental damages are directly affecting local communities, indigenous peoples, and the quality of living in cities.

These damages are up to a level that should be considered human rights violations if we consider the Universal Declaration of Human Rights, Article 25, which states that "Everyone has the right to a standard of living adequate for the health and wellbeing of himself and of his family." In addition to the environmental damage and its tremendous effects on public health, some of our economic practices include sweatshops, slave labor, unfair trade, unsustainable production, and other human rights violations for the sake of profit.

All these realities should be considered part of the current human experience, and we should reanalyze the question 'what it means to be human' to understand our experience as we live in the wealthiest and the most developed era of human history. As the author Ronald Wright in his book *A Short History of Progress* mentions, today we tend to think old rules do not apply to us. We think of ourselves as the strongest, wealthiest, and most intelligent human beings that human history has ever seen, which is a fact. However, Wright warns us that probably many ancient civilizations who destroyed themselves or caused their extinction somehow were thinking in the same way. It is essential to question whether our progress and experience (as development) in this era has tricked us and created an *ideological pathology*, which keeps us from seeing the truth and realities of our human experience. This delusion

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could lead us to our extinction, just like many other human species and civilizations have experienced. In other words, are we deluded by our progress?

Historian Eric Hobsbawm, in one of his interviews, describes human progress with philosopher Walter Benjamin's example of *The Angel of History*. *The Angel of History* looks to the past from human progress and sees nothing but ruins and destructions behind. Is our so-called endless progress leading to a future full of destruction and ruins? Eric Hobsbawm replies when he is asked about today's world as "we should get used to living under the conditions that should not be tolerated."^9 Are we going to get used to these conditions we are living in today, as change and adaptation is one of the answers to the question of *what does it mean to be human*? Or are we going to deny the change, and if we choose to do so, what is next for our human experience on this planet?

Here I would like to mention what the great archeologist Gordon Childe states in his book *What Happened in History* man adjusts himself to the environment or adjusts the environment to his needs.^10 It seems that we have adjusted the environment to our needs, but how are we going to adjust the reality of climate change and its consequences according to our survival? Is *adjusting* the natural disasters according to our comfort level an option for us? For example, Noah Harari, in his book Sapiens states that adopting the sedentary lifestyle, although with all the opportunities and easiness it brought to our lives, was a trap for humans. We probably ignored or did not want to consider the possible risks and all the potential challenges during the adaptation because we were amazed by the idea of living

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comfortably and safely without continually hunting in the wilderness to survive. Is it possible that the idea of comfortable living, infinite wealth, mass production, and endless consumption persuades us in the same way and makes us ignore the environmental damages we have been doing, which will eventually jeopardize our existence?

This question of Sustainable Development, corporate social responsibility, and Environmental Sustainability, as will be analyzed in this research, connects us with the questions above; in other words, our very own decisions in this era of human history will undoubtedly affect our experience on this planet. Our decisions and choices will shape the answer to the question: What does it mean to be human? We live in critical times, where we see the highest Co2 levels of the last 800,000 years. We are not sure about the specific consequences of this much Co2 in the atmosphere, nor do we seem to have a planet B close by and advanced technology to migrate to another planet altogether. The critical question is, are we living in a delusion that is full of ideological pathology and modern exceptionalism, where we think that we are different from all the previous civilizations that have disappeared from the face of the earth?

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1.4 Research Question

In order to reflect the current stance of analyzed countries, answers for the following questions were addressed in this research:

What factors affect the determination of sustainability policies of the analyzed countries in energy, industry, and agricultural sectors, and what is the connection between government characteristics and Sustainable Development policymaking?

1.5 Data Sources

Detailed data analysis work is the primary means of data collection in this research. The data in this research was collected as a result of a thorough analysis and elaboration of the reports of the United Nations Framework Convention on Climate Change, World Bank, OECD, Government of Turkey, Government of the United States, Government of Russia, and Government of China.
1.6 Illustration of the Research Question

Figure 1 Illustration of the Research Question
CHAPTER 2: LITERATURE REVIEW

2.1 Sustainability and Corporate Social Responsibility

Although the concept of sustainability is not new, it has become one of the major concepts of today's world. The idea of sustainability became popular in the late '80s, and the definition back then was still the same as today's definition; developing without compromising future generations' resources. For many scholars, the concept is seen as an essential tool to analyze and solve the complex problems of our time. In his book, *The Age of Sustainable Development*, Jeffrey Sachs argues that the Sustainable Development Goals "will guide the world's economic diplomacy in the coming generation." He also states that the concept of sustainable development is a way to clarify the intricate connection between three important aspects of our lives; the world economy, humanity, and the planet's physical limits.

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15 Sachs, 3.
There is a fair amount of literature examining corporate social responsibility and corporate approaches to environmental problems, and these studies mainly examine the organizational dynamics and cost of CSR. Unlike the definition of sustainability, corporate social responsibility has no cookie-cutter definition in the literature. The first groundbreaking discussion started with Milton Friedman's well-known article in 1970, the Friedman Doctrine, which states that the only responsibility of a corporation is making a profit and keeping the shareholders happy.\(^{16}\) There are, of course, many critics to the Friedman Doctrine, and examples of how unregulated business practices can create significant negative externalities. In his famous book, *Collapse: How Societies Choose to Fail or Succeed*, Jared Diamond shows the disastrous effects of unregulated mining practices in Montana and how the people of Butte, Montana, and the environment of the region are still suffering due to the accumulated toxic waste over the years of unregulated mining practices.\(^{17}\)

Ambec and Lanoie (2008) argue that there are multiple potential benefits for organizations that chose to become better at environmental consciousness and performance to develop a better economic outcome. They state that the decision to be an environmentally conscious firm will differentiate the firm from competitors who are environmentally unconscious and will attract more customers as a result.\(^{18}\) On the contrary, Pollution Haven Hypothesis states that increasing regulation and cost of operation due to environmental damage will create pollution havens where there is no regulation for environmental


consequences of economic activity. According to the Pollution Haven Hypothesis, environmental regulations will cause unfair competition, and firms will relocate to markets where the regulation is minimal or none, as discussed by Dechezlepretre and Sato (2017).19

On the other hand, the Porter Hypothesis became popular in 1995, after Michael Porter and Claas van der Linde published their Harvard Business Review article Green and Competitive, which claimed that strict environmental regulations trigger competition and innovation, eventually benefiting businesses while easing the environmental damage.20 Even the economist and philosopher Friedrich Hayek, who religiously believed in the unconditional necessity for small government in order to reach the complete freedom of individuals, stated in his famous book The Road to Serfdom that the government should track the environmental consequences of economic activity.21 Osang and Nandy (2003) show that the Porter Hypothesis can work under effective regulations. They argue that without direct emission controls, where the government is not responsible for the environmental performance of firms, firms chose to embrace business-as-usual, a high polluting approach. When there are no higher authority regulations, it is not preferable for firms to step towards investing in new technologies to reduce pollution. Firms consider the risk of harming their profit and competitiveness. In addition, the risk of competitor firms can become free riders of costly and risky investment and innovation is also a possibility; creating an unfair competitive advantage, a prisoner's dilemma scenario. However, when there are effective

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government regulations on emissions and environmental performance for all, the situation provides the same starting point for all firms, averting the prisoner’s dilemma scenario and free-rider problem. Under correct conditions, effective regulations can lead firms to invest in new technologies and innovation to keep their operation levels the same even with regulations; in another saying, investing in innovation and new technologies is preferable for firms to operate at the same level, which can eventually provide better business practices overall and lower environmental degradation.\(^2\)

On the role of government, Li, Fetscherin, Alon, Latterman, and Yeh (2010) discuss the relationship of corporate social responsibility and governance environment. They focus on two different types of governance, rule-based governance environment and relation-based governance environment. In a country that has a rule-based governance environment, where an organization relies on public rules to operate, political rights, the rule of law, free flow of information, and public trust is expected to be high. In a country that has relation-based governance, where organizations rely on private connections, political rights, the rule of law, free flow of information, and public trust is expected to be low. According to their research, the characteristics of a country can have a direct effect on CSR policies, and transition economies see different approaches to CSR policies in time.\(^3\) Whereas Lyon and Maxwell (2008) emphasize the importance of corporate leadership for environmental sustainability and corporate social responsibility issues, valuing market-driven CSR as the regulations and

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regulators may both cause further damage at the expense of shareholders if they do not understand the nature of business.\(^{24}\)

### 2.2 Gap in literature

This research will include a detailed analysis and comparison of four important actors in the world economy. The majority of the literature is focusing on corporations, and developed economies generally involve one or two countries. Analyzing a broader field by looking at four different countries with different levels of wealth, geopolitics, and market characteristics, and considering their positions in the global economy, can help researchers, students, companies and international organizations and non-governmental organizations to gain a better understanding of where today's policymaking and adoption of UN Sustainable Development Goals are at. Detailed elaboration of country characteristics and the relations between these characteristics and governmental sustainable development policies with a human rights advocacy approach will add useful resources and overall understanding to the upcoming need for governmental policymaking on corporate social responsibility and Environmental Sustainability.

Dechezlepretre, Kozluk, Kruse, and Serres (2019) draw attention to the necessity of cross-cultural research on multiple policies:

Only two multi-country studies are currently available, while cross-country studies would enable researchers to determine which combination of public policies (instruments for environmental policy, innovation policy, fiscal policy, etc.) works best at inducing the greatest benefits in terms of improved environmental performance, while implying the smallest costs or, potentially, the greatest improvements in terms of economic performance (productivity, etc.) 25

This research is a cross-country study that analyzes different national policies on the same three sectors: energy, industry, and agriculture. The data collected and the analyzed governmental policies in these sectors can be used to elaborate the adoption levels of eight of the seventeen Sustainable Development Goals:

- #2 Zero Hunger
- #6 Clean Water and Sanitation
- #7 Affordable and Clean Energy
- #9 Industry, Innovation, and Infrastructure
- #11 Sustainable Cities and Communities
- #12 Responsible Consumption and Production
- #15 Life on Land
- #17 Partnership for the Goals

2.3 The Function of the State and Fukuyama's Approach

The concept of sustainability is certainly more complicated than its definitions. Especially when we look at the examples of everyday life, governments and firms have many unforeseen situations to face, which directly affect their decision-making processes. What does the literature say about the role of government? Just like the case of sustainability and corporate social responsibility, the function and the duties of the state creates controversy. Francis Fukuyama, in his famous book *State-Building, Governance and World Order in the 21st Century*, analyzes the function, size, and strength of the state in detail. It is essential to understand Fukuyama's approach before diving deep into the policies and policymaking process of concerned countries of this research. In the '80s and '90s, the main consensus amongst policymakers was reducing the size of government. With the lead of the International Monetary Fund, the World Bank, and the U.S. government, sets of neoliberal policies called the Washington Consensus became the central economic policy of the global economy and for developing countries.

The primary justification for the application of these policies was that the state sectors of developing countries were acting like obstacles instead of institutions that promote development. However, although liberalizing the state sectors looked fruitful in theory, the primary remedy for this problem was increasing the strength of some institutions instead of reducing the state activity altogether. In fact, reducing the government institutions of these developing countries degraded their prosperity further.\(^\text{26}\) Fukuyama's example shows us the critical importance of state institutions and detailed planning, as they play an essential role in

policymaking and development. Here Fukuyama points out the critical difference between state scope versus state strength. State scope is determined by the number of different fields that a government functions as an institution and sets goals, and state strength refers to the power and ability of the state to execute policies, apply law and goals, which determines the institutional capacity. According to Fukuyama, understanding and differentiating these two concepts will help us to understand the role of the state in different countries. Understanding state scope and state strength can help us to justify the levels of regulation and policy levels of concerned countries in this research. The level of state scope is grouped into three categories: minimal functions, intermediate functions, and activist functions.

The Scope of State Functions

![The Scope of State Functions](Figure 2)

The combination of state scope and state strength gives us the matrix of stateness and efficiency. Stateness and efficiency matrix helps this research to examine the ration behind the choices of concerned countries when it comes to sustainability policies. The stateness and efficiency matrix has four quadrants, and members of different quadrants have different approaches to regulations and stateness, as well as economic differences. Without going deep into this concept, it is essential to mention that the matrix shows that there is a connection between a country's decision to have sustainability-related policies and its quadrant.

Figure 3 Stateness and Efficiency Matrix 1


Fukuyama states that according to the economist's approach, the best part to be in this matrix for economic growth is quadrant I. Quadrant I is a combination of minimal state scope and strong institutions. The closer to the origin of the axis, the slower the economic
development, and if a state moves beyond the origin of the axis in the direction of the X-axis, institutions and the state itself becomes inefficient. Thus, in this case, quadrant I means minimal state scope but strong institutions. The United States is in quadrant I. Quadrant II contains broader state scope with strong institutions but slower economic development than quadrant I. European Union is in quadrant II. While quadrant III contains states with weak institutions, quadrant IV is the worst place to be economically as the state is trying hard to be the main actor of all activities, which reduces the power of its institutions and economic efficiency.

In the matrix, the quadrants on the left (I and III) would contain countries with less government involvement in issues, and more privatization, deregulation, and lack of subsidies. Fukuyama states that a large number of developing economies are in quadrant IV, including Turkey, China, Russia.\textsuperscript{27} As Acemoglu and Robinson showed in their famous book, \textit{Why Nations Fail}, strong and inclusive institutions are critical for economic development, stability, and public welfare, and in contrast, weak institutions can become a means to abuse power and accumulate national wealth for personal gains by elites.\textsuperscript{28} Therefore, the optimal point for development would be quadrant I, whereas quadrant III would not be desired. Fukuyama points out the same problem as the majority of developing nations end up in quadrant III instead of quadrant I due to the rapid minimization of the state's scope and rapid liberalization of the market without strong institutions.\textsuperscript{29}


2.4 Daly's Isolated System

Herman Daly, in his book *Beyond Growth*, discusses current civilization's tendency to see economics as an isolated circle consists of exchanged value between firms and households. In this isolated circle, the physical environment and the consequences of our economic activities are not included. However, Daly points out that, in reality, the economy is an open system under the non-growing planet's ecosystem, and the functionality of our economic activity is dependent on the planetary boundaries that are determined by physics and finiteness.

![Diagram of the economy as an isolated system](image)

Figure 4 The economy as an Isolated System

The problem with considering the economy as a closed, isolated system is that we ignore the real cost of production and consumption, the natural capital. In 1973, the concept was mentioned for the first time by Ernst Friedrich Schumacher in his book *Small is Better*. Schumacher argued that geology, air, water, soil, resources, and all living things are finite...
capital and are included in the economy as finite resources, assets that are part of our
development. Daly developed the concept further and combined ethics, environment,
community, and sustainability, offering alternative strategies to the growth-based economy.
He mainly promoted a steady-state economy, which is a concept that suggests stabilizing the
size of the economy without seeking to grow in size and numbers, sustaining the
consumption and technical and qualitative improvement instead of the quantitative increase
in throughput. Daly criticizes the idea of an unlimited growth-based economy. His criticism
is justified when we consider the benefits of economic development and the adverse effects
of environmental degradation; we put ourselves in a vulnerable position where the cost of
growth is rising faster than its benefits.

According to Daly, growth is limited to two main concepts: biophysical limits and
ethico-social limits. Biophysical limits to growth are determined by finitude, entropy, and
ecology. Daly argues that economic growth is limited to its host system's size, and as our
planet does not grow or renew its natural resources, the growth will eventually have to stop.
Besides, the waste of our economy cannot grow indefinitely, and simply the planet cannot
store unlimited waste. Even if we become very efficient in recycling, entropy will eventually
interrupt the recycling cycle, and there will still be waste to accumulate, pollution, and
environmental degradation. In a system where we take raw materials from the environment
and return it as waste, environmental degradation cannot be abstract from economic activity.
Thus accepting the environment as natural capital and acknowledging that the capital is not
endless is one of the primary takes from Herman Daly's Beyond Growth.31

30 Ernst F. Schumacher, Small Is Beautiful. A Study of Economics as If People Mattered.

31 Herman E. Daly. Beyond Growth: The Economics of Sustainable Development (Boston, MA:
The illustration below shows the empty world and full world concepts. In the empty world, the economy has limited capital, and the ecosystem is not a part of it. The empty world model is the accepted model of our contemporary economic activity. However, the reality is far from the empty world illustration, and we are living in the full world where our economic activity is depending on the ecosystem and the finite natural resources, where the capacity to store and recycle waste is limited. The danger of an unsustainable economy is shown in the full world system, where the man-made capital reaches the physical limits of the planet.

Figure 5 The Economy as an Open Subsystem


In addition to the physical limits of endless growth, ethico-social limits are other phenomena we tend to ignore by today's economic system. The first point Daly discusses is that we are consuming the environment at the expense of future generations. The future generation will pay the cost of our excessive economic activities. Indeed, this way of thinking gives us a straightforward definition of sustainability; living without sacrificing the wellbeing of future generations. As I mentioned before, the Universal Declaration of Human Rights,
Article 25, states that "Everyone has the right to a standard of living adequate for the health and wellbeing of himself and of his family." Thus the ethico-social limits to growth that Daly discusses should be seen as a human rights problem as well.

Herman Daly explains the question of why we exclude planetary limits from our lives by giving an example that is very similar to Ronald Wright's. As I mentioned before, Wright, in his book *A Short History of Progress*, argues that; today, we tend to think old rules do not apply to us, as we see ourselves as the strongest, wealthiest, and the most intelligent human beings that human history has ever seen. Ronald Wright named this reality as ideological pathology, and Herman Daly explains the same concept with two examples; Thomas Kuhn's paradigm and Joseph Schumpeter's preanalytical vision. Schumpeter's preanalytical vision can be described as the viewpoint that is accepted in order to eliminate unseen problems or the problems that can be ignored today. As in the environmental degradation problem, a person who believes in unlimited growth has a preanalytical vision that makes him ignore the problem of waste and environmental degradation. Daly gives an example of the World Bank, arguing, the World Bank cannot accept the limits to growth because economic growth is a pivotal solution to cope with poverty.

The World Bank has to change its preanalytical vision in order to acknowledge limits to growth, yet changing a viewpoint has always been a challenge for humanity. Changing a viewpoint is that challenging for us that Thomas Kuhn identified the famous concept paradigm shift: changes of methods, views, fundamentally accepted rules that are shaped by our views and knowledge. A paradigm shift happens in steps. First, there is a paradigm that

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gives us the path to follow when approaching a problem; this is a common and lasting view. The second step occurs with the observation of some anomalies that the current paradigm cannot explain or solve. As a result, new research and experiments to find new paths to cope with these abnormal problems start, which develops the new thought process. Lastly, the new path becomes the new paradigm, and in the long run, it becomes a dominant, widely accepted thought process, causing a scientific revolution.\textsuperscript{34}

Duck and Rabbit illustration is a simple example to symbolically visualize the effects of a preanalytical vision or paradigm's effect on our views. When we look at the illustration, our perception changes back and forth. We both see rabbit and duck, but neither the illustration nor our eyes change. The importance of long-lasting perception, especially when the world view or learned habits are involved, is massive enough that we cannot ignore while

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Duck-Rabbit-Illusion.png}
\caption{Duck-Rabbit Illusion}
\end{figure}


\textsuperscript{34} Thomas Kuhn, \textit{The Structure of Scientific Revolutions}. (Chicago, IL: University of Chicago Press, 1692), 147.
questioning a decision or behavior. Herman Daly, Thomas Kuhn, Joseph Schumpeter, and many more names pointed out this reality in their works.

Daly’s explanation of our view of economic growth and progress, and physical limits to growth, gives us an important message. The sustainable development goals are a path to have a better future, but we may not be able to create this future without considering changing our current views on progress and growth. Both Herman Daly and Francis Fukuyama will provide critical concepts for this research to analyze the countries and their environmental sustainability policies with a multidisciplinary approach.
CHAPTER 3: TURKEY

Turkey is an important actor in international affairs as its strategic location connects Europe and Asia. As a rapidly growing economy, Turkey has been working towards the European Union (EU) candidacy, along with its active role in the Organization for Economic Co-operation and Development (OECD). Turkey is a populated country, and the population is estimated to reach 105 million people by the year 2050.\textsuperscript{35} It is the eighth-most significant and fastest-growing economy among the other OECD countries, with an 83% real GDP increase between 2005 and 2017. As a result, Turkey’s energy demand is also the highest among other OECD countries\textsuperscript{36}. As energy demand and production climbs up, the Green House Gas (GHG) emissions and environmental damage also increase. Therefore, analyzing the sustainability policies of the Turkish Government and understand the levels of adoption of corporate social responsibility is crucial to foresee the sustainable development path of Turkey. In order to learn the challenges and motivations of policies, it is essential to look at the sectors which have the highest GHG emissions as these sectors usually have the most influence on environmental quality. Elaborating industries which releases the most GHG in a


country would make the most sense when trying to understand if environmental sustainability policies of a country are on target and what the motivations or obstacles are for sustainability policies.

First, Turkey is notably stating its determination to the United Nations Sustainable Development Goals in its 10th (covers the years between 2014-2018) and 11th Development Plans (covers the years between 2019-2023). The country thoroughly analyzed global and domestic challenges to its rapidly developing sectors and put a comprehensive effort to develop solutions for these challenges in accordance with the United Nations Sustainable Development Goals. Energy efficiency, investments in technology production, education, human rights, sustainable and inclusive economy, sustainable agriculture, income equality, and sustainable cities, which will increase productivity, public health and promote a better environment for people, are the main themes of the 11th Development Plan of Turkey.37

Secondly, Turkey has been communicating well with global actors, international organizations, and non-governmental organizations on climate change, sustainable development, and sectoral improvements. The country has been reporting to the United Nations Framework Convention on Climate Change promptly. Detailed reports such as; Republic of Turkey Climate Action Plan 2011-202338, Turkey’s National Climate Change


Adaptation Strategy and Action Plan\textsuperscript{39}, Seventh National Communication of Turkey Under the UNFCCC 2018, \textsuperscript{40} and OECD reports on Environmental Performance Reviews 2019\textsuperscript{41} is current and available to people.

Third, although Turkey was not a part of the agreements held in 1997, it ratified the Kyoto Protocol in 2009 and committed to staying on the same page with the emission reduction goals of the protocol.\textsuperscript{42} On the other hand, Turkey did sign the Paris Climate Agreement; however, it did not yet ratify. However, according to the National Energy Efficiency Action Plan 2017 – 2023, Turkey acknowledges the risks of increasing GHG emissions in the atmosphere and is determined to decrease GHG emissions by investing in energy efficiency and renewable energy options.\textsuperscript{43}


Figure 7 GDP (at current prices) Turkey


Figure 8 GDP and Primary Energy Consumption

In the charts above, it can be seen that Turkey’s gross domestic product (GDP) has been increasing steadily. As a result, primary energy consumption and demand has also been growing. Besides, figure 8 shows the decoupling of GDP and primary energy consumption in 2011, where the primary energy consumption is starting to have a slower rate of increase than the country’s GDP. This separation is an important indicator that shows the rapid effects of the energy efficiency plans put in effect in 2011 by Turkey to curb its energy consumption by improving efficiency. After the energy consumption policies of 2011 showed promising results in curbing primary energy consumption, these policies were revisited and summarized in the National Energy Efficiency Action Plan (NEEAP) 2017-2023. According to the NEEAP, the success of reducing the primary energy consumption while the GDP kept increasing was achieved by successful application of efficiency law and regulation. The energy efficiency law no. 5627 of 2007, where Turkey took progressive steps to reduce its energy usage by improving efficiency and energy infrastructure. The energy efficiency law no. 5627 of 2007 mainly focused on the industrial establishment, public and private buildings, the construction sector, and waste management.44

After the energy efficiency law no. 5627 of 2007 came into effect Turkey introduced maximum emission limits and legal sanctions to its successful construction industry to improve the awareness of sustainable operation in the sector while encouraging the sector to become greener and more sustainable to avoid legal fines. Besides, sufficient financial aids and legislative framework were offered to the construction companies to promote new buildings to be built greener and energy-efficient. For example, new buildings were required to have double-layered energy-efficient windows and energy-efficient light bulbs. Strict

regulations took place in newly built buildings, and the construction industry was required to provide energy performance certifications during the transactions of sales and leasing of these properties. The rapidly growing construction sector of Turkey builds more than 100,000 buildings every year, and policies such as the requirement of energy efficiency certificates, incentives for greener buildings, and strict regulations did not exist before they came into effect in 2007.

The efforts showed promising results as Turkey was able to reduce its primary energy usage. Considering the increasing volume of the construction sector, revising the sector was an effective way to reduce the primary energy consumption while promoting resilient buildings.\textsuperscript{45} As of 2015, the energy intensity \textsuperscript{(*)} of Turkey is 0.12 tons of oil equivalent (toe)\textsuperscript{(**)} per 1,000 USD (at 2010 prices), which is lower than the world average (0.18) but higher than the OECD average (0.11). Thus, there is still a significant potential for energy efficiency improvement in Turkey, which would reduce the primary energy usage of the country further.\textsuperscript{46}


\textsuperscript{(*)} Energy intensity is a quantity of energy needed for every unit of output or activity (as in GDP). Less energy intensive indicates more efficiency.

\textsuperscript{(**)} Toe is a unit of energy represents the amount of energy generated by burning one ton(1000kg/2204lbs) of oil.
3.1 Energy Sector and Environmental Sustainability & Corporate Social Responsibility

3.1.1 Energy Policies of Turkey

The energy sector is the primary resource of GHG emissions in Turkey. In 2016, the energy sector shared 72.8% of the total GHG emissions. The energy and natural resources demand of Turkey have been increasing rapidly as a result of rapid growth in the economy, industry, and population. The growth rate of Turkey is annually at 5.5%, which ranks the country in the first place among OECD countries in the quest for natural resources to produce energy. Increasing demand for natural resources and energy production will double Turkey’s energy use over the next decade. Although the country maintains a total of 90.4 GW\(^47\) (gigawatts)(*) installed capacity (which means the total installed capacity of energy has tripled over the last 15 years), Turkey is still looking to increase its installed capacity along with sustainable and reliable energy resources.\(^48\)


(*) 1 Gigawatt power equals to 1.3 million horsepower, 3.1 million photovoltaic Panels, 412 Utility scale wind turbines.
As we see in the charts above, final energy consumption by sector along with GDP has been on the rise. One reason for this sudden boom has been achieved as a result of the radical sectorial privatization efforts of the Turkish Government started in 2001. Starting with the electricity sector, Turkey attracted investors and created a competitive market by privatizing the energy sector. Ever since the privatization of the energy sector, private investors have been investing and playing a significant role in the Turkish Energy Industry.  

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When we look at the overall structure of energy in Turkey, two main points draw attention the most; first, there is a constant increase in energy demand. Second, the country is highly dependent on energy imports to the level that this dependency can create energy insecurity. The country is in urgent need of providing energy independence. Energy independence means meeting domestic energy demand with national energy production, without depending on any other foreign resource. Energy independence has significance when it comes to manufacturing, development, and national wealth as it provides political superiority, production ability, and wealth to a country. Energy independence can be achieved thanks to a wide variety of natural resources and technological developments in a country. The need for oil creates the most significant energy dependency globally. Many countries must import oil since it is the primary source of energy production.

The levels of natural resources of Turkey required for energy production, especially natural gas and oil, are extremely limited. When the national energy demand increasing rapidly, and there are no adequate reserves of natural resources for energy productions, Turkey becomes a highly import-dependent country. To explain Turkey’s energy-import dependency further, it is essential to state that 91.3% of the oil and 99.7% of the natural gas used for domestic energy production was imported in 2016, the country was able to meet only 26% of the energy demand with other national resources.\(^5^0\)

The chart above shows us the distribution of final energy consumption percentage by sectors in 2016. 32% of the total energy generated has been distributed to the residential/commercial and institutional sector, 25% of the total energy generated has been allocated to the transportation sector, 32% of the total energy generated has been distributed to the industry, 4% percent of the total energy generated has been allocated to agriculture, and lastly, 7% of the total energy generated has been utilized by non-energy use sectors.

Throughout history, nations have fought over resources, and thanks to natural resources, they created wealth, have gained domination over other regions and nations. Natural resources are so valuable that countries and even entire continents have suffered due to a lack of them. Even today, countries, mostly in Asia, Africa, and South America are suffering because of limited resources. Indeed, it can be said that the availability of resources has fundamentally affected every aspect of our evolution and history.
In order to analyze the situation of energy-dependent Turkey in the global energy case further, it is useful to take a look at the example of the 1973 Global Oil Crisis. In the year 1970, the oil demand of the US was rapidly increasing. The majority of this demand was being met thanks to the imports of Middle East oil. During the Yom Kippur War of 1973(\textsuperscript{(*)}), the Organization of Arab Petroleum Exporting Countries (OAPEC) decided not to export oil to the United States and its allies due to their support to Israel in the 1973 Yom Kippur War. Mass shortages occurred in the supply; oil prices have increased globally; the price for a barrel of oil soared from $3 to $17 only in the United States. This embargo acutely harmed the United States economy -which had become dependent on foreign oil- in a short time.\textsuperscript{51} Importing resources had become an essential weakness for the United States and the other countries which were dependent on the Middle East oil, whereas the OAPEC had the edge over these countries by becoming the primary supplier of their energy needs.

Another example of how resource dependency can become an energy security turmoil for a country is Russia – Ukraine/Europe gas disputes. Russia has cut off natural gas flows into Ukraine a few times in the last ten years as a result of political and regional conflicts. The situation directly affects the security and reliability of the energy supply of Western Europe, as Ukraine is one of the bridges carrying the Russian natural gas to Europe.

Russia has an advantage against European Union countries when it comes to politics as the European Union is one of the leading importers of Russian natural gas.(\textsuperscript{(*)}) Even though the Russian gas is not the only option for Europe as the European gas grid is being fed by multiple different sources, and Europe imports only 24% of its gas from Russia, a reduction

in Russian supply is still powerful enough to hurt the European economy and energy security. Therefore, the main points of Turkey’s energy strategy can be sorted as;

- Invest in a sustainable and reliable energy supply.
- Invest in reducing energy import dependency.
- Focus on environmental sustainability.
- Support research and development of alternative energy sources.

Fossil fuels play an essential role in the Turkish Industry; almost 90% of the energy demand is being met by fossil fuels, mostly imported. In order to reduce energy import dependency, Turkey is also utilizing and looking to increase domestic coal production, renewable energy installments, and international cooperation for nuclear energy developments. Turkish Government is also publishing energy efficiency research and development reports as guidance for the sector periodically. Besides, Turkey sees nuclear energy as an effective way to curb GHG emissions in energy production. Nuclear energy production is also seen as a vital diversification to reduce energy import dependency by the Turkish Government. As a result, two nuclear plants, Akkuyu (with the cooperation of the


(*) Also known as “1973 Arab-Israeli War”.

(**) One-Third of Russian gas flows into European Union


Russian Government) and Sinop (with the collaboration of the Japanese Government), are in the process of construction.55

3.1.2 Key Policies

Turkey’s main area of focus is increasing the domestic supply and reducing energy dependence. Therefore, the critical points of its strategies are as follows;

- Promote domestic production and increase domestic renewable resources.
- Production without dependency.
- Decentralize the supply chain.
- Increase energy efficiency and renewable energy applications.
- Diminish fossil fuel consumption.
- Invest and utilize natural gas.
- Invest in nuclear power.
- Improve and maintain the energy security of small and mid-size enterprises (SMEs).

In order to achieve sustainable economic growth and provide affordable energy for the citizens and SMEs, the country needs a remarkable amount of investments in its energy infrastructure. Especially for the manufacturing industry, Turkey should provide competitive various energy supplies to its domestic market. Even a small increase in energy demand in today’s energy outlook of Turkey will require serious investments to the current energy infrastructure, mainly dependent on imports. New gas storage facilities, new power plants, decentralization of existing infrastructure, and similar investments are estimated to cost more

than USD 260 billion. Almost 65% of this amount is required by the electricity sector, whereas the oil and gas sector would require 25% of it.56

Public policy has to serve the common good of people. It is essential to create and use policies to make people’s lives better and eliminate potential threats to the wellbeing of society. As the energy sector is responsible for 72.8% of the total GHG emissions in Turkey, it is useful to look at the energy sector’s corporate social responsibility and government’s policies on environmental sustainability to see if Turkey is on track with the United Nations Sustainable Development Goals 2030 (SDGs), and what the motivations or obstacles for the country to be able to on track or not. Center for Global Energy Policy at the School of International and Public Affairs at Columbia University explains the importance of public policy on the energy sector as follows:

In just a few years, the global hydrocarbon outlook has rapidly shifted from scarcity to abundance as a result of new technologies… These changes have significant economic, geopolitical, security, and environmental implications that demand independent, balanced, data-driven analysis.

At the same time, the cost of clean energy technologies continues to fall, and there are increasingly urgent calls… to take meaningful action to address climate change. Energy policymakers must balance the economic, security, and geopolitical benefits of increased oil and gas resources with the need to drive the development cost reduction, and deployment of emerging clean energy technologies and improve the energy productivity of the economy.

The policy choices made in the coming years, both domestically and globally, will be of profound importance in balancing these multiple objectives. Smart policies will be key to meeting the defining challenge of the next generation – how to provide billions of more people with reliable, affordable, secure access to energy supplies that enable more rapid rates of economic growth while sustaining the planet.57


Policies are useful for multiple reasons; some of those reasons would be; preventing or mitigating environmental pollution, use resources sustainably, provide environmental justice, meet global international goals. The application of and changes in policies come with economic consequences. The best-case scenario would be finding the optimum level, which would be a combination of environmental sustainability, continuing economic activity, public benefit, and achieving long-term goals, both for the economy and the environment. Finding this sweet spot can be the most challenging part for countries to apply progressive policies, especially if there is a possible financial consequence of replacing or implementing strategies as there can be unintended consequences of strategy changes.

Turkey has been continuously working on the applications of Sustainable Development Goals into governmental policies. The country has profound reports and road maps to make its industries more efficient and resource responsible, along with promoting and raising awareness about corporate social responsibility. In Turkey, policies are made by the central governments along with legal regulations, which binds all the private and governmental entities in 81 provinces. Thus, if there is a new policy for a city, the same procedure applies to other cities as well.

3.1.3 Energy Efficiency

Energy efficiency is one of the most critical topics for the Turkish Energy sector as the country is highly dependent on importing resources, which creates a remarkable amount of disadvantage that poses a threat to the energy security of 80 million people, weakens the country’s stance in the international arena, along with high costs of production and unaffordable, unsustainable energy prices. As the energy demand of Turkey is increasing most rapidly amongst the OECD countries, investing in resilient and efficient energy infrastructure to use imported energy more efficiently has the highest importance for the
country. Energy efficiency is an effective way to decrease energy costs and the volume of expensive energy imports along with curbing GHG emissions as well.58

As of 2015, the energy intensity (*** of Turkey is 0.12 tons of oil equivalent (toe)† per 1,000 USD (at 2010 prices), which is lower than the world average (0.18) but higher than the OECD average (0.11). Thus, Turkey must work more on efficiency as there is a significant potential for energy efficiency improvement.59 Turkey acknowledges this potential and is determined to utilize it for the country’s benefit. One of the major topics of recent governmental publications is energy efficiency. Reducing the amount of energy needed to produce one more unit is targeted both in private and governmental parts of production. Reducing the energy intensity of a country is desired as it will reduce the environmental damage and promote cost-effectiveness.

Turkey wants to revive its domestic production while reducing energy import dependency from the region. The country’s long-term goal of more domestic and more renewable can be achieved with successful applications of progressive policies and productive investments, which will help to revive domestic production as planned, utilize renewable energy potentials such as solar, geothermal, and wind, along with increasing the energy efficiency. As the first step, Turkey formed Energy Efficiency Law in 2007 to start a


(*** Energy intensity is a quantity of energy needed for every unit of output or activity (as in GDP). Less energy intensive indicates more efficiency.

(†) Toe is a unit of energy represents the amount of energy generated by burning one ton(1000kg/2204lbs) of oil.
new transformation in the energy sector, following with energy Efficiency Strategy reports and road maps in 2012 to set energy efficiency goals to be achieved by 2023. The primary purpose of the Energy Efficiency Law of 2007 is to avoid waste, use energy efficiently and effectively, reduce the cost of energy for the domestic economy, and maintain the environmental sustainability. The law includes the regulation of the buildings and their performance of efficiency, regulation, and support of small and medium-sized enterprises (SMEs) to promote energy efficiency in the SME sector by providing training, audition, and consultancy. In addition to laws and regulations, the government founded and operated the ENVER portal (enverportal.yegm.gov.tr) is an efficient online database to track energy efficiency activities and energy consumption and to find detailed reporting on energy efficiency for all energy and production-related entities.

3.1.4 YEKDEM – Renewable Energy Resource Support Mechanism

YEKDEM has come into force in 2013, and the policy’s goal is to support investors for renewable energy infrastructure investments and for generating electricity from renewable energy sources by providing them required incentives. The primary goal is making investments in renewable energy more desirable and preferable for investors while supporting environmentally friendly energy transition and reducing energy import dependency thanks to new infrastructures. Feed-In-Tariffs are designed to become the primary support for new renewable energy power plants under the YEKDEM program, and these tariffs are planned to be valid for ten years with the rates of $0.133/kWh produced for biomass and solar, $0.073/kWh produced for wind and hydro plants and $0.105/kWh produced for geothermal.

The YEKDEM policy is paying renewable energy producers for their energy production. 61 For instance, an investor with a 3 kW (kilowatts) solar PV (photovoltaic panels) system would generate about 3,000 kWh per year. (††) Since the feed-In-Tariff for solar power generation is $0.133/kWh, the calculation would be; 3,000*0.133 = $399 gained per year. If this investor uses half of all the energy they generate, the rest of the electricity generated from their investment would be exported back to the energy grid; in another saying, the government would buy the excess power. If this is the case, the investor will earn from the unused portion of the energy generated as well. These tariffs are secured for ten years, and producers are guaranteed to sell their produced energy at the fixed price during this term, as stated by Law No. 6446 of 2013. 62 Thus, market risks or fluctuations would not damage investors for ten years. YEKDEM is one of the most attractive policies for small and middle-size enterprises, along with investors; besides, it provides excellent opportunities for foreign investors as well. Currently, there are 465 renewable energy power plants in Turkey benefiting from the YEKDEM policy. As of 2016, the total amount paid for 62,474,456.66 MWh national electricity generated is 21.98 billion Turkish Liras. 63 One field that YEKDEM

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(††) 3 kW is usually what is used in family homes, but to keep the calculation simpler I used this example. 3 kW energy can be generated with 10-12 solar panels.

has accelerated is the wind power capacity of Turkey; as of 2019, installed wind power capacity has reached 8,000.00 (megawatts), \textsuperscript{64} which was 18.9 MW in 2002.\textsuperscript{65}

### 3.1.5 YEKA – Renewable Energy Resource Areas Auctions

Another essential policy YEKA was introduced in 2016 as an effective way of utilizing the renewable energy potential of Turkey. YEKA (Renewable Energy Resource Areas) policy aims to take advantage of large-scale lands owned by either public/treasury or private entities by assigning these areas to investors on the condition of renewable energy generation. Investors compete with each other during the tender offer to win the right to utilize these large areas to produce renewable energy for the nation, and By-law requires that majority of the supplies to generate the renewable energy power plants are provided from the domestic market and have domestic goods certificate, which ensures that local industries and domestic market are also receiving support and dividend from these investments directly and indirectly. Turkey’s Energy Production Policies have the main focus on utilizing the country’s potential, maximizing domestic energy production, and minimizing the import dependency, which will increase the energy security of the country. Under the YEKA tender, the winner investor also has to invest in a wind turbine manufacturing plant which will produce Turkish made wind turbines. As it is required by law, at least 65\% of wind turbines will be local production produced by domestic supplies with a production capacity of 150 units per year (or 400 megawatts per year). Besides these obligations, investors who are


awarded the tender and interested in solar power generation are also required to establish solar PV (photovoltaic) panel production plants near the solar power plant itself, along with investing in research and development actions and projects.66

YEKA is a supplemental policy to YEKDEM, as investors can take advantage of both of the policies for their investments while increasing the total energy production of the country from renewable sources and generate continuous revenue and work volume. After it came into force, YEKDEM per se attracted a respectable number of investors, and a total of near 7 GW (gigawatt) onshore wind power plants have been installed by the end of 2018, besides 5 GW solar PV target was reached at the same time, which was initially planned to be met by 2023. As a result of these policies, total renewable energy production in Turkey has reached to more than 9% by 2018, which will increase further when all the investments reach their full operational potential in the near future.67 By attracting more investors, following recent technological advancements, and utilizing the renewable energy potential of the country in full, Turkey can generate up to 30% of its total energy production from solar and wind alone.68(†††)


Improvement of onshore wind and solar PV capacities can be seen in the charts below:

Figure 11 Cumulative installed capacity of solar PV and onshore wind energy in Turkey 2007-2017


Turkey has attracted many investors and created 7,000 jobs in the renewable energy sector, and the Turkish Government has been very determined for further expansion of the sector to the point that it shows more enthusiasm than many countries in Europe. It is aimed to generate 25 GW from wind energy by 2030. If the country can keep having these supportive, attractive policies, along with its supplemental research and development efforts,


(†††) %30 is predicted with the best-case scenario in the report. It is also possible for Turkey to generate %12 to %21 only from solar and wind power by 2026. The best-case scenario is used in order to draw attention to country’s encouraging potential.
the sector’s future in Turkey is very promising and encouraging, as the country will keep attracting reputable numbers of domestic and foreign investors.69

3.2 Industry and Environmental Sustainability & Corporate Social Responsibility

3.2.1 Industry Policies of Turkey

The industrial sector is accounted for generating 25% of the GDP in Turkey; the sector provides a remarkable amount of employment and a significant factor in national economic growth. The most significant share of revenue in the country belongs to the manufacturing industry with a share of 83.8%; it is followed by supply products for the energy sector industry with 12.4%, whereas 2% of the share belongs to the mining and quarrying industry, and lastly, 1.8% of the share of revenue belongs to water treatment industry. Besides, the manufacturing sector employs the most amongst the other sectors by employing 97% of the workers in the industry as it is in touch with many different sub-sectors such as food, metal, parts production for motor vehicles, and textile.70


As of 2016, the industry sector in Turkey is responsible for 32% of the country’s total energy consumption, with a demand of 33 million toe (tons of oil equivalent). Besides the high amounts of energy use, it is predicted that the water demand of the industry sector will increase in the near future. By 2023, it is projected that 22 billion m³ water will be used by the industry sector in Turkey, which is an increase from the current share of 13% to 20%.  

When the resource use of industry is high and expected to keep growing, environmental sustainability policies are becoming highly essential to create sustainable development paths for producers and the country. It is stated in the Turkish Industrial Strategy Document that Turkey is aiming to have a sustainable industry that follows the principles of the Sustainable Development Goals. The country is working towards the full implementation of environmental sustainability policies, which are essential for a growing and advancing economy.

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industry. By resource responsible and environmentally friendly production, the Turkish Industry aims to become more competitive and efficient. The country has been working on effective policies, research and elaborations, and applications of these policies to its sectors, which are rapidly growing and becoming resource hungry.\(^{72}\)

### 3.2.2 Key Policies

Turkey’s primary area of focus is increasing efficiency, support small and middle enterprises and entrepreneurship, promote green growth and production. Therefore, the critical points of its strategies are as follows;

- Foster innovation and increase the green manufacturing potential of domestic firms.
- Give importance to recycling and recovering industries.
- Help SMEs to become competitive and environmentally sustainable.

### 3.2.3 Financial Support Scheme for Energy Efficiency Projects in Manufacturing Industry (VAP)

VAP is a financial support program supplementary to the ongoing energy efficiency implementations of Turkey. As supplementary to the Energy Efficiency Law of 2007, the VAP program has been designed to provide necessary funds to industrial enterprises that develop projects in order to increase the energy efficiency of their existing production systems. Producers that use a minimum of 500 toe\(^{(*)}\) of energy annually are eligible to apply for the VAP project and receive funds to develop and apply their energy efficiency

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innovations to their ongoing production practices.\textsuperscript{73} If the estimated cost of a project is under 5,000,000 TL (~ 845,000 USD), 30\% of the cost is granted to project owners by the Ministry of Energy and Natural Resources. The main aim of this support is to help SMEs to improve their production methods and facilities by renewing and renovating while minimizing total waste and waste energy during production. Increasing energy efficiency is an important step for industries to cut Co2 emissions and reduce the cost of production. Since 2009 a total of 213 projects have been funded, and a total of 23,500,000 TL (~ 4,000,000 USD) has been granted. While the total investment made from enterprises for these projects is 97,900,000 TL (~ 16,500,000 USD), total of 84,700,000 TL (~ 14,282,000 USD) has been saved thanks to renovations and innovations in production lines.\textsuperscript{74}

3.2.4 Developing National Green OIZs (Organized Industrial Zones) / Eco-Industrial Parks

Industrial zones play a significant role in production as these areas are efficient hubs that bring multiple different clusters of different sectors together. Organized industrial zones (OIZs) are an excellent opportunity for industries to thrive and become internationally competitive; many countries around the world, especially emerging markets, invest in these zones as OIZs provide great economic growth opportunities. While accumulating producers into a designated large area by creating these industrial zones helps to improve productivity

\textsuperscript{73} United Nations Framework Convention on Climate Change, Seventh National Communication of Turkey Under the UNFCCC, August 28, 2019, pt.4, 95, accessed February 12, 2020, \url{https://unfccc.int/documents/199646}.

\textsuperscript{74} Republic of Turkey Ministry of Energy and Natural Resources, National Energy Efficiency Action Plan 2017-2023, 2018, accessed on July 20, 2019, \url{https://policy.asiapacificenergy.org/node/3903}

(*) Ton of oil equivalent, is a unit of energy represents the amount of energy generated by burning one ton(1000kg/2204lbs) of oil.
and production, these areas can also have adverse effects on regional natural resources, environmental sustainability and can become main polluters in the area.

Figure 13 Izmir Pancar Organized Industrial Zone

As a developing and emerging economy, Turkey needs to utilize OIZs while reducing the adverse effects of these areas on the environment. For this reason, the 11th Development Plan of Turkey is especially emphasizing the transition to green growth. The country is giving great importance to environmental sustainability and sustainable use of natural resources while increasing environmental awareness and promote socially responsible production.75 Turkish industry should increase the use of high technology, and since the government is supporting research and development initiatives on green growth, the industry should take necessary actions to start the green growth transition as well.

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The Republic of Turkey is also effectively utilizing international relations and opportunities to receive sufficient support for the country to keep up with the United Nations Sustainable Development Goals. The concept of Green Organized Industrial Zones / Eco-Industrial Parks is a result of the combination of these efforts. The implementations of Eco-Industrial Parks are becoming highly popular among emerging markets as a transition to Eco-Industrial Parks can improve productivity, resource efficiency, corporate social responsibility, and reduce greenhouse gas emissions and other harmful effects of industrial production on the environment and public. Eco-Industrial Park investments are made to increase production efficiency, energy efficiency, improve energy infrastructure, have better waste management strategies and capabilities, promote responsible water use, practice advanced recycling, increase the use of renewable resources. In another saying, a sustainable operating environment for companies and suppliers.76

The United Nations Development Organization (UNIDO) and the World Bank have been providing necessary support to emerging markets that are looking to start their transition to eco-friendly production by making required investments to build Eco-Industrial Parks. 77 These supports help policymakers and the private sector come together, cooperate and guide


them to establish eco-industrial parks, and increase economic, social, and environmental sustainability. ⁷⁸

There are currently 327 OIZs in Turkey, and 250 of them are in operation, employing more than 1.8 million people nationwide. OIZs in Turkey are established as PPP (public-private partnership), and as it is stated in the 11th Development Plan of Turkey, the government is determined to support the firms which are a part of the OIZs by establishing innovation centers inside OIZs to support and educate tenant firms about business practices, the adaptation of new technologies, energy efficiency, waste management, digitalization, and similar practices. ⁷⁹ In addition to these innovation centers, established infrastructure such as road, energy lines, water management, waste management is provided in these zones, and these utilities support firms to be more productive, resource-efficient, and environmentally responsible. It is reported in the Transformation of Organized Industrial Zones in Turkey publication that well maintained, well developed OIZs with modern infrastructure attract firms and support their innovative and economic performance. ⁸⁰

After a detailed technical analysis and research, the World Bank Group, under the Country Partnership Framework, has approved the investment project financing for 18 OIZs.

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in the Republic of Turkey to support the country for its transition to Green OIZs. According to the World Bank, the main goal of the support (Project ID P171645) is helping Turkey to increase its production efficiency and environmental sustainability of its OIZs, convert these zones into Green OIZs (Eco-Industrial Parks). The project will be an essential guide for clean production, innovation, new technology implementation, green growth, and creating an environmentally sustainable business environment, which will promote corporate social responsibility by providing required green infrastructure to the tenant firms operating inside Green OIZs. As a result of Green OIZs transition, the following outcomes are expected:

- Increasing investment in green infrastructures,
- Increase in private investments to OIZs,
- Increase in firms with better corporate social responsibility practices,
- Water-saving and better wastewater treatment,
- Energy-saving and decrease in Co2 emissions during production.

Expected positive effects of investing in green infrastructure also stated in the report as follows;

Green infrastructure examples include investments in energy supply from renewable sources (e.g. rooftop solar photovoltaic, biogas), LED street lighting, advanced wastewater treatment, improved energy efficiency of administrative buildings, and recycling/reusing waste materials for production inputs. It could also include investments to facilitate industrial symbiosis between two or more firms, e.g. pipes to share heat/steam that is a byproduct of one industrial process and needed as input to another. Green infrastructure would have both environmental and competitiveness benefits by reducing electricity, water, and waste expenditures for OIZ management and resident firms. The infrastructure would also be expected to help zones obtain a “Green OIZ” certification.⁸¹

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**Figure 14 Developing National Green OIZs**

3.3 Agriculture and Environmental Sustainability & Corporate Social Responsibility

3.3.1 AGRICULTURE Policies of Turkey

For a well-populated country like Turkey, it is a must to have sustainable, environmentally friendly, and efficient agricultural practices to securely meet the food demand. Turkey aims to have a secure food supply for its rapidly increasing population. In addition to the increasing domestic demand, it is also essential to remain as a competitive producer for the international market. During the 1960s, agriculture was responsible for half of the country’s GDP, and Turkey used to be considered as an agrarian country. As a result of the increase in the industry and industrial production, there has been a significant decline in farming practices and arable lands; as of 2016, agriculture is accounted for only 6.2% of the country’s total GDP. However, the agricultural sector remains as a significant addition to the overall GHG emissions as it is responsible for 11.4% of the national GHG emissions. Besides, 55.5% of total CH₄ (methane) and 77.6% of N₂O (nitrous oxide) emissions are caused by agriculture. ⁸²

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Although the agricultural practices and its share in the total GDP of the country have been declining, Turkish agriculture is still a vital supplier for international trade. The OECD estimates that the country will become the world’s 7th largest producer in the near future. As a result, environmental sustainability policies have significant importance when it comes to agricultural practices. The changes in climate patterns can directly affect, disrupt, and threaten crop quality, food, and water availability hence the food security. Floods can become more frequent as a result of irregular precipitation, which can cause soil erosions and water pollution, or droughts can be seen as a result of decreased rainfall, which will directly affect crops and make arable lands useless. Farmers who are familiar with local conditions may not adapt to rapid changes and shifting patterns of these events, which may leave them helpless. New and invasive pests, insects, and harmful weeds can be seen in a previously secured region, or the local ones become stronger, which will threaten the wellbeing of crops and land. Farmers may choose to use more fertilizers, pesticides, and other chemicals to cope with these rapid changes, which can damage the soil quality and crop health faster, hence harm productivity.

In addition to GHG emissions, threatened crop, and soil quality, another significant problem in the sector is water usage. Although the country is surrounded by three different seas, it is not a water-rich country when we consider the available water per capita. When a country has available water around 10,000 cubic meters (m³) per capita, it is considered a

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water-rich country, whereas Turkey has only 1,500 cubic meters (m$^3$) per capita. As the population of Turkey is expected to rise, available water per capita will diminish further. The growing population will create more water scarcity for the country.\textsuperscript{85} However, the country is the third-largest water consumer for agricultural practices amongst OECD countries.\textsuperscript{86} Agricultural irrigation takes 75\% of the total water consumption in Turkey.\textsuperscript{87} When a water-stressed, highly populated, and high-water consumer country like Turkey is a concern, sustainable agricultural practices and policies have a curial role in environmental sustainability.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure15.jpg}
\caption{Total Numbers of Meteorological Extreme Events in Turkey (including heavy thunderstorms, floods, hail, freeze, landslide, wildfires, sandstorm, tornado, low air quality.)}
\end{figure}


\textsuperscript{85}Republic of Turkey Ministry of Foreign Affairs, Turkey’s Policy on Water Issues, accessed May 7, 2019, \url{http://www.mfa.gov.tr/turkey_s-policy-on-water-issues.en.mfa}


\textsuperscript{87}Organization for Economic Co-operation and Development, Agricultural Water Pricing: Turkey, 2010, 5, accessed May 9, 2019, \url{http://www.oecd.org/turkey/45016347.pdf}
Above, the increase in total numbers of extreme weather events (including heavy thunderstorms, floods, hail, freeze, landslide, wildfires, sandstorms, tornado, low air quality.) in Turkey can be seen. Unpredictable and shifting climate patterns play an essential role in these events, and it is forecasted to have more extreme weather events in the future.\textsuperscript{88} The increasing number of extreme weather events has tremendous effects on agricultural efficiency and the food security of Turkey. As a result, effective and well-thought policies have to be prepared and applied promptly.\textsuperscript{89}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure16.png}
\caption{The Environmental Effects of Agriculture in Turkey and the OECD Average}
\label{fig:16}
\end{figure}

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\end{flushleft}


Agriculture is one of the leading exploiters of natural resources in Turkey. The sector has a remarkable impact on air and water quality, along with being a significant user of energy, national land, and water resources. According to the chart above, greenhouse gas emissions (GHG) of Turkish agriculture is close to the OECD average. Energy consumption is also close to the OECD average, but the water use of Turkish agriculture is significantly higher than the OECD average. Although the total land used for agriculture has been declining since 2,000, fertilizer and pesticide use has been increasing in the sector. The increasing use of fertilizers and pesticides is affecting the chemical balance of water and soil. For instance, the frequent application of fertilizers causes nitrogen accumulation in the soil, which will eventually pollute fresh groundwaters.\(^9^0\) Thus, Agricultural Sector’s social responsibility in Turkey can be suggested as; responsible use of freshwater and keeping the soil and water clean.

### 3.3.2 Key Policies

Turkey’s main focus on agriculture is to increase productivity and resiliency while improving efficiency and land quality. Besides, increasing the agriculture’s share in GDP is aimed to be increased significantly, especially by increasing agricultural exports numbers. Growth and improvements in the sector are planned to be achieved with a sustainability approach such as land consolidation on 14 million hectares and renew irrigation systems on all arable lands.

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3.3.3 Modern Irrigation System Incentive

Turkey has a total of 112 billion m$^3$ consumable surface and groundwater potential annually. Irrigation uses 40 billion m$^3$ (74%), industry and production use 7 billion m$^3$ (13%), and households use 7 billion m$^3$ (13%). The country can utilize only 48.2% of its water potential. In order to increase productivity and quality, the modern irrigation system incentive has been introduced to the agricultural sector in 2017. This system allows producers to use low-interest rate loans to meet financial expenses to improve the production and efficiency of farming. Modernizing the irrigation systems in Turkey will directly benefit the agricultural output and eliminate water waste, which is the most critical part as agriculture accounts for 74% of total water usage in the country.

![Sectoral Water Use in Turkey](image)

**Figure 17 Sectoral Water Use in Turkey**


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Before the Modern Irrigation System Incentive Plan has been implemented, Turkey had already acknowledged the significance of modernizing the irrigation systems of the agricultural fields. It is reported in the Tenth Development Plan of Turkey that in order to accelerate the implementation of environmental sustainability practices and efficiency, the country spent 14.7 billion Turkish Lira in 2012 to renew existed irrigation canals and build new ones. A total of 610 km (379 miles) of irrigation canals have been activated, and over 1.1 million ha (hectare) land consolidation has been achieved. 92 In the Eleventh Development Plan of Turkey, the continuation of support and investments in the agricultural sector’s environmental sustainability has also been remarkably emphasized.

According to the project, the irrigation systems that are older than 30 years and the irrigation systems that have not been maintained or used for decades are going to be the main focus for renovations and incentives. Fields with these types of irrigation systems are the least efficient ones, and the production costs are higher than desired as a result of inefficiency. Modernization of these agricultural fields will help farmers to cut production costs, increase profits, increase efficiency and quality of the products, which will eventually increase the overall welfare and production of farmers. 93

Turkey is one of the countries which are vulnerable to the negative effects of climate change. The country is already experiencing hotter summers, especially in the Mediterranean and Aegean regions, and a decrease in annual precipitation. As a per capita water stress country, the adverse effects of climate change, such as declined precipitation and hotter


summers, will further reduce water availability in the country, which will threaten the agricultural sector, hence food security. In addition to the water stress, agrarian lands in Turkey are also under threat due to land degradation and salination. 59% of the agricultural land is in danger of irreversible degradation as a result of poor water management, inappropriate irrigation practices that lead to erosion, salinization, desertification, and similar degradations.

With the guidance of the 10th and 11th Development Plans of Turkey, the country has requested support from the World Bank for the irrigation modernization program. As of 2018, the cost of the project is approximately US$232 and is funded by the World Bank in order to improve the irrigation infrastructure of 50,765 hectares in total. Atabey, Alasehir, Eregli-Ivriz, and Uzunlu are the first agricultural areas to be modernized with the funds as they are in urgent need of modernization, according to recent research and studies. It is aimed to increase efficiency and decrease water usage by switching these areas from the water inefficient open channel flow irrigation system to pressurized pipe irrigation systems. The primary purpose of the modernization project is to reduce the already high total water usage in agriculture and mitigate the effects of climate change on increasing water stress in the country.


96 Ibid.
3.3.4 CATAK (Environmentally Based Agricultural Land Protection Program)

CATAK (Environmentally Based Agricultural Land Protection Program) have been introduced in 2006 to protect soil and water quality, which can be affected by agricultural practices. In addition to soil and water quality, the program also aims to prevent erosion, maintain sustainable agricultural practices, and provide environmental sustainability knowledge to farmers and investors. The program is pursued by the Ministry of Agriculture and Forestry and works as a supportive grant mechanism to eligible farmers.\textsuperscript{97} The program has started with four pilot cities and only 469 farmers in 2006. As of 2015, there are 51 cities and 22,628 producers registered in CATAK. After detailed field researches and elaborations on arable lands, the program first started in the high cultivation areas, which are close to being damaged irreversibly as a result of unsustainable agricultural practices. The program is designed as three years grant agreement and provides sufficient funds to farmers in accord with their land size and practices. Between 2005 and 2008, a total of $9 million has been invested under the CATAK program; the amount has been provided by World Bank funds as a part of the transformation program of Turkish Agriculture. The Ministry of Finance and Treasury of the Republic of Turkey has been funding the program since 2009.\textsuperscript{98}


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The United Nations Framework Convention on Climate Change (UNFCCC) considers CATAK as one of the best environmental sustainability programs in Turkey,\textsuperscript{99} as it aims to take necessary precautions to prevent irreversible damage to soil and water quality along with promoting replenishing of renewable natural resources and fight against erosion. Besides, the program is helping to reduce methane (CH\textsubscript{4}) and carbon dioxide (CO\textsubscript{2}) emissions by educating farmers to adopt environmentally sustainable agricultural practices. It is also important to mention that as a strong European Union candidate, Turkey’s CATAK program is sharing a common ground with the European Union’s agricultural fund for rural development (EAFRD). As of 2018, the CATAK program is supporting a total of 166,834 producers by covering 625,736 ha (hectare) and investing 637,652,975 TL (109m USD).\textsuperscript{100}

3.3.5 EU IPARD – European Union Pre-accession Assistance for Rural Development

European Union has developed the IPARD program to assist candidate countries in promoting rural development during the process of becoming an EU member. Turkey, as a strong European Union candidate, is eligible for the IPARD program. IPARD focuses on developing the agri-food sectors in rural areas by promoting environmental sustainability, responsible agriculture, and introducing the EU policies and applications to these areas.


Besides Turkey, Albania, Montenegro, North Macedonia, and Serbia are also benefiting from the IPARD support.¹⁰¹

According to this program, the main goal is to encourage small and medium-sized agri-food industry firms to adopt environmentally sustainable agricultural practices and sustainable production. European Union funds pay 75% of the projects while the Republic of Turkey pays the remaining 25% of the expenses. These projects have been supporting local producers, help rural areas improve and transforming meat and dairy producers, fruit and vegetable producers, fisheries and aquaculture, bee culture, plant breeding, greenhouse cultivation, and many different occupations. As of 2017, at the end of the first part of the program (IPARD I), a total of 10,693 investors paid 6.7 billion TL into the IPARD guided projects, and they received 3.15 billion TL grants from the Agricultural and Rural Development Support Institution (TKDK) of Turkey. These investments employed 57 thousand people and revived the export capacity of small and middle-size firms.¹⁰²

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Figure 18 IPARD Support Eligible Provinces, Turkey


The second part of the IPARD program (IPARD II), which covers the 2014-2020 term, is currently active and still supporting rural production and applications of related Sustainable Development Goals. Developing rural areas has significant importance for the overall wellbeing of Turkish society and the embracement of sustainable development goals in Turkey. Although the agricultural fields have decreased in recent years for the sake of industrial advancement, agriculture is still an important value for Turkey. The sector is still an important employer and fruitful field for entrepreneurship. From big firms to small-scale production, Turkish agriculture plays an important role in rural development. More than half of the population (66.4 %) in rural areas is working in agricultural production.\textsuperscript{103}

Thus, projects like IPARD, international cooperation, and governmental entrepreneurialism are highly important for creating incomes, fight poverty, and reduce unbalanced development which accumulated around big cities and metropolitan areas. Along with rural support and development, the IPARD program is also aiming to improve employment conditions and gender equality in rural production. Women's employment and entrepreneurship are highly encouraged and supported. Turkish Government and the EU IPARD program is giving priority to the projects submitted by women and young entrepreneurs. For instance, the projects to be funded are selected by a grading system out of 100 points, and the projects that are prepared by women entrepreneurs or projects that are aiming to improve women's employment receive 15 points directly. The first IPARD program (IPARD I, 2006-2013) has been helping Turkey to improve the country’s support capability and rural development.

Figure 19 Agricultural and Rural Development Support Given Yearly (Million TL)


105 Ibid.
CHAPTER 4: THE UNITED STATES

The United States is the 3rd most populated country in the world, with more than 330 million people as of 2019. By 2050 the population of the country is expected to exceed 430 million. The country is the highest populated amongst the advanced economies. Besides its population, the economy of the United States has been continuously growing; in 2012, the country was the second-biggest economy after the European Union, with a GDP of $15.7 trillion. Today, the country has become the biggest oil and gas producer in the world by outproducing Russia and Saudi Arabia. With a population of 330 million people and a current GDP of $21 trillion, the country is the largest economy of the OECD. Being the largest economy in the world results in increasing amounts of greenhouse gas (GHG) emissions. The United States is the second-largest GHG emitter in the global economy after China.


The country has been investing in transition fuels such as natural gas and improving renewable energy options such as renewable biomass, hydropower, solar, and wind power. The United States is a resource-rich country with respectable amounts of natural resources and diverse resource utilization capabilities such as petroleum, nuclear, renewable, and natural gas for its domestic energy demand. As of 2017, oil has the most significant share in the country’s total energy consumption by meeting 37% of the domestic demand. Natural gas follows oil with 29%, coal 14%, renewables 11%, and nuclear electric power meets 9% of the total domestic demand.

Figure 20 USA GDP at Current Prices

The primary energy source of the country is fossil fuels; natural gas usage is rapidly increasing while coal is losing its popularity. The utilization of natural gas and the use of renewable resources is expected to keep growing.

The United States, as a developed industrial country with high GHG emissions, has signed the Kyoto Protocol in 1997 but has not yet ratified it. The initial goal of the Kyoto Protocol international treaty is to bring GHG emissions 5% lower than the global GHG levels of 1990 as a part of global efforts to preserve and protect environmental quality, air quality, public health, and slow down the adverse effects of global climate change.

Under the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol was designed as two phases; the first-period takes account between 2008 and 2012, intending to lower the global GHG emission 5% lower than the 1990 emission levels, and the second-period covers between 2013 and 2020, aiming to reduce the global GHG emission 18% lower than the 1990 emission levels.\textsuperscript{110}

\textsuperscript{110} “What is the Kyoto Protocol?” United Nations Framework Convention on Climate Change, accessed February 12, 2019, \url{https://unfccc.int/kyoto_protocol}. 
In addition to not ratifying the Kyoto Protocol, the United States announced in 2017 that the country is withdrawing from the Paris Agreement due to the concerns on the consequences of the Paris Agreement on the US Economy. The purpose of the Paris Agreement is to bring all nations together to draw attention to the potential risks of climate change and increasing global temperatures, create globally approved guidance for countries to mitigate the impacts of the changing temperatures, and promote and strengthen global efforts to reduce global CO2 levels.\textsuperscript{111}

It is essential to look at the sustainable development policies and applications of the world’s largest economy to analyze how an advanced economy applies environmental sustainability policies while promoting sectoral growth and corporate social responsibility. First, in 2014, the United States has submitted its first biennial report as the 2014 U.S. Climate Action Report under the UNFCCC (United Nations Framework Convention on Climate Change) Sixth National Communications initiative. In this report, the United States acknowledges the importance of remarkably reducing the GHG emissions by the year 2020. According to the 2014 U.S. Climate Action Report, between 2009 and 2011, the country has achieved lowering GHG emissions to the levels of 1994-1996 thanks to governmental policies along with economic factors. The country has been mainly focusing on agricultural efficiency, improvements in buildings and appliances, and vehicle GHG emissions reduction, while increasing the share of wind and solar-powered electricity generation of the country.\textsuperscript{112}


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In addition to the U.S. Climate Action Report, the previous administration of President Barack Obama published President’s Climate Action Plan in June 2013 to address the importance of accelerating clean energy investments, cutting GHG emissions in industry, and application of national sustainability policies.113

Second, the previous administration of President Barack Obama has underlined the importance of collective international efforts to address global climate change and reduce global GHG emissions. The administration stated the importance of working closely with the world’s major economies and major emitter countries such as China and India. In 2009, 44th President of the United States Barack Obama launched the Major Economies Forum on Energy and Climate and brought 17 countries that are accounted for 75% of the global GHG emissions together. This meeting aimed to establish a common ground for global GHG emission reduction and climate change action for emerging and developed economies while guiding potential initiatives and cooperation.114

Third, along with international cooperation and efforts, the United States was also an essential agent for global climate negotiations and inclusive action programs. During 2009, under the United Nations Framework Convention on Climate Change (UNFCCC), the United States worked closely with other world leaders and countries to create a common ground for curbing global emissions by setting targets and limitations with an internationally transparent and observable manner.


Lastly, with the current President Donald J. Trump’s administration, the United States has been gradually retracting from treaties that limit or set targets for GHG emissions, such as Paris Climate Agreement, due to economic concerns. Nevertheless, this chapter will focus on the most current environmental sustainability and CSR programs of the United States.

4.1 Energy Sector and Environmental Sustainability & Corporate Social Responsibility

4.1.1 Energy Policies of the United States

The energy sector is the primary resource of GHG emissions in the United States; in 2011, the industry accounted for 85.7% of the country’s total GHG emissions. As of 2017, 76% of the GHG emissions in the United States are coming from the energy sector. In 2018, the country generated a total of 95.7 quadrillions BTU of energy. This indicates that the country can supply 95% of its domestic energy demand. Although the energy


production of the country is stable, a decrease in the energy sector’s CO2 emissions occurred in the last decade. An important reason for this change is the increase in utilizing less carbon-intensive fossil fuels such as natural gas. Coal has the highest CO2 intensity (releases more CO2 when burned) among fossil fuels, whereas natural gas has a low CO2 intensity. The United States has a great variety of resources for the energy sector; fossil fuels, nuclear power, hydropower, and renewables are all used to generate energy for the country. By investing more in CO2 intensive resources for electricity generation, ceteris paribus, CO2 emissions of the sector can be reduced effectively.

Figure 22 Electricity generation and CO2 emissions of the US Energy Sector


(*) The United States itself is consumes about 17% of the global energy, the total primary energy consumption of the world was 582 quadrillion BTU in 2017.
Figure 23 Carbon Intensity of Fossil Fuel


4.1.2 Key Policies

The United States Environmental Protection Agency (EPA) is determined to remain as a guide for the agencies to reduce environmental footprint. Increasing energy efficiency, building efficiency, utilizing renewable energy, and lowering GHG emissions are some of the central policies. The United States is a federal republic; a number of federal agencies, advisory offices, and commissions are involved in national policies for coordinating, implementing, and development.

4.1.3 Smart Grid Investment Grant Program

Smart Grid Investment Grant Program is a public-private partnership that came into effect after the introduction of the Energy Independence and Security Act of 2007. The program aims to modernize the electricity distribution systems of the United States. The Department of Energy guides energy providers to modernize their grid by adopting the
newest technology, software, tools, and research and development techniques to upgrade their systems. The application of smart grid technology can help the energy industry become resilient, reliable, and highly efficient, which will support environmental sustainability and promote sustainable development. Smart grid technology works by providing two-way interaction by using a computerized automated controls system between different power grids and end-users to meet their demand in a most efficient and resourceful way. In other saying, this technology creates a reliable web of communication between readily available power from a variety of energy grids and the sophisticated energy demand of today’s end-user.\footnote{\textit{The Smart Grid}, U.S. Department of Energy, accessed January 6, 2019 \url{https://smartgrid.gov/the_smart_grid/smart_grid.html}.}

The program supplies federal financial assistance to eligible projects up to 50% of their planned costs. Ninety-nine projects have been supported with a total of $8 billion investment. With the help of the Smart Grid Investment Grant Program, the sector gains efficient energy transition ability, provides better service with the help of supportive grids and quicker restorations, reduces operational costs, eliminates the volume of peak demands, gains the capability of adding new renewable energy technologies into their supply, becomes more secure and resilient.\footnote{Ibid.}

4.1.4 EPA’s Green Power Partnership

The Environmental Protection Agency (EPA) formed the Green Power Partnership (GPP) in 2001 in order to encourage companies and organizations to voluntarily purchase renewable energy and support the renewable energy market while reducing the dependency on electricity generated by fossil fuels. According to the partnership, EPA guides companies and organizations by providing the required technical assistance and information. Companies receive national recognition in return for their clean energy purchase while reducing their
environmental impact and carbon footprints. It is an effective way of educating companies and encouraging corporate social responsibility. Companies of any size that use more than 100,000 kWh, that want to improve their environmental sustainability practices can benefit from the free and voluntary partnership program and become the pioneers of one the most rapidly emerging markets in the United States, gain national recognition, and promote their EPA Green Power Partnership recognition to attract an increasing number of environmentally concerned customers.

As of 2018, there are more than 1700 organizations from different sectors benefiting from EPA’s Green Power Partnership program, using more than 45 billion kWh annually. Since 2001, the program tremendously helped the United States renewable energy industry, conduced to create thousands of jobs in the country. A nationwide respected program like the EPA’s Green Power Partnership is an essential motivation for all sizes of businesses to become a part of environmentally sustainable business practices.

<table>
<thead>
<tr>
<th>Your Organization's Electricity Use</th>
<th>Green Power Partner Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>If your annual electricity use is...</td>
<td>You must, at a minimum, use this much green power</td>
</tr>
<tr>
<td>≥ 100,000,001 kWh</td>
<td>7% of your use</td>
</tr>
<tr>
<td>10,000,001 - 100,000,000 kWh</td>
<td>10% of your use</td>
</tr>
<tr>
<td>1,000,001 - 10,000,000 kWh</td>
<td>25% of your use</td>
</tr>
<tr>
<td>100,000* - 1,000,000 kWh</td>
<td>50% of your use</td>
</tr>
</tbody>
</table>

*Organizations that use more than 100,000 kWh are eligible for Partnership.

Figure 24 Green Power Partnership Requirements


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4.2 Industry and Environmental Sustainability & Corporate Social Responsibility

4.2.1 Industry Policies of The United States

The industrial sector of the United States is responsible for 22% of the country’s total greenhouse gas (GHG) emissions.\textsuperscript{123} The country has a variety of successful sectors as significant drivers of economic growth, such as real estate, information, non-durable goods manufacturing, automotive, retail, health care, and finance and insurance, and many other sectors. The industrial sector provides 20% of the GDP in the country.\textsuperscript{124}

4.2.2 Key policies

Central policies are shaped by closely tracking the sectoral GHG emissions and create roadmaps in accordance with the needs of the industry. EPA plays a vital role as a national guide to educate businesses, form public-private partnerships, develop roadmaps, and financially support transformative initiatives.

4.2.3 Greenhouse Gas Reporting

Environmental Protection Agency (EPA) initiated the Greenhouse Gas Reporting rule in 2009. According to the rule, large US industries that emit 25,000 metric tons or more C02 annually, fuel and industrial gas suppliers, and CO2 injection sites are required to report their


GHG emissions to EPA.\textsuperscript{125} With the help of the data collected from these reports, it is intended to track emissions, the effects of GHG emissions policies, and create pathways for future strategies to reduce CO2 emissions. According to the United States Climate Action Report of 2014, the program is capable of tracking up to 90\% of the emissions by receiving data from 8,000 facilities. Reports from these facilities will provide information on CO2 (carbon dioxide), CH4 (methane), N2O (nitrous oxide), and other greenhouse gases that are emitted by industries.\textsuperscript{126} As of October 2019, emission data from 2010 through 2018 is available to the public; nationwide emissions can be checked at the interactive online platform; EPA FLIGHT (EPA Facility Level Information on Greenhouse gases Tool). Publicly available GHG emission data is essential to improve CSR and environmental sustainability in the industry as it provides trackable, transparent information on firms. Facilities and their impacts on environmental quality.

In 2018, 7,655 facilities out of 8,000 from 9 different sectors have reported their GHG emissions. These reports helped EPA to track emissions of large industries, equal to 2.99 billion metric tons of CO2 equivalent.

4.2.4 EPA Center for Corporate Climate Leadership

The United States has formed the center for corporate climate leadership in 2012, which serves as an information hub for all organizations in different industries that are interested in reducing their greenhouse gas emissions and gaining the ability to accurately measuring GHG emissions of their operations. The program acts as a guide for corporations


and small firms by encouraging them to adopt cost-effective GHG reduction methods, informing organizations on climate change and GHG reduction targets, support larger firms to work on innovation and development, provide required test and measurement guidance, and gather different organizations interested in increasing their environmental sustainability by reducing their carbon footprint. The center works closely with NGO (non-governmental organization) partners such as the Center for Climate and Energy Solutions (C2ES) and The Climate Registry (The Registry) to plan leadership conferences and events. Along with the conferences and meetings, EPA Center for Corporate Climate Leadership supports organizations by guiding supply chain GHG emission management, setting strategic partnerships and cooperation, promoting the most recent GHG emission management practices and technologies with the help of other EPA programs and policies.

4.2.5 EPA SmartWay

SmartWay program is designed to reduce GHG emissions in the transportation sector, as the industry is the most significant emitter in the United States. In 2017, 29% of the total GHG emissions in the country came from the transportation sector, pushing down the energy sector to second place.
The transportation and freight sector is an important powerhouse of the United States economy; in 2018, the sector transported a total of 11.49 billion tons of freight, the equivalent of the 71.4% of total domestic shipments. The sector doubled its size between 1990 and 2013, and it is projected to double its current volume by 2040. By 2050 emissions from the transportation industry will surpass the emissions of passenger vehicles.\textsuperscript{127} As a result of the high volume, GHG emissions of the sector also increases, making initiatives like EPA SmartWay essential for efficiency and reducing GHG emissions.

The program was formed in 2004 as voluntary public-private cooperation to achieve sustainable transportation and supply chain for industries nationwide. SmartWay can help companies to select the most efficient transportation and operational strategies, which will improve their supply chain efficiency to reduce the expenses while reducing the environmental impact of their operations. The program also supports and guides industries to apply energy-efficient, fuel-saving technologies to their freight operations. EPA SmartWay program establishes these goals with the help of three main principles. First, the agency encourages strong partnerships building between the EPA, industry leaders, and stakeholders (SmartWay Transport Partnership). Second, the program sets goals for industry and determines the gold standard efficiency practices to reduce the maximum amount of GHG emissions and increase efficiency. As a result, it is rewarding for companies to follow gold standard practices and use the SmartWay brand as an indicator of their commitment to environmental sustainability and corporate social responsibility (SmartWay Brand). Lastly, EPA builds national and global partnerships with organizations and countries from different backgrounds to improve and promote sustainability measures in transportation and supply chain; driver training, developing global green freight action plans and strategies are some of the collaborations that EPA has been working on (SmartWay Global Collaboration). 128

4.3 Agriculture and Environmental Sustainability & Corporate Social Responsibility

4.3.1 Agricultural Policies of the United States

With a wide variety of crops, fruits, vegetables, and other agricultural commodities, the agricultural sector in the United States is highly productive. It is a well-equipped sector that can meet the increasing domestic demand of 330 million, along with agricultural exports. Agricultural productivity in the United States has continuous, sustained growth as a result of progressive farm consolidation practices and widespread adoption of innovations, and the country and approval of active policies are providing sufficient investments in food production, agricultural development, and applications of new technologies in the sector. As of 2017, agriculture and directly related industries generated 5.4% of the country’s GDP with a total output worth $1.053 trillion. The industry and related fields have created 21.6 million jobs in 2017, which is the equivalent of 11% of the total employment in the country. 2.6 million of these employees are farmworkers.
Figure 26 Share of agriculture and related fields to GDP, USA


Figure 27 Jobs created by agricultural and related industries in 2017, USA

4.3.2 Key Policies

Agriculture is responsible for 9% of total GHG emissions in the US. Agricultural practices such as fertilizer use increase the N2O (nitrous oxide) emissions from arable lands; manure usage contributes to CH4 (methane) emissions and negatively affects soil quality. 129 In addition, to be the most robust economy in the world, the United States is also leading the world in innovation, research, and development of agricultural practices. Increasing productivity in US agriculture directly affects agriculture practices globally. Innovative approaches to production efficiency, environmental sustainability, and GHG emission reduction in the United States can become a guide for developing nations and arable regions. Although governmental expenditure on agricultural research and development has been declining, private investment in the sector is growing and promising.130 On the other hand, environmental sustainability and social issues may not be the first concern for private investors, thus maintaining the environmental sustainability policies and promote CSR in the sector becomes an essential duty for administrations.

4.3.3 Environmental Quality Incentives Program (EQIP)

Environmental Quality Incentives Program (EQIP) is a financial and technical support mechanism for eligible producers to help them implement conservation practices to agricultural production. These conservation practices are operational investments such as; efficient use of natural resources, conserve ground and surface water quality, reduce


agricultural air pollution, reduce soil erosion, and sedimentation. Under the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) works with producers directly to develop conservation plans and help them apply these new practices into their production efforts. The program has 200 different practices applicable to different situations for different parts of the country in accordance with the local and state requirements.\textsuperscript{131} Between 2005 and 2018, 36\% of the arable lands received incentives under the EQIP.\textsuperscript{132}

Some of the common practices under the Environmental Quality Incentives Program are,

**Cover Crop Application:** Under the EQIP program, producers can receive assistance to grow cover crops to be used for seasonal protection of arable lands. The practice is used to prevent and control erosion, maintain soil quality, and attract pollinators. Supplemental production practices such as; pest management techniques, mowing and monitoring of an invasive weed, and manuring are also provided.

**Prescribed Grazing:** Prescribed grazing is a type of conservation plan that aims to maintain sustainable levels of production by limiting and monitoring the rate of plant reproduction and animal grazing in accordance with the limitations of the land. It is an important policy to keep agriculture and farm production sustainable, maintain animal and soil health, and reduce erosion.


**Irrigation System, Micro-irrigation:** This practice aims to improve irrigation quality and keep the soil productive and healthy for sustainable plant growth. Proper applications of chemical treatments to land and water can improve efficiency and productivity while keeping these sources away from losing their quality and potential to overtreating. The practice is provided to prevent excessive water chemical use in agriculture, erosion, and salt accumulation in soil. \(^{133}\)

Figure 28 Current Landscape Initiatives Map 2019

4.3.4 Agricultural Management Assistance (AMA)

Agricultural Management Assistance program is a financial support program for producers who wish to construct or rebuild their infrastructure efficiency, diversify products, plant trees as windbreaks to protect fields, improve pest management, and install conservation practices to reduce financial risks caused by product loss due to inefficiency and other factors such as droughts. Producers can receive financial support up to 75% of the total cost of their conservation and improvement plans. The program currently covers 16 states; Connecticut, Delaware, Hawaii, Maryland, Massachusetts, Nevada, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Utah, Vermont, West Virginia, and Wyoming. These are the states where the producers have low participation in the Federal Crop Insurance Program. AMA serves as supplementary assistance to the producers in these states. Under the assistance, the payments cannot be higher than $50,000 per producer per fiscal year, but in case the producer requires more support as a result of continuous underdevelopment, AMA can provide additional support.

Figure 29 Agricultural Management Assistance (AMA) Total Obligations by Fiscal Year and Type of Fund, USA

Figure 30 Conservation Practices Related to Soil Quality


Figure 31 Conservation Practices Related to Irrigation

As the charts reflect above, with the help of the Agricultural Management Assistance program, a remarkable number of agricultural producers find a change to improve their production efficiency and environmental sustainability practices. Between 2009 – 2018, 31.83% of the total arable lands received financial support for irrigation water management, 25.73% of the total arable lands received financial support for integrated pest management purposes under AMA soil quality practices. Between 2009 – 2018, 31.79% of the total arable lands received support for irrigation infrastructure (pipeline), and 25.99% of them received irrigation system renewal, micro-irrigation applications under AMA irrigation efficiency practices. Between 2009 – 2018, 20.27% of total arable land received support for pest management under AMA water quality practices.134

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CHAPTER 5: RUSSIA

Russia has the most prominent land amongst all other countries, and with more than 145 million people live in the country as of 2019, it is the 9th most populated country in the world.\(^{135}\) The economy of the Russian Federation ranks 11th largest economy with a nominal GDP of $1.657 trillion.\(^{136}\) It is the biggest natural gas exporter of the world as the country possesses the world’s largest natural gas reserves.\(^{137}\) The country is the energy superpower for the European Union as it is supplying 42.4% of hard coal, 29.8% of crude oil, and 40.4% of natural gas imports of the Union.\(^{138}\) With all the energy production and export, Russian Federation ranks as the 4th biggest greenhouse gas emitter of the world economy.\(^{139}\)

Russian Federation is a resource-rich country with respectable amounts of natural resources and an excellent capacity for energy production thanks to its various resources such as natural gas, petroleum, coal, and nuclear. The country can fulfill its domestic energy demands and


export a substantial amount of its production mainly to the European Union. As of 2016, natural gas has the most significant share in the country’s total energy consumption by meeting 52% of the domestic demand. Petroleum follows natural gas with 22%, coal 13%, and nuclear and renewables meet 13% of the total domestic energy consumption.\textsuperscript{140}

Figure 33 Russian Federation GDP at current prices


\textsuperscript{140} “Russia,” Energy Information Administration, accessed February 10, 2019, https://www.eia.gov/international/an…/RUS.
Figure 34 Russia’s primary energy consumption as of 2016


The primary energy source of the country is fossil fuels; natural gas usage is rapidly increasing while coal is losing its popularity. The utilization of natural gas and the use of renewable resources is expected to keep growing. Recently the Government of Russia has prepared the Energy Strategy 2035 (ES-2035) policy goals to sustain its economic stance in the global energy world while reducing the cost of domestic energy and curb the energy intensity and Co2 emissions.\textsuperscript{141} Despite being a significant Co2 emitter, the country has signed the Paris Agreement in 2016 and ratified it in 2019.\textsuperscript{142}


The purpose of the Paris Agreement is to bring all nations together and draw attention to the potential risks of climate change and increasing global temperatures, create globally approved guidance for countries to mitigate the impacts of the changing temperatures, and promote and strengthen global efforts to reduce global CO2 levels. In addition to the Paris Agreement, as the energy production powerhouse, Russia’s joining the Kyoto protocol in 2004 played a supportive role for countries to plan to reduce global carbon emissions. The initial goal of the Kyoto Protocol international treaty is to bring GHG emissions 5% lower than the global GHG levels of 1990 as a part of global efforts to preserve and protect environmental quality, air quality, public health, and slow down the adverse effects of global climate change. Under the United Nations Framework Convention on Climate Change (UNFCCC), The Kyoto Protocol was designed as two phases; the first period takes account between 2008 and 2012, intending to lower the global GHG emission 5% lower than the 1990 emission levels. The second-period covers between 2013 and 2020, aiming to reduce the global GHG emission 18% lower than the 1990 emission levels.

It is essential to look at the sustainable development policies and applications of Europe’s largest energy provider to analyze how an energy production powerhouse applies environmental sustainability policies and the effects of these policies on businesses and corporate social responsibility (CSR) while seeking continuous export growth and energy


production. First, in 2019, The Energy Research Institute of the Russian Academy of Science published the *Global and Russian Energy Outlook 2019* report. According to the report, the country’s primary focus is energy transition, innovation, and efficiency. Improving renewable energy investments and reducing fossil fuel dependency is one of the main conclusions of the report. Russia believes the energy transitions and curbing GHG emissions will come naturally as the demand of the global consumers has been shifting towards sustainable options, and thanks to improving technology and innovation, this shift is happening rapidly. The country also indicates the importance of progressive policymaking and applications to remain competitive and relevant.\footnote{146 The Energy Research Institute of the Russian Academy of Sciences, Global and Russian Energy Outlook 2019, 2019, pt. 1, 45, accessed May, 20, 2020, https://www.eriras.ru/files/forecast_2019_en.pdf}

Secondly, the government recently introduced a bill in 2018 to regulate the greenhouse gas emissions of sectors. By establishing emission targets, the government aims to reduce overall emissions and keep the emissions around the targets decided by international obligations. With this bill, it is hoped to establish an economic mechanism to regulate the domestic GHG emissions and work towards responsible economic development.\footnote{147 “Russia: Government Introduces Bill to Regulate Greenhouse Gas Emissions and Absorption,” Library of Congress, May 7, 2019, accessed June 4, 2019, https://www.loc.gov/law/foreign-news/article/russia-government-introduces-bill-to-regulate-greenhouse-gas-emissions-and-absorptions/} The effects of these policies and reports should be followed during the upcoming years in order to measure their effectiveness and success; this chapter will focus on the most current environmental sustainability and CSR programs of the Russian government in energy, agriculture, and industry sectors.
On the contrary, Russia is one of the countries that consider climate change as beneficial to their interest. A milder climate is desired by Russia as a better climate can boost overall development, support industries to expand and increase overall production and efficiency in Russia’s case. Although the country is not immune to the possible disasters as a result of increasing temperatures, such as increasing numbers of floods and infrastructural problems due to thawing permafrost, the country is not in favor of a full-fledged fight against climate change. It is accepted that the expected possible improvements thanks to a warmer climate outweigh the adverse effects. According to the Russian Government, some of the possible benefits of climate change will be lower national energy usage, expanding and improved arable lands, an increase in agricultural production and variety, increased dominance in the Arctic Ocean. Desmet and Hansberg (2015) show that the wishful thinking of Russia can become a reality as they argue permanent global temperature changes will have different geographical effects on different regions, and temperature changes will affect sectoral development and production differently. Their detailed analysis and projection of the potential impacts of global warming on economic growth show that northern economies that experience colder temperatures most of the year, like Russia, will gain an advantage at production. The economic importance of these countries will become critical for world throughput, and these countries will have better opportunities for the overall welfare.


5.1 Energy Sector and Environmental Sustainability & Corporate Social Responsibility

5.1.1 Energy Policies of the Russian Federation

The energy sector is the primary source of GHG emissions in the Russian Federation; in 1990, the energy industry was responsible for 80.58% of the country’s total GHG emissions. As of 2018, the sector remains to be the leading GHG resource, with 78.94%. In 2017, the country generated a total of 61.5 quadrillions BTU of energy and consumed 32.8 quadrillions BTU of energy, which means the domestic energy production meets and exceeds the domestic demand. This situation creates a tremendous economic opportunity for the country in terms of energy export. The breakdown of the total energy production is as follows; 10 quadrillions BTU comes from coal, 24.1 quadrillions BTU comes from natural gas, 23.6 quadrillions BTU comes from petroleum and nuclear, and renewables account for the remaining 3.8 quadrillions BTU. In 2012, the country ended its Kyoto Protocol commitment and accepted the sharp GHG emission decline during the first half of 1990 (as a result of the collapse of the Soviet Union) as its already met global contribution and achievement. In 2015, Russia set a target to remain 75% below 1990’s emission levels by 2030. Considering that the country has managed to remain at 68% below 1990 emission

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151 “Russia,” Energy Information Administration, accessed February 10, 2019, [https://www.eia.gov/international/analysis/country/RUS](https://www.eia.gov/international/analysis/country/RUS).

152 Ibid.
levels in 2012, the 2030 target is likely to be achieved.\textsuperscript{153} The Energy Research Institute of the Russian Academy of Sciences states in their report \textit{Global, and Russian Energy Outlook 2019} that increasing energy efficiency and increase the utilizing of low carbon energy resources from 10\% (2015) to 19\% by 2040 will create the opportunity for the country to remain below 75\% of the 1990 Co2 emission levels.\textsuperscript{154}

\begin{figure}[h!]
\centering
\includegraphics[width=\textwidth]{image.png}
\caption{Russian Federation GHG Total Without LULUCF, in kt CO\textsubscript{2} Equivalent, by the Energy Sector}
\end{figure}

Figure 35 Russian Federation GHG Total Without LULUCF, in kt CO\textsubscript{2} Equivalent, by the Energy Sector


The Co2 emissions and energy production of Russia is going upwards together; however, although the country is mainly using natural gas, a lower intensity fossil fuel, as a primary source for energy generation, (*) Co2 emission of the sector is not as low as it could be with properly efficient energy infrastructure. The Energy Research Institute of the Russian Academy of Sciences states in their report *Global and Russian Energy Outlook 2019* that the lack of proper efficiency is due to the country’s cold climate, vast distances between the cities and production plants, and lack of technology. However, with proper energy efficiency and conservation investments, the country can reduce the current Co2 emission trends lower.\textsuperscript{155}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
\hline
Btu & 77,696 & 43,102 & 42,649 & 51,971 & 54,319 & 57,884 & 61,574 \\
\hline
\end{tabular}
\caption{Russian Federation Total Energy Production, quad BTU}
\end{table}


\textsuperscript{*} Natural gas has 57% lower intensity than coal. (Pounds of CO2 emissions per KW Hour)
5.1.2 Key Policies

As resource export is the primary driver of the Russian economy, the country mainly focuses on its international economic competitiveness when it comes to policies. The country seems hesitant to step away from a fossil fuel-based economy anytime soon, and the policies mainly focus on improving the utilization of fossil fuels by energy efficiency and innovation.156

5.1.3 Energy Strategy 2035

Energy Strategy 2035 (ES-2035) has been approved in June 2020 by Russian Prime Minister Mikhail Mishustin in order to keep the Russian energy sector sustainable and profitable.157 Energy production and export have a significant share in the country’s total GDP.158 The Russian Federation is determined to increase the significance of the energy sector even more for the economy. The ES-2035 program aims to increase the production of energy sources and keep the domestic energy demand sustainable with increased efficiency. Increasing the amount of energy exported and the utilization of natural gas, attracting energy importing countries in Asia, and slightly reducing the crude oil usage, while promoting


innovation and development of new energy resources are amongst the other goals of the ES-2035.\textsuperscript{159}

The first step is to modernize the energy infrastructure, which will enhance domestic energy use efficiency. Along with modernizing the domestic infrastructure in populated areas, modernizing the resource-rich regions such as Eastern Siberia and the Far East region, which plays a vital role in the nation’s gas production and export, is aimed under the ES-2035 Strategy.\textsuperscript{160} Second, diversifying the channels of energy export, especially by investing in liquefied natural gas (LNG) as Russia plans to produce 3.4 times more LNP by 2024.\textsuperscript{161} The projected increase in LNG production can be possible as the ES 2035 strategy is also planned to attract companies by introducing tax breaks\textsuperscript{162} to important joint venture initiatives such as The Yamal LNG. The Yamal LNG plant in the Yamal Peninsula is a massive LNG hub for Russian export that has an output capacity of 16.5 million tons of gas annually.\textsuperscript{163}


\textsuperscript{161} Ibid.


In addition to Yamal LNG, the partially state-owned multinational corporation GAZPROM has significant numbers of LNG stream projects which will receive substitution under the ES-2035 program as well, encouraging to maintain the optimum production with the support of the government.164

5.2 Industry and Environmental Sustainability & Corporate Social Responsibility

5.2.1 Industry Policies of Russia

The industry sector of the Russian Federation is responsible for 32.4% of GDP165 and 10.95% of the country’s total GHG emissions.166 The country has a variety of successful and promising sectors such as precious metals, chemicals, military vehicles, automotive, aerospace & aircraft, machinery manufacturing, steel, and aluminum.167

5.2.2 Key policies

Unlike its energy sector, Russia seems to apply more pressure on the industry sector and focus more on GHG emissions rather than the productivity of the industry. Although the


country seems to remain hesitant to apply progressive climate change mitigation policies, regulating the GHG emissions of the industry sector can be a good start.

**5.2.3 Regulation on Greenhouse Gas Emissions and Absorption**

As of December 2018, the Ministry of Economic Development introduced a bill to regulate greenhouse gas emissions. The regulation sets an upper limit and emission targets for various sectors and issues permit to industries for emission monitoring. The initiative is expected to bring a nationwide system and monitoring to industrial GHG emissions while supporting the sustainable economic growth of the industry sector. The program also allows transferring and trading emission permits and tax benefits. The government prepares a list of greenhouse gasses that are subject to this regulation with limitations, fees, and similar information to guide the emitters and help them take necessary actions during their operations accordingly. The regulative system can also help the government to project long-term GHG emissions and stay with the Paris Climate Agreement requirements.\(^{168}\) While environmental nongovernmental organizations found the regulation system as an essential step towards curbing the national emissions and climate change mitigation, the industry leaders and entrepreneurs argued that GHG emission regulation is going to harm the Russian industry and economy. Nevertheless, President Putin stated that embracing environmental regulation is an essential step for modernizing the Russian economy and adopt a sustainable development approach.\(^{169}\)


\(^{169}\) Ibid.
5.3 Agriculture and Environmental Sustainability & Corporate Social Responsibility

5.3.1 AGRICULTURE Policies of the Russian Federation

With only a 4.7% addition to the GDP employing roughly 6% of the total workforce, the agricultural sector plays a small role in Russia’s export-dependent economy. Arable lands in Russia are 13% of the total landmass, and as a result of its harsh climate, agricultural lands are distributed unevenly. Since 2012, Russian agriculture has been growing and becoming more critical for the national economy; the country saw good developments in food security, food quantity, and food quality. In fact, during 2018, Russia became the top wheat exporter by meeting 20% of the global demand. However, regardless of the growing export numbers, the country still imports the majority of its vegetables and fruits such as citrus, soybeans, bananas, apples, pears, and tomatoes.


174 Ibid.

Figure 37 Russian Arable Lands Map


Figure 38 Russia’s Agro-Food Import and Export

5.3.2 Key Policies

The main goal of the agricultural policies is to increase agricultural production, self-sufficiency, and export while reducing agricultural import dependency. Recent policies strongly focus on governmental funds to support the development and competitiveness of the sector, secure long-term sustainable production goals, and promote research and development. The government recently revised The State Program for Development of Agriculture program and protracted it until 2025. Revision of this program will keep and increase the state support to the sector further, mainly to keep the export infrastructure developing and foreign markets more reachable for Russian agricultural products, while increasing the future governmental financing to the sector by 17% annually.\textsuperscript{176}

5.3.3 Agriculture Development Program 2013-2025

The Russian Federation introduced the Agricultural Development program in 2012 and put it into effect in 2013. The main goal of the program is significantly increasing financial and social support, along with subsidies to agricultural producers. The program initially provided total funds of $76 billion between 2013 and 2020 for the development of agricultural practices and improving the national food market along with direct monetary support to farmers.\textsuperscript{177} There are four crucial steps in the program which aims to improve food security and productivity. First, the improvement of crop production and processing while supporting the production with effective marketing of Russian products is desired—


secondly, improvement of animal production, processing, and effective marketing of animal products. Thirdly, investing in the livestock industry, and lastly, funding small businesses, technical and technological improvements, and investing in the sustainable development of rural territories, enhancing irrigation systems, and land development are the backbones of the Agriculture Development Program.\(^{178}\)

The program was initially planned to end in 2020. However, in recent years, as the government started to adopt self-sufficiency and food security/agricultural export policies heartily, it is now extended until 2025 with multiple revisions and an increased number of goals. The Agricultural Development Program of the Russian Federation is now more robust and determined. Additional objectives are as follows; the agricultural production of Russia is planned to be increased by 16.3% as a first step, which will reduce the country’s dependency on food export. The agricultural value-added is planned to be increased by $31.6, which would give the total value of $88 billion, and fixed capital investment in the sector is planned to be increased by 21.8% as well. After the recent revision, the agricultural workforce is getting a raise in their direct disposable income support, and the agricultural workers are set to be paid $332 per person each month.\(^{179}\) In 2018, the budget of the program saw an increase of 10%, reaching $3.9 billion. Roughly 36% of this budget goes directly to investment projects and loans in the sector, 25% of the budget goes to the development of agriculture-


related sub-sectors, and the rest is distributed in the program such as investment grants, leasing of machinery.\textsuperscript{180}

\textbf{5.3.4 The Cooperation of the Russian Federation and FAO}

Food and Agriculture Organization of the United Nations (FAO) is a United Nations agency focusing on world hunger and working towards eliminating hunger and food insecurity for all nations. The organization has more than 194 member states and currently in operation in more than 130 countries, working to provide high-quality food and healthy lives for those in need.\textsuperscript{181} Russian Federation became a member of FAO in 2006, and in 2016 the country provided 2.4\% of the organization’s total funds with the amount of $12 million.\textsuperscript{182}

With a total contribution of $79 million, the country’s contributions rank 23\textsuperscript{rd} among members.\textsuperscript{183} The FAO opened its first office in Russia in 2015, and in 2018 Russian Federation hosted a regional conference for Europe.\textsuperscript{184} In 2019 another conference was held in Moscow to increase awareness of the risks of antimicrobial resistance in agriculture (AMR) in Europe and Central Asia.\textsuperscript{185} These conferences are essential steps to bring


\textsuperscript{181} “About FAO,” Food and Agriculture Organization of the United Nations, accessed July 20, 2020, \url{http://www.fao.org/about/en/}.


\textsuperscript{185} Ibid.
organizations from different backgrounds, such as the private sector, scientists, nutrition, and health specialists. Russian Federation’s continuous contribution and increasing cooperation with FAO is crucial as the country aims to become a significant agricultural exporter in the region.

With the cooperation of FAO, Russia mainly focuses on combating antimicrobial resistance (AMR) in agricultural practices which jeopardize the food security of the region. In 2017, the country donated another $3 million to the Food and Agriculture Organization of the United Nations in order to support the advancement of combating the risk of antimicrobial resistance (AMR). With the funding, Russian Federation aims to contribute to three major action plans against the risk of AMR in the region. First, the development of national strategies to cope with AMR in the food supply chain and agriculture with the help of improved regulations and legal framework. Second, building a domestic tracking system to measure and test AMR occurrence in the food supply chain and animal husbandry. Third, educating the farmers and other stakeholders in agriculture about the risks of AMR and teaching effective ways to cope with AMR. Russia realized the fact that with the increasing population and food demand, the traditional old-fashioned agricultural practices are not sustainable. Today, the risk of AMR is one of the results of our unsustainable agricultural methods, which include using harsh medicines and pesticides in production. These practices eventually create superbugs that conventional pesticides cannot eliminate.


187 Ibid.
Along with superbugs in food systems that can easily contaminate humans, they also create a considerable risk to the food security of nations, livestock, and public health as they are difficult to control and prevent with traditional methods. In a global world where countries are getting dependent on each other with food imports and exports, AMR jeopardizes global health and wellbeing. Thus, international cooperation is required to eliminate the risks and develop national and international action plans for better and sustainable food systems.\footnote{188} Along with coping with AMR, the Russian Federation's cooperation with FAO also includes food loss and food waste reduction with the help of other partners such as academia, Russia’s Central Agricultural Library (CSAL), and neighboring states in the region.\footnote{189}


Figure 39 AMR Transmission example

CHAPTER 6: CHINA

With 1.3 billion people, China is the most populated country in the world that is rapidly becoming a significant economic power in the world economy. With a GDP of $14.3 trillion, the country is currently the second-largest economy.\(^{190}\) Today, China is the 5\(^{th}\) biggest oil producer with 4.89 million barrels per day and the second-biggest oil consumer after the United States.\(^ {191}\) As the second-largest economy, China is the biggest greenhouse gas (GHG) emitter and is responsible for 27\% of the total global emissions. Although in recent years, the GHG emission of China has been stagnant, the country is still highly insufficient when we consider its emission levels considering the Paris Agreement goals.\(^ {192}\) The country’s primary energy resource for production is fossil fuels, and the consumption has been increasing. As a result, the Co2 emissions rose by 2.3\% in 2018 and 4\% in the first half of 2019.\(^ {193}\) China is also increasing its investments in renewable energy, essential to mention that the country is the world’s biggest consumer of coal, and the largest developer of renewable energy, China, is both investing in fossil fuels and renewables domestically and internationally.\(^ {194}\)

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\(^{192}\) “China,” Climate Change Action Tracker, accessed June 10, 2020, [https://climateactiontracker.org/countries/china/](https://climateactiontracker.org/countries/china/)

\(^{193}\) Ibid.

\(^{194}\) Ibid.
China is a resource-rich country, and its production is mainly dependent on coal. As of January 2020, coal has the most significant share in the country’s total energy consumption by meeting 69% of the domestic demand. Renewables follows coal with 23%, nuclear 5%, and natural gas meets 3% of the total domestic demand.\(^{195}\)

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The primary energy source of the country is coal. Although the share of other resources is projected to increase in the near future gradually, coal has been dominating the energy demand of the country. As a developing economy with high GHG emissions, China was exempt from the Kyoto Protocol in 1997, but the country ratified the Paris Agreement in 2016. The purpose of the Paris Agreement is to bring nations together to draw attention to the potential risks of climate change and increasing global temperatures.

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Furthermore, to create a globally approved guidance for countries to mitigate the impacts of the changing temperatures and promote and strengthen global efforts to reduce global CO2 levels.\textsuperscript{197} It is essential to look at the sustainable development policies and applications of the world’s second-largest economy to analyze how the mainly coal-dependent economy applies environmental sustainability policies while promoting sectoral growth and corporate social responsibility. First, in 2019, China’s National Development and Reform Commission has submitted the Third National Communication Report to the United Nations Framework Convention on Climate Change. In this report, China acknowledges the severe effects of climate change on human survival, as well as on national and global development. In the report, the country states its commitment to eco-civilization; improvement of domestic policies to mitigate and adapt the effects of climate change, developing a path for green and low carbon progress, and progressive approach on curbing domestic greenhouse gas emissions, along with the importance of the cooperation with the UNFCCC (United Nations Framework Convention on Climate Change). The country also points out the importance of international cooperation against the effects of climate change. It states its commitment to support international cooperation and to developing countries that are vulnerable to the effects of global climate change.\textsuperscript{198}

Second, China is becoming an active actor in international relations and cooperating with other actors to cope with the adverse effects of climate change. As a result, the country has teamed up with the European Union. The partnership against the effects of climate change


change started in 2005, and ever since, the European Union and China have been actively cooperating on policymaking and mitigation efforts. Both sides have agreed to strengthen their mutual effort on essential steps of mitigation such as; developing strategies to curb greenhouse gas emissions, developing energy efficiency strategies, working on the transition to renewable energy, reducing the emissions of the transportation sector, reducing the emissions of cities, improving and investing on climate-related technologies, coordinating climate change and clean energy projects, guiding and cooperating with developing countries in all these fields and other climate change mitigation projects.\(^{199}\) Previously, China and the European Union published the EU-China Roadmap on Energy Cooperation (2016-2020). According to the roadmap, both sides pledged to improve partnership to work on reversing environmental degradation, energy security and clean energy development, low-carbon development, and nuclear energy safety.\(^{200}\) Lastly, China has been working to implement the United Nations Sustainable Development Goals 2030. President Xi Jinping attended the United Nations Sustainable Development Summit in 2015 and showed China’s motivation to implement UN SDGs (United Nations Sustainable Development Goals). The country is eager to improve its sustainable development capability and adopt the 2030 agenda in all sectors.

Considering the UN SDGs, China’s primary focus amongst these goals is to eliminate poverty and hunger by enhancing agricultural production and improving food security while investing in innovation and progressive strategies to achieve fruitful and sustainable economic growth. Besides, China acknowledges the importance of connecting urban and


rural areas with inclusive development policies as an essential step that will make social security and social services equally approachable to everyone regardless of where they live. In addition, improving social justice and human development, coping with environmental degradation, giving importance to climate change mitigation policies, increasing resource efficiency both in urban and rural areas are also some of the primary goals China is aiming for. 201

6.1 Energy Sector and Environmental Sustainability & Corporate Social Responsibility

6.1.1 Energy Policies of China

The energy sector is the primary resource of GHG emissions in China; in 2010, the energy sector was responsible for 78.6% of the country’s total GHG emissions. 202 The total GHG emission of the country has been growing; in 2017, the country generated a total of 112 quadrillions BTU of energy, which meets 81% of the country’s annual energy demand. 203 Between 2013 and 2017, China’s total energy production and consumption remained at the same levels. 204 Nevertheless, the country achieved to curb its Co2 emissions target three years before its scheduled deadline. According to the 2018 report of the United Nations


204 Ibid.
Framework Convention on Climate Change, China reduced its emissions by 40 to 45% from its 2005 emission levels. These levels were initially planned to be achieved by the end of 2020. According to the report, China was able to achieve its target with the application of the country’s emission trading system and improving efficiency, and dropping carbon intensity.205(*)

China has a good variety of resources in the energy sector, including coal, oil, gas, nuclear, and renewables. However, fossil fuels are still 87% of China’s energy mix, causing the carbon intensity of China’s energy sector to become extremely high, ranking the country as the most prominent GHG emitter amongst BRICS countries.206

![Energy-related CO₂ emissions](image)

**Figure 42 China’s Energy-Related Co2 Emissions**


6.1.2 Key Policies

In the Third National Communication Report submitted to the United Nations Framework Convention on Climate Change, China’s primary focus is improving the energy conservation and efficiency in the energy sector with policies and regulations while still promoting development and production. China has been preparing and publishing five-year policy plans and reports to transform and lead its sectors and promote development since 1953, and the last FYP (five-year plan) covered between 2016 and 2020.

6.1.3 2016-2030 Energy Supply and Consumption Revolution Strategy

In 2017, The National Development and Reform Commission of China (NDRC) released the Energy Supply and Consumption Revolution Strategy policy action plan, which plans to revolutionize the Chinese energy sector almost in a decade. According to this report, the Chinese Government plans to apply a wide range of goals, such as; by 2030, the energy mix of the country should include more than 20% of non-fossil fuel resources, the sector should invest more in natural gas, and natural gas should create more than 15% of the energy production, total energy production of the country should include at least 50% of renewables, at least 80% of the coal plants will be improved and equipped with the highest technology which will provide ultra-low emission levels, and future demands should be met by renewable technologies.207 Along with renewables and natural gas, the plan also promotes an increase in nuclear energy as a way of curbing Co2 emissions. As China seeks to increase its global dominance, the 2016-2030 Energy Supply and Consumption Revolution Strategy is a road map for the country to lead the world in energy efficiency, sustainable energy

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production, and modern energy systems. Besides, it is applied effectively, the strategy promises significant development for China by promoting modernized energy infrastructure, enhanced energy efficiency, healed air pollution and environmental degradation while developing the economy and increasing production at the same time.208

6.1.4 EU – China Energy Cooperation Platform

The European Union and China have strengthened their energy dialogue that has been established more than two decades ago and launched the Energy Cooperation Platform in 2019.209 The ECECP (EU – China Energy Cooperation Platform) aims to bring two major energy consumers together and develop joint effort towards the Paris Agreement goals by applying the latest technologies and successful policies with the help of international cooperation. The EU and China are responsible for one-third of global energy consumption.210 Their cooperation can transform the energy sector of China and the EU as well as can play an essential role for all nations that are looking to adopt renewable energy development and innovation and sustainable energy transition.211


The European Union’s Partnership Instrument is funding the cooperation with the hopes of bringing the energy sector, energy business, and research institutes of China and the EU closer to create opportunities for new business and innovation implementation.\(^\ast\) The cooperation is an essential and progressive step for China to open its energy sector to the western world and supports its enthusiasm to become a global leading energy innovator. The cooperation’s first mutual plan includes goals such as; reducing coal dependency in the energy mix, a slight increase in nuclear energy production, improve infrastructure for efficient natural gas usage.\(^{212}\)

### 6.2 Industry and Environmental Sustainability & Corporate Social Responsibility

#### 6.2.1 INDUSTRY Policies of China

According to the 2019 report of Climate Transparency, the industrial sector of China is responsible for 31% of the country’s total GHG emissions.\(^{213}\) The country is a powerhouse for world production, responsible for up to 50% of the world’s main industrial production. Chinese industry has a variety of successful sectors such as steel, construction, cement, auto parts and vehicles, ships, robots, machinery, solar panels, and electronics, which have been

\(^{(*)}\) The EU Partnership Instrument serves as an international policy exchange and international cooperation tool to fulfill the global interests of the EU; the initiative had a budget of €960 million to build international relationship with countries between 2014 and 2020.


helping China to increase its welfare tremendously.\textsuperscript{214} As of 2019, the industry sector provides almost 40\% of the GDP in the country.\textsuperscript{215} China is facing severe air, water, and soil pollution problem as a result of its rapid industrial development during the last three decades. Therefore, pressure on the industry sector to start a transition to sustainable practices has been growing.\textsuperscript{216}

### 6.2.2 Key Policies

China has prominently ambitious policies when it comes to the development of its industry sector. The 13\textsuperscript{th} Five-Year Plan states the necessity of research-based innovation, technology, smart and green manufacturing, and improving quality in the industry, which will make the sector globally even more competitive and preferred.\textsuperscript{217} The chart below shows the volume and competitiveness of Chinese manufacturing in the international market.


Figure 43 Countries by share of global manufacturing output, 2018, top 10


6.2.3 New Energy Vehicle Policy

China is the biggest market for electric vehicles in the world; the country has been trying to increase the demand for electric vehicles and support the automotive industry for a rapid transition to new energy vehicles (NEV). The National Development and Reform Commission of China is trying to apply new policies to support this goal and improve the domestic market to create further demand. The New Energy Vehicle Policy is serving this goal by offering industry incentives for producing and developing new energy vehicles. In 2018, China announced the gradual elimination of the limitation on foreign ownership policy in the NEV automotive sector. This policy had been in effect since 1994, applied to prevent foreign investors from owning more than 50% of any commercial vehicle manufacturing companies. Elimination of the limit on foreign ownership in the automotive sector triggers

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foreign direct investment and stimulate the NEV automotive industry, helping the automotive market in China become greener.

This decision rapidly attracted the Tesla company, and they announced their first giant NEV factory in Shanghai.\footnote{Fred Lambert, “Tesla Makes Gigafactory 3 In China Official, Plans to Start Production In 2 Years,” Electrek, July 10 2018, accessed May 5, 2019, \url{https://electrek.co/2018/07/10/tesla-gigafactory-3-china-official-production/}.} After Tesla, the world’s automotive leaders, such as Toyota, Volkswagen, and BMW, rushed to the Chinese market for their electric car productions.\footnote{“Foreign investment drives boom in China’s NEV Sector,” Shine, June 21, 2020, accessed September 5, 2020, \url{https://www.shine.cn/biz/auto/2006210643/}.} Besides opening the doors to foreign investors, the Chinese Government also welcomes foreign competition, which will push the domestic brands to innovate more and become better competitors globally.\footnote{“China Scraps Foreign Ownership Limits on Commercial Vehicle Manufacturers,” Just Auto. June 29, 2020, accessed May 5, 2019, \url{https://www.just-auto.com/news/china-scrap-foreign-ownership-limits-on-commercial-vehicle-manufacturers_id196336.aspx}.} As a part of this policy, along with producers and investors, the Chinese Government also encourages the public to buy new energy vehicles instead of their fossil fuel counterparts. For instance, issuing a license plate for a new vehicle in China can take months, even up to a year. A license plate for a regular vehicle can cost as much as $16,000 in big cities like Shanghai.\footnote{Ellen Hughes-Cromwick, “China’s New Energy Vehicle Policy,” University of Michigan Energy Institute, accessed July 30, 2019, \url{https://energy.umich.edu/news-events/energy-economics-weekly-briefings/story/chinas-new-energy-vehicle-policy/}.} In contrast, a new electric vehicle comes with its license and free of charge.\footnote{“China’s Electric Vehicle Market: A Storm of Competition Is Coming,” Wharton University of Pennsylvania, May 9, 2019, accessed July 30, 2019, \url{https://knowledge.wharton.upenn.edu/article/chinas-ev-market/}.} The below chart shows the result of China’s ambitious electric car market.
Figure 44 Passenger Electric Car Sales and Market Share 2013-2019


6.2.4 Made in China 2025

In 2015, China developed the Made in China 2025 strategic plan to improve and revolutionize its manufacturing sector by 2025. $1.5 billion funding has been issued for the program, which will be used to improve a wide area of industrial production by developing and applying smart production systems, innovation, sustainability, improved product quality, and global competitiveness. The results from the first pilot projects are promising; The Ministry of Industry and Information Technology reported that the country was able to increase average productivity by 38% while cutting operational costs by 21%.224

Made in China 2025 aims to improve critical manufacturing areas in the industry that would help China to gain a better influence on the global economy. Some of these manufacturing areas are; electrical equipment production, machinery and farming, energy-

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saving technologies, new energy vehicles, tools and robotics, information technology, aerospace and railway equipment, vessel engineering, and also medical devices. In order to improve these sectors above, there are multiple vital points determined as a pathway; innovation improvement in manufacturing, better integration of the latest technologies into Chinese industry, more substantial industrial base, promoting Chinese brands in the global economy, enforcing green manufacturing and sustainability, and internationalize Chinese manufacturing are some of these multiple vital points for Made in China 2025 initiative to succeed.

Under the Made in China 2025 initiative, Chinese companies are provided with support to develop national technologies and brands to reduce the dependence on foreign technology and research. With government substitution, these developments will advance even further until they become able to compete with foreign technologies globally and capture the global market share. Made in China 2025 policy can be an essential step for China to promote green production and sustainable development during its production transformation and to revise its industry sector. Indigenous innovation and production will get required support and subsidies from the Government under the Made in China 2025 initiative, creating a suitable opportunity for China to build the required efficiency in industry and adopt sustainable production.

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Figure 45 Made in China 2025 Improvement of Key Technologies and Market Share

6.3 Agriculture and Environmental Sustainability & Corporate Social Responsibility

6.3.1 Agriculture Policies of China

China is the second biggest country in Asia by land area, covering 9.6 million square kilometers and an additional 3 million square kilometers of offshore territory. Feeding the population of 1.3 billion people is not an easy task; it requires well equipped, efficient agricultural capacity and well-established successful policies. Agriculture in China has a strong history with productive resources and tradition. Agricultural production and security have always been a vital topic for the Chinese Government. As of 2019, agriculture and directly related industries generated 7.1% of the country’s GDP, following a downward path since the 1980s as a result of increasing industrial production of the country, with a total output of $1.4 trillion. China has a pollution problem directly affecting its food security and agricultural production. In the 13th Five Year Plan, the country is stating the importance of improving the air, soil, and water quality of the country. The below charts show the changes in GHG emissions of the sector.

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229 Ibid.


Figure 46 Carbon emissions in China’s Agriculture by source, 1997-2016


Figure 47 Agricultural Carbon Emissions in China by Provinces Over the Years

6.3.2 Key Policies

Agriculture is responsible for 22% of the total GHG emissions in China.232 Over the years, the main objectives of agricultural policies focused on the ability to quantitively increase the production to feed the increasing population in China. However, since the 1990s, the main objective of policies has shifted towards increasing self-sufficiency, sustainable agriculture, food safety, reduce environmental degradation as a result of agricultural practices, support and increase the wellbeing of farmers and increase the competitiveness of the sector. After 2010, sustainable agricultural development has become the primary goal of the country’s agricultural policies, along with improving food quality. 233

6.3.3 New Food Strategy Program

As a highly populated country, China is one of the world’s largest food producers and consumers. As a result, import dependency on food creates a critical risk for the nation’s food security.234 China believes that self-sufficiency in agriculture is crucial for continuous development and economic wellbeing.235

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In 2014, China introduced the New Food Strategy Program. The main goal of the program is to promote agricultural production with domestic resources and reduce the import dependency of the agricultural sector. Fast industrialization of the country has left the agricultural sector behind with structural obstacles to meet the domestic food demand. However, with the help of utilizing the science and improving technology in the sector, the country ambitiously aims to make the national agriculture self-sufficient.\textsuperscript{236} The New Food Strategy Program also focuses on sustainable development and sustainable agricultural production, pointing at the environmental degradation and pollution as a result of development and inefficiency. During the hay day of its rapid industrialization, China overused its arable lands to catch up with the productivity of its manufacturing sector. As previous national development plans show, China aimed for maximum domestic food production up to 95\% of the maximum output potential for a long time. However, these unsustainable and aggressive agricultural practices became the main reason for overused farmlands, high accumulation of pesticides and fertilizers in the soil, and water pollution, creating a more significant risk for maintaining food security than producing less food for the nation.\textsuperscript{237} The New Food Strategy Program policy aims to eliminate the previous aggressive practices and reduce the risks in the sector by giving weight to food quality, diversifying food sources, sustainable agriculture practices, research and development, implementation of long term food security policies instead of food quantity and aggressive production.\textsuperscript{238}


\textsuperscript{238} Ibid.
6.3.4 Agricultural Research and Development

The Government is the primary promoter and funder of research and development programs in China. In recent years, the Chinese Government has collaborated with the private sector to supplement research and development funding. Allowing the private sector to cooperate with the Government on research and development initiatives helps the Government to fund a broader scale of institutions along with allowing the Government to distribute the potential risks and responsibilities in such investments. The agricultural research and development cooperation plan is built on five main themes to improve the effectiveness and train researchers. First, researchers from public institutions will engage in the research activities of private institutions as part-time researchers. Second, public and private research institutions, including higher education institutions, will work together on technological developments to improve the agricultural practices of Chinese farmers. Collaborative work will help these institutions to become more efficient and sustainable thanks to new materials, equipment, and practices developed with mutual effort. Third, public research institutions and the private sector can also collaborate with intermediary institutions such as consulting firms and government agencies in order to maintain the efficiency and effectiveness of their cooperation. Fourth, the private sector can form a hybrid, joint research institution with public research and development institutions with the intent of increase research efficiency and utilization of resources, which will help to speed up the research process.

Furthermore lastly, institutions can come together with the private sector to form an enterprise.\textsuperscript{240} Government-funded public research institutions are the leading players in agricultural development in China. Up to 70\% of agricultural research and development spending goes to these institutions.\textsuperscript{241} In 2015, the Chinese Government funded agricultural research and development more than any other research and development areas; agricultural R&D institutions have received government funding for 86\% of their expenditures.\textsuperscript{242}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure48.png}
\caption{Spending on Public Agricultural Research and Development 2009-2015}
\end{figure}


\textsuperscript{241} Ibid.

\textsuperscript{242} Ibid.
Figure 49 Distribution of Agricultural R&D Funding by Area

CHAPTER 7: Summary, Conclusion, Answer to the Research Question and Recommendation

This study sought to explore internal and external motivation and obstacles for adopting environmental sustainability policies on energy, agriculture, industry sector of Turkey, The United States, China, and Russia. The goal of this research was to provide information on these countries and provide a broader view of their current environmental sustainability policy applications, opportunities, and obstacles while adding a multidisciplinary approach to literature. The main area of concern in this research is environmental sustainability as a part of the United Nations Sustainable Development Goals. By analyzing the current state of environmental sustainability policies and internal and external factors, this research provided sufficient data for researchers to have a better grasp of governmental decision making and challenges to the adoption of such policies.

The following research questions were asked and addressed by the study:

What factors affect the determination of sustainability policies of the analyzed countries in Energy, Industry, and Agriculture, and what is the connection between government characteristics and Sustainable Development policymaking?
7.1 SUMMARY AND CONCLUSION

7.1.1 Turkey

The growing population and economy of Turkey play a decisive role in policymaking. Data showed in this research that the country is one of the fastest-growing economies in OECD\textsuperscript{243} with essential issues in energy dependence, water scarcity, and unbalanced urbanization. Turkey accepts the need for and importance of sustainability policies in its sectors. The energy dependence of Turkey has been growing along with its economy and population, as domestic production only meets 26\% of the country’s demand.\textsuperscript{244} As a result, the country has a powerful incentive to invest in domestic renewable energy technologies and create policies that promote energy efficiency and conservation. Energy import dependency is risking the country’s sovereignty and progress as the situation increases the cost of production, goods, and services while increasing the vulnerability of the country’s international relations in the region. The industry sector in Turkey is one of the primary energy users, and the lack of natural resources to generate required energy has adverse effects on national production. Turkey’s primary area of focus is increasing the domestic supply and reducing energy dependence. Therefore, the critical points of the strategies are as follows;

- Promote domestic production and increase domestic renewable resources.
- Production without dependency.


\textsuperscript{244} United Nations Framework Convention on Climate Change, Seventh National Communication of Turkey Under the UNFCCC, August 28, 2019, pt. 2, 32, accessed February 12, 2020, \url{https://unfccc.int/documents/199646}. 
• Decentralize the supply chain.
• Increase energy efficiency and renewable energy applications.
• Diminish fossil fuel consumption.
• Invest and utilize natural gas.
• Invest in nuclear power.

As the country imports majority of its energy, energy efficiency becomes crucial for Turkey to cut costs on energy usage. Energy efficiency is an effective way to decrease energy costs and the volume of expensive energy imports along with curbing GHG emissions as well. Turkey acknowledges this potential and is determined to utilize it for the country’s benefit. One of the essential topics of recent governmental publications is energy efficiency; reducing the amount of energy needed to produce one more unit is targeted both in private and governmental parts of production. Increasing energy efficiency is a way for the country to reduce energy usage, which will help to reduce GHG emissions. Turkey wants to revive its domestic production while reducing energy import dependency in the region. The country’s goals can be achieved with successful applications of its progressive policies and productive investments, which will help to revive domestic production as planned, utilize renewable energy potentials such as solar, geothermal, and wind, and increase energy efficiency.

The industry sector of Turkey provides an essential amount of employment and plays a significant role in the country’s economic progress. The industry of Turkey helps countless sub-sectors create employment and growth. Industry demands 32% of the country’s total

energy and consumes 20% of its usable water.\textsuperscript{246} Turkey’s primary area of focus in the industry sector is increasing efficiency, support small and middle enterprises and entrepreneurship, promote green growth and production. Foster innovation and increase the green manufacturing potential of domestic firms. Give importance to recycling and recovering industries. Help small and medium-sized enterprises to become competitive and environmentally sustainable.

The unbalanced distribution of the industrial sector is also a problem for the country. The big cities such as Istanbul, Ankara, Izmir, and Bursa are home to the majority of the country’s population; the population of Istanbul alone is more than 16 million, 20% of the total population of Turkey lives in Istanbul. Unbalanced distribution of the industry promotes unplanned urbanization, and urban sprawl causes overwhelmed and expensive infrastructure, increases the risks of water scarcity and pollution. The industry sector should be evenly distributed in the country, and other cities should also get a fair amount of investments and economic growth.

Data shows that with the changing climate, previously unseen natural disasters are now seen frequently in Turkey. Droughts are also becoming frequent and severe, risking the food security of 80 million people. In addition to GHG emissions, threatened crop, and soil quality, another significant problem in the sector is water usage. Although many lakes and three different seas surround the country, it is not a water-rich country when we consider the available water per capita. The rapidly growing population and economy create more water

scarcity for the country. Agriculture takes 75% of the total water consumption in Turkey, and data shows that the country is the third-largest water consumer for agricultural practices amongst OECD countries. In addition to the water stress, agrarian lands in Turkey are also under threat due to land degradation and salination. 59% of the agricultural land is in danger of irreversible degradation as a result of poor water management, inappropriate irrigation practices that lead to erosion, salinization, desertification, and similar degradations. Increasing irrigation efficiency and improving the infrastructure has vital importance for Turkey’s food security and agricultural production.

7.1.2 The United States

With plentiful natural resources, The United States can supply 95% of its domestic energy demand, and The United States Environmental Protection Agency (EPA) is determined to remain as a guide for the agencies to reduce environmental footprint. Increasing energy efficiency, building efficiency, utilizing renewable energy, and lowering GHG emissions are some of the central policies. Although the energy production of the country is stable, a decrease in the energy sector’s CO2 emissions occurred in the last decade. An important reason for this change is the increase in utilizing less carbon-intensive fossil fuels such as natural gas. The main goal of the country is to increase the resilience of the

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sector and apply the latest technologies to improve efficiency and reliability. Since 2005 the energy exports of the United States have been increasing, and the country wants to become the pioneering global energy actor. With the current President Donald J. Trump’s administration, the United States has been gradually retracting from treaties that limit or set targets for GHG emissions, such as Paris Climate Agreement, due to economic concerns and global economic competition. Global financial competition, especially the rising power of China, is the primary concern for the current administration of the country for hesitating to adopt a progressive approach to the energy transition. In 2019, the current administration lifted the federal regulation, which required energy-efficient light bulbs with the concerns that such regulation would increase the prices for consumers and businesses while the cost of saved energy does not compensate for the cost of energy-efficient bulbs.250

The country has a variety of successful sectors as significant drivers of economic growth, such as real estate, information, non-durable goods manufacturing, automotive, retail, health care, and finance and insurance, and many other sectors. Central policies are shaped by closely tracking the sectoral GHG emissions and create roadmaps in accordance with the needs of the industry. The United States Environmental Protection Agency (EPA) plays a vital role as a national guide to educate businesses, form public-private partnerships, develop roadmaps and financially support transformative initiatives, and set voluntary goals. However, strict regulations on business and profound sectoral transition programs in the industry are not an option due to the free-market approach.

Agricultural practices such as fertilizer use increase the N2O (nitrous oxide) emissions from arable lands; manure usage contributes to CH4 (methane) emissions and negatively affects soil quality.\textsuperscript{251} In addition to being the most robust economy in the world, the United States is also leading the world in innovation, research, and development of agricultural practices. Increasing productivity in US agriculture directly affects agriculture practices globally. Innovative approaches to production efficiency, environmental sustainability, and GHG emission reduction in the United States can become a guide for developing nations and arable regions. Although governmental expenditure on agricultural research and development has been declining, private investment in the sector is growing and promising.\textsuperscript{252} On the other hand, environmental sustainability and social issues may not be the first concern for private investors, thus maintaining the environmental sustainability policies and promote CSR in the sector becomes an essential duty for administrations. Governmental expenditure on agricultural research and development has been declining, and private institutions have been taking over the research and development programs in the agricultural sector. The critical points of the strategies are as follows;

- Increase competitiveness in the global energy markets.
- Balance the rise of China by improving economic power in the global market.
- Decrease regulations to help local sectors become global competitors.


• Promote transformative initiatives in sectors only if they will help the business to thrive.
• Promote a free-market approach to policymaking.
• Promote private investments to sectors.

7.1.3 Russia

The energy sector is the primary source of economic growth in Russia; the energy capacity of the country is a tremendous economic opportunity in terms of export and revenue. The Co2 emissions and energy production of Russia is going upwards together. However, although the country is mainly using natural gas, a lower intensity fossil fuel, as a primary source for energy generation, Co2 emission of the energy sector is not as low as it could be with properly efficient energy infrastructure.  

The Energy Research Institute of the Russian Academy of Sciences states in their report *Global and Russian Energy Outlook 2019* that the lack of proper efficiency is due to the country’s cold climate, vast distances between the cities and production plants, and lack of technology. However, with proper energy efficiency and conservation investments, the country can reduce the current Co2 emission trends lower.  

However, the cost of such renovation can be an important obstacle for the country. Besides, as energy export is the primary driver of the Russian economy, the country mainly focuses

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254 Ibid.

on its international economic competitiveness when it comes to policies.\textsuperscript{256} Transitioning the sector while heavily depending on its revenue is the main challenge for adopting the sustainability policies in the sector. Increasing the energy exports and revenues dominates the policymaking process, and the country does not want to risk its powerhouse by trying to make it sustainable. The country seems hesitant to step away from a fossil fuel-based economy anytime soon, and the policies mainly focus on improving the utilization of fossil fuels by energy efficiency and innovation.\textsuperscript{257}

Although the country seems to remain hesitant to apply progressive climate change mitigation policies due to economic concerns, the industry sector of the Russian Federation sees the most progressive policies. The country sets an upper limit and emission targets for various sectors and issues permit to industries for emission monitoring. The policies apply to a variety of successful and promising sectors such as precious metals, chemicals, military vehicles, automotive, aerospace & aircraft, machinery manufacturing, steel, and aluminum.\textsuperscript{258} The main drive of regulating the industry sector is to modernize the production by promoting sustainable production. The Russian economy is massively dependent on energy exports and although energy exports bring a significant amount of revenue to the economy, depending only on one sector creates vulnerabilities to the Russian economy. Thus, bringing sustainability and longevity to the country’s industry will create a resilient supplement for the


\textsuperscript{257} Ibid.

economy and will create an opportunity for the country to open another of its sectors to foreign markets.

The agricultural sector plays a small role in Russia’s export-dependent economy, and the arable lands in Russia are 13% of the total landmass. As a result of its harsh climate, agricultural lands are distributed unevenly, risking the country’s food security, quality, and quantity.\textsuperscript{259} As a result, Russia’s primary goal is to strengthen its agricultural production and reduce the import dependency on vegetables and fruits and become self-sufficient like it is in the energy sector.\textsuperscript{260} By promoting development and renovation, the country sees agricultural production as another way to open its production to foreign markets. Recent policies strongly focus on governmental funds to support the development and competitiveness of the sector, secure long-term sustainable production goals and promote research and development. The government recently revised The State Program for Development of Agriculture program and protracted it until 2025. Revision of this program will keep and increase the state support to the sector further, mainly to keep the export infrastructure developing and foreign markets more reachable for Russian agricultural products, while increasing the future governmental financing to the sector by 17% annually.\textsuperscript{261} The critical points of the strategies are as follows;

- Promote self-sufficiency in all sectors.
- Increase the global competitiveness of all sectors.


• Reduce dependency on one type of export.
• Support sectors to diversify exported goods.
• Do not risk the main drivers of the economy by applying costly policies.
• Increase the volume of agriculture and promote the self-sufficiency of the agricultural sector.
• Reduce import dependency on food products.

7.1.5 China

China has a good variety of resources in the energy sector, including coal, oil, gas, nuclear, and renewables. However, fossil fuels still make 87% of China’s energy mix. China’s primary focus is improving energy conservation and efficiency in the energy sector with policies and regulations while still promoting development and production. The country seeks to increase its global role in the energy sector by promoting energy efficiency, sustainable energy production, and modern energy systems technologies. China is facing severe air, water, and soil pollution problem as a result of its rapid industrial development and energy use during the last three decades. Pollution is a severe problem for China, and since the energy production is heavily dependent on fossil fuels, the country acknowledges and states the importance of reducing GHG emissions, investing in renewable energy, natural gas, and nuclear power to meet domestic demand. China’s ambition to become an important world actor in the global energy sector motivates the country to invest in innovation, new technologies, and efficiency. Chinese industry is the powerhouse of world production, responsible for up to 50% of the world’s industrial production. Chinese industry has a variety of successful sectors such as steel, construction, cement, auto parts and vehicles, ships,
robots, machinery, solar panels, and electronics, which have been helping China to increase its welfare tremendously.262

China is facing severe air, water, and soil pollution problem as a result of its rapid industrial development during the last three decades. Therefore, pressure on the industry sector to start a transition to sustainable practices has been growing.263 China’s primary goal in industrial is developing production technology while promoting innovation and efficiency. The country believes that if green manufacturing policies are applied, Chinese production will reach its highest level of competitiveness in the international market while reducing environmental degradation and pollution.

As a country of 1.3 billion people, agriculture in China is one of the most important topics for the country. Feeding a massive population such as China is not an easy operation. Furthermore, as a result of rapid urbanization and increasing industrial production since the ‘80s, the share of agriculture in the country’s GDP has been falling.264 On top of air, soil, and water pollution, shrinking agricultural productivity risks food security for 1.3 billion people. Over the years, the main objectives of agricultural policies focused on the ability to quantitively increase the production to feed the increasing population in China. However, since the 1990s, the main objective of policies has shifted towards increasing self-sufficiency,


sustainable agriculture, food safety, reduce environmental degradation as a result of agricultural practices, support and increase the wellbeing of farmers and increase the competitiveness of the sector. Since 2010, sustainable agricultural development has become the primary goal of the country’s agricultural policies, along with improving food quality.\textsuperscript{265}

The main drive of agricultural policies in China is the adverse effects of urbanization and pollution in agricultural production, hence food security. The critical points of the strategies are as follows;

- Become the global leader of innovation in the global energy market.
- Diversify energy sources. Invest mainly in new energy technologies.
- Invest in efficiency and promote innovation.
- Keep the role of being the powerhouse of the world economy.
- Improve the agricultural production capacity to maintain food security.
- Reduce environmental degradation with innovation and sustainable production.
- Improve food quality of agricultural production.
- Increase the competitiveness of the agricultural sector in the global market.

7.2 What factors affect the determination of sustainability policies of Turkey in Energy, Industry, and Agriculture?

This research found that Turkey shows a good effort to stay on top of sustainability policies for the following main factors; the country is heavily dependent on energy import, which increases the cost of production, and risks the industrial sovereignty of the country. Hence investing in domestic renewable options and improving energy efficiency to reduce the amount of energy demanded to provide an excellent opportunity for the country.

The majority of water use in Turkey goes to agricultural production. The country is water-scarce, and agriculture does not add significant value to the overall GDP while demanding substantial water to produce. The risk of water scarcity and the risk of food security increases with the high demand for clean water from the agricultural sector. Increasing population, growing economic activity, and environmental degradation, including worsen soil quality due to continuous agriculture, are the motives for Turkey to adopt environmental sustainability policies and promote sustainable production to firms.

Unbalanced distribution of industry amongst cities in Turkey risks the possibility of balanced development of the country. 20% of the entire population lives in the biggest city Istanbul, causing employment opportunities to remain undesirable outside of Istanbul, increasing the cost of living and housing, and promoting even more unbalanced urbanization while jeopardizing the resiliency of infrastructure. The industry should be distributed evenly in the country to promote overall development as the industry sector is the biggest employer of the country. These reasons are the essential motives for Turkey to promote sustainability in its industrial sector.
7.3 What factors affect the determination of sustainability policies of the United States in Energy, Industry, and Agriculture?

The United States’ latest submission of the national communication report States to the United Nations Framework Convention on Climate Change was in 2014. Although the previous reports stated that the improve energy efficiency, promote green energy, and reduce environmental footprint due to energy use is some of the key policies for the energy sector, global economic competition is the main hesitation for the United States and, as a result, the country is determined to increase the use and production of fossil fuels and promote deregulations in the energy sector.

The productive industry sector of the country also remains unregulated, and the application of policies is not mandatory but voluntary. As the country promotes a free-market approach, foreign investment is seen as an important opportunity for the economy and keeping the regulations at the minimum level possible to attract investors overseas while competing with the attractive opportunities of China and leaving the adoption of sustainability policies to firms and consumers.

The United States offers programs to agricultural producers to revise and apply the recent technologies to their production by helping the producers with incentives and technical assistance. The main motive is to protect the agricultural fields, keep water, soil, and arable lands sustainable and usable. The advanced technology of the country makes this approach possible and switching to sustainable agriculture easier. The United States values agricultural production, and the agricultural sector has the most progressive policies of the country.
7.4 What factors affect the determination of sustainability policies of Russia in Energy, Industry, and Agriculture?

This research found that it has become a trap for Russia’s economy to depend on one type of export. Energy export is the primary driver of the economy as the country is the most significant natural gas exporter in the world. Hence, the country does not want to risk its most crucial revenue by trying to apply environmental sustainability policies to the sector. The cost of renovation, improvement of infrastructure, and the possibility of some loss in export revenue due to new policy applications are the main reasons Russia does not see environmental sustainability policies in the energy sector as a necessity. This situation also discourages global powers such as the United States from applying environmental regulation to its energy sector, claiming such a case would create injustice in global economic competition.

The energy export is being the only driver of the Russian economy brings significant vulnerabilities to the country’s overall wellbeing. As a result, Russia is determined to improve its industry sector to have a second door opens to the global market. While ambitious to become a more significant player in the world economy, environmental sustainability is not the first motivation of Russia. The country prioritizes self-sufficiency, and as a result, strengthening the industrial sector becomes essential for policymakers. The country sees a strong and exporting industry will help to reduce energy export dependency. Although GHG emissions of the sector are being regulated, the main motive is to expand the industry and increase production while promoting resiliency and longevity.

Food security, antimicrobial resistance, food quality, and quantity are problems for Russian agriculture. The country’s harsh climate and limited, uneven arable lands make it
difficult for the sector to be competitive and highly productive. Besides, this research found that although Russia exports some agricultural products, the country is importing an important share of vegetables and fruits, which does not fit Russia’s self-sufficiency policy. Therefore, food security, lack of a resilient and productive agricultural sector is the main drive for Russia to adopt environmental sustainability policies. The country financially and socially supports farmers and the livestock industry to renovate and improve the product while promoting sustainability and resiliency.

7.5 What factors affect the determination of sustainability policies of China in Energy, Industry, and Agriculture?

This research found that as a result of rapid industrialization and fossil fuel use, China has been facing air, water, and soil pollution. However, the country is still the most significant CO2 emitter in the world and will continue to utilize fossil fuels. The country is the powerhouse of the world economy and, as a result, will continue to use fossil fuels for the near future to keep its economy alive. However, China also acknowledges environmental degradation and accepts improving energy efficiency as the central policy, which will reduce energy usage and pollution. Along with efficiency policies, alternating energy sources is essential for China. This research found that China is determined to utilize alternative renewable sources for its energy demand. Along with environmental sustainability, China’s ambition to become the world’s energy and innovation pioneer is an important driver for the country to adopt sustainable development, energy efficiency, and renewable energy policies.

The industry of China meets 50% of global demand; industrial activity is a fundamental reason for the pollution problem of China. The country puts pressure on the industry sector when it comes to sustainability. Similar to its energy sector, efficiency and innovation-based
development to reduce pollution are the main policies of the country for its industry sector. However, maintaining the global competitiveness and the ambition of becoming a superpower is still crucial for China, so a perfect transition to environmental sustainability industry is not expected, yet China sees a further competitive advantage in the global market by going green in its industry.

Along with water, air, and soil pollution as a result of rapid industrialization, fast urbanization is also the cause of China’s shrinking agricultural production. Shrinking agriculture jeopardizing the food security of 1.3 billion people in the country. This research found that a high population, rapid industrialization, and urbanization caused remaining arable lands to be overly used, making the soil unproductive rapidly. Sustainable agriculture and renew environmental practices with the help of innovation and technology is the only option for China to strengthen its agricultural production and maintain national self-sufficiency. These are the main reasons for China to be environmentally conscious and apply progressive policies to agricultural production.
7.6 What is the connection between government characteristics and Sustainable Development policymaking?

In order to answer the second part of the research question, this research used Fukuyama’s stateness and efficiency matrix and Daly’s isolated system explanation to show the correlation between the adoption of sustainable development policies and government characteristics. The United States, as the quadrant I country in the matrix, is expected to have limited scope; hence limited regulatory policies in its sector are expected. Research showed that global competitiveness and economic growth are a primary concern for the United States, and with the limited scope of the state, adoption of such policies and applying these policies to sectors is not a priority for the country.

In the matrix, just like many of the developing countries, Turkey, Russia, and China are in quadrant IV. Quadrant IV is a challenging state for economic development as the state is trying hard to be the main actor in all activities. This research showed that Russia decides not to accept environmental sustainability as a primary concern due to economic reasons. Nevertheless, the country is still in control of its sectors. Comprehensive environmental sustainability policies of Turkey can be an example of a quadrant IV country trying to guide many sectors at the same time with limited economic resources. Lastly, China is trying to renovate its industries with sufficient resources but still has strong global competition concerns. The challenges in quadrant IV comes from the limited resources and lack of complete renovation capacity of the state with the risk of worsening in case the renovation attempts are unsuccessful. This situation can explain why Russia does not want to risk its energy export revenue while trying to renovate its energy sector. The adoption of sustainable development policies adds an extra burden for developing countries if they are costly, and the need for guidance and international cooperation becomes crucial.
On the other hand, as Daly pointed out, the physical limits of our planet should be considered for the idea of unlimited economic growth. Countries tend to promote economic growth at the expense of environmental degradation. Especially the countries that have limited state scope (quadrant I) are not in favor of regulative approaches to sectors. It is seen as one of the critical points for an advancing economy. Quadrant I countries are rich and developed, yet still on the same planet with the same rules of physics. Environmental degradation may be ignored for the sake of economic growth in the short term. However, in the long run, it is highly possible that an unhealthy environment will not be suitable for economic growth. Therefore, sustainable development becomes an important topic also for long term economic development as well.

The biggest challenge for sustainability remains humanity’s quest for unlimited economic development. Mentioned in chapter two; Herman Daly’s criticism of the current economy, which he argues that humanity sees the environment as an unlimited capital, and points out that our economic activity, progress, and development are indeed limited by the limits of the ecosystem and the finite natural resources, remain widely relevant to today’s world and governments’ approach on sustainable development. Analyzed countries and policies showed that countries tend to see economic advancement as the primary factor of success. This situation promotes global competition, and ambitious global competition triggers the obsession for growth further while reducing the resources further away. Global economic competition remains an important challenge for governments' willingness to adopt the environmental sustainability approach. In order to overcome this challenge, collective action and will of all countries, including developing economies and advanced economies, is required. Yet creating a common will that’s embraced by every government in the world is as utopic as it sounds. Therefore, the problem of convincing countries to step back from global economic competition and further economic advancement in order to adopt environmental
sustainability and recoup the environmental loss remains the biggest challenge to the concept of sustainability itself. Adoption of sustainability policies at the local level is more possible, especially for newly developing nations when they are applying the latest technologies and solutions from scratch with the guidance of international organizations and non-governmental organizations, but the question of how the biggest polluters, which are the biggest players of the global economy can be convinced to step back from the competition, and start to drag their foot on economic advancement remains as the biggest challenge.

The risk of economic instability, such as unfeasible investments for new infrastructure or loss of production capacity as a result of transformation attempts, remains an important challenge for the application of sustainability policies as well. The progressive policymaking towards the complete adoption of sustainability requires complete determination and ability of risk-taking. Not every economy is strong enough to be able to start a large transformation movement from-scratch. Developing nations would like to use every possible opportunity to continue their economic advancement, and the safest route to do so is to follow and apply the approved and known rules of the global economy. It is risky for a developing nation that has limited options to grow to take on an unknown path to success. The transformation of energy infrastructure remains a costly and risky task that governments do not aspire to attempt. When especially a national economy is benefiting from current infrastructure and current energy policies, the possibility of taking such risk remains discouraging. Although the transformation to renewable energy from fossil fuel-based energy production is one of the main aspects of sustainable development, our growth-based economy is still highly dependent on the extraction and processing of fossil fuels. Although the importance of renewable energy and sustainable energy production is becoming clearer, the lack of sufficient technology that can power the global and national economy remains an important challenge for governments in going forward for sustainable energy transitions. Our
energy addiction for progress remains an important dilemma that can jeopardize the progress itself; but in the case of developing countries, the potential solution of the effective and secure energy transition can be a hybrid energy model where a country gradually increases renewable energy options over time while reducing the amount of fossil fuel dependency. However, this solution will only be possible when transitioning to renewable energy technologies become affordable, reliable, and strong enough to compensate for fossil fuels while powering economic activities and goals.

Being a resource-rich country also becomes a challenge for adopting environmental sustainability policies. Country’s that are thoroughly self-sufficient tend to care less about environmental sustainability as they are under the influence of the illusion of being gifted with unlimited resources. Of course, under the correct circumstances and with just, democratic, and sovereign administrations, self-sufficiency is an important requirement for high national welfare. However, countries that are not worried about resource poverty tend to think that rules do not apply to them when it comes to environmental degradation and diminishing resources. Having plenty of resources encourages inefficiency and wastefulness, and if a country with plenty of resources does not prioritize efficiency and effective use of resources, unsustainability becomes the main concept of the economy, dragging the government even further away from the possibility of adopting an environmental sustainability approach.

When we go back to the state scope and state strength discussion in chapter two and consider Fukuyama’s stateness and efficiency matrix, it is important to note that being a quadrant I country is also a challenge to adopt environmental sustainability policies effectively. Quadrant I is a combination of minimal state scope and strong institutions. Minimal state scope means fewer regulations, less government involvement, and less binding
policies for sectors. Quadrant I countries tend to have the most liberal approach to sectors, and sectors are not bothered with new policies for the sake of the environment or similar externalities. If environmental sustainability policies are jeopardizing the potential of economic growth and production, they are ignored and left behind. Although quadrant I is the most optimum place for economic development and growth with strong institutions and lesser government involvement, according to Fukuyama, in quadrant I, environmental sustainability policies are either not existed, not mandatory, or not extensive. An outcome that takes us back to the biggest challenge for environmental sustainability applications; the desire for unlimited development.

A large number of developing economies are in quadrant IV, and these countries tend to have a wider state scope; a large number of different fields in which they function as the sole institution that sets goals and apply binding policies. A quadrant IV government, if it gives importance to environmental sustainability, is expected to create and apply several environmental sustainability policies to its sectors. Yet as argued in chapter two, considering that the quadrant IV governments are trying their hardest to be the main actor of all sectors and activities in the country, their efficiency and effectiveness will be reduced. Thus, being a quadrant IV country itself can become a challenge to the ability to create and adopt sustainable development policies effectively. Besides, a quadrant IV country will likely replace or prevent the growth of its independent institutions, which will eliminate the different points of view and damage the ability of inclusive policymaking, which can also feed the fear of instability as a result of transformation attempts. In addition, the fear of radical transformation increases when we consider Fukuyama’s statement that the majority of developing nations which are trying to get to quadrant I are ending up in quadrant III. Quadrant III is the most undesired part of the matrix as it contains ineffective weak
governments with small state scope and ineffective weak institutions, a nightmare scenario for sustainable development, environmental sustainability, effectiveness, and efficiency.

What about motivations? The research showed that there are also motivations for countries to embrace environmental sustainability policies. Resource dependency and limited resources are the main motivations for embracing the environmental sustainability approach. For instance, in the energy sector, when a country imports the majority of its energy, import dependency becomes a burden for its economic freedom. Being dependent on imported energy means not having economic freedom and a lack of energy reliability and security. Domestic production, sectors, export, and even food security are in danger when a country lacks sufficient resources to support domestic demand and production. The cost of living and producing increases as a result of imported power, and the country puts itself in a vulnerable position in international relations as well. When we add a high population to this equation, policies that promote a variety of energy sources in order to gain energy independence become a matter of life or death. Although these policies are not directly related to the goal of saving the environment, energy dependence motivates countries to invest in renewable energy technologies and innovations as a promising path to gain energy independence. Greening the energy sector is an indirect, positive side effect of this situation. Although renewable energy technologies may not make an advancing economy completely energy independent yet, diversifying the energy sources can help with other sustainable development goals such as food security, affordable clean energy, innovation, and better infrastructure.

Along with resource dependency, a lack of self-sufficiency is also an important driver to adopt environmental sustainability policies. A country that has limited arable land would want to keep its lands fertile as much as possible. A country that lacks clean water resources would want to keep its water resources as clean as possible. Or, if a country diminishes or
endangers its limited natural resources due to fossil fuel processing, it would be wise to adopt environmental sustainability policies to secure remaining natural resources. Food security is one of the most important topics when it comes to self-sufficiency. A country should be able to feed its population and maintain healthy generations by providing sufficient nutrition. Giving special attention to soil and water quality is one of the most significant ways to maintain food security, and the adoption of environmental sustainability policies would help to do so effectively. Water security is also one of the most important topics in the near future. Waste generation, microplastics, pollution due to fossil fuel extraction, weak and bad infrastructure are some of the dangers to water security. The solution to these problems is effective policies that put the environment and sustainability in the center. A risk of deprivation can become a good motivator to build something stronger before deprivation is experienced.

Back to Fukuyama’s stateness and efficiency matrix, as mentioned in chapter two, quadrant II contains broader state scope with strong institutions. For example, these countries are happy to accept slower economic development than quadrant I in order to maintain social justice, or they will give more importance to equal distribution of wealth to maintain and improve social safety nets. Quadrant II will promote progressive taxation to build an inclusive healthcare system accessible to everybody. Hence, quadrant II seems like the sweet spot for progressive policymaking, which can develop the mindset that Herman Daly argued in chapter two, which is respecting the planetary boundaries and ethico-social limits. Although being in quadrant II itself is not a direct motivation for the adoption of sustainable development policies, it is the most promising part of Fukuyama’s matrix for the application and trial of environmental policies. If the tension of global economic competition calms down, and the obsession of rapid and continuous growth disappears, more countries may aim
for quadrant II in order to have better social policies, and in that case, embracing the sustainable development goals can become a mainstream approach.

The reality of today’s world is that our quest for economic development continues, and it is the main driver of every country. We tend to ignore environmental limits for the sake of unlimited growth, and it seems like environmental degradation is not a concern as long as it does not hit us in the face. We are a fossil fuel civilization, and fossil fuels are here to stay for some more time. Production, consumption, and waste are also the best friends of modern humans. In the long run, the rules of the planet apply to every being, and sustainable development can be a way of understanding and adapting to these rules and even solving potential problems while still having the life we have today.

While hyper-consumerism of disposable things has become the epidemic of today’s world, we are almost running out of landfill space. While throwing away billions of single-serving coffee pods each year and consume them back in the form of microplastics, it is essential to question whether our progress and development have tricked us and created an illusion that keeps us away from seeing the truth and realities of our experience. If this is the case, and unless we find a way to bend the rules of the planet, this illusion could lead us to our extinction just like many other human species and civilizations have experienced. In other words, are we deluded by our progress?

Whether we agree with Daly or Fukuyama, different challenges to the adoption of sustainable development policies exist. Fukuyama’s stateness and efficiency matrix showed us that both small scope governments with minimum regulations and large scope governments with excessive degree of regulations and intervention could create challenges for countries to adopt sustainable development goals. A moderately involved state with strong institutions seems to be the most efficient scenario for sustainable development
policies; however, there is no cookie-cutter scenario to be applied to convince countries to transform their status quo.

Most of the time, countries do not dare to transform their system entirely as policies for environmental sustainability do not excite voters and sectors as much as policies for strength and more wealth, especially if the transformation offers slower economic growth. Countries compete with each other for global and regional dominance and desire to become stronger and wealthier. Although the negative effects of climate change such as frequent hurricanes, floods, and loss of biodiversity are already here, and global environmental degradation is not a future problem anymore, we do not seem to care enough to change our habits and addictions. A wealthy, self-sufficient country will not disclaim its potential to get stronger and wealthier further, whereas it is not just to dictate a developing nation not to start utilizing fossil fuels to power up its industry, which can help it to escape from the poverty trap, and increase national welfare. International organizations hope to improve the developing world, low-income regions, and conflict zones and want to guide them to become as wealthy as developed nations. However, many studies show that world resources cannot provide the same living standards of developed nations to everybody. How can we explain the situation to developing nations that the world cannot afford their development as rich nations have used and have been exploiting most of the resources to become the industrialized, self-sufficient, wealthy countries they are today? Development and wealth come at a price, and many scientists warn us that we are not able to maintain this level of development or keep increasing global output with limited resources. However, change and development are an important part of our experience on this planet; hence it is not completely against our nature to be better, stronger, and go further. Maybe the reason we are behind on embracing sustainable living is Daly’s explanation of how we see the world as a place of unlimited resources. By externalizing the cost of nature in the global economy, we became
happier and left today’s problems to another time, and we chose to focus on quantity instead of quality. We decided that many things are disposable, obsolete, and should be thrown away as soon as possible. Daly’s steady-state economy, which is a concept that suggests stabilizing the size of the economy without seeking to grow in size and numbers, sustaining the consumption and technical and qualitative improvement instead of the quantitative increase in throughput, can be the answer for the challenge above which points out the unjust situation towards low income and developing nations. It seems possible on paper to imagine that developed nations to slow down their throughput and resource exploitation, and developing nations are given their fair share of resources and the chance to harm the environment. However, such a case would not solve the problem of environmental degradation, does not reduce the planet-warming greenhouse gas emissions, and does not eliminate climate change. These challenges show that our very own definition of development is ill-defined as we associated better living with competitiveness, total throughout, and hyper-consumerism. We are deluded by this definition to the level that we do not feel responsible for the approaching adverse effects of our lifelong activities. We assume that our current level of development will be enough to overcome any challenge to our existence. It is minacious to think that, most probably other human species that are now disappeared, the collapsed civilizations and emperors of the past had the same confidence during their heyday.
7.7 Recommendations for Future Research

Future researches will be supplementary to this research; multiple opportunities and questions to be explored have emerged as a result of this study. First, the results of the explained policies in the energy, agricultural, and industry sector should be analyzed to see if these policies are successful and help to cope with the environmental degradation as a result of our economic activity. Second, rapidly advancing technology should be followed and analyzed to explore how technology can have an active role in policymaking, environmental sustainability, and corporate social responsibility. Third, the role of international relations in switching to sustainable development sectors should be explored as a solution to governments’ concerns of staying behind in the global economy as a result of the unsuccessful transition to sustainable development. Especially the situation of quadrat IV countries should be analyzed further. The overall transition to a sustainable development path for a country should be shown beneficial by providing policy recommendations.


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