

# Change Management In the Energy Sector In Guyana: A Shift From Fossil To Renewable Energy Mix

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## **Abstract**

*This paper delves into the multifaceted realm of change management in transitioning from fossil fuels to a sustainable energy mix, spotlighting Guyana's unique position. With a global trend towards renewable energy driven by environmental concerns, countries like Guyana, blessed with significant oil reserves, face opportunities and challenges. Drawing insights from case studies of Denmark, The Kingdom of Norway, and Pakistan, key challenges such as economic barriers, technical complexities, regulatory issues, and social implications were identified. Success stories like Denmark's wind energy dominance and Norway's hydro-centric approach provide valuable lessons. However, challenges faced by countries like Pakistan emphasize the necessity of strategic planning. For Guyana, a nation experiencing explosive GDP growth and on the cusp of an energy revolution, recommendations include establishing clear policy frameworks, engaging stakeholders, promoting technological innovation, and investing in public awareness. Guyana could ensure a balanced, sustainable energy future by integrating these strategies and possibly revisiting its Low Carbon Development Strategy 2030.*

**Keywords:** *Change Management, Energy, Energy Mix, Fossil, Guyana, Renewables.*

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## **Introduction**

The energy sector is critical in driving any country's economic growth and social development. However, in recent years, global concerns about the environmental impact of energy generation and carbon footprints have led to a worldwide shift towards renewable energy sources. Guyana, a small South American country, has traditionally relied on fossil fuels, mainly imported petroleum products, for its energy needs. However, with the discovery of significant oil reserves and the growing global push towards sustainable energy sources, the Country can transform its energy production to an environment pollution-free energy mix to safeguard its prosperity for future generations.

Change management is a complex and challenging process that involves careful planning, stakeholder engagement, and

effective communication. This paper explores the change management process of moving from fossil fuels to renewable energy blends in Guyana. Through a review of existing literature and analysis of case studies from Denmark, The Kingdom of Norway and Pakistan, this paper highlights the key challenges and success factors in change management within the energy sector. It also examines the specific context of Guyana, including its political, economic, and social landscape, and provides recommendations for effective change management.

## **Literature Review**

Literature was selected using scholarly articles, books, and magazines to support change management principles relating to Guyana. The selection used various databases to provide valuable analysis and comparative energy frameworks. While existing research

points to a similar study area, no academic literature was found for Guyana, an emerging Petro State at the time of conducting this study.

This research aims to examine and conclude on change management in Guyana's energy mix as part of the Country's economic and structural transformations with the global trend of renewables. The study aims to end with pertinent recommendations for improving the change management system for Guyana.

This study is underpinned by theories such as the portfolio approach, which suggests that a diversified energy mix can help to reduce the risks associated with reliance on a single energy source because if the price of one energy source rises, other sources can help offset the price fluctuation; also, the demand response approach suggests that energy demand can be responsive to changes in price and other market signals. Energy efficiency can be achieved by incentivizing consumers and businesses to reduce their energy use.

## **Methodology**

This study used secondary data sources to gather information to satisfy the research question. The methodology selected resulted in pertinent academic research materials to synthesize this study. Journals were selected from TAU Library, Science Direct, Taylor and Francis, Research Gate and OilNow. Reports from OilNow were fact-checked with Government websites, etc, for accuracy.

## **Results**

The transition towards renewable energy sources is a global trend that has gained momentum in recent years. The International Energy Agency (IEA) stated that clean, renewable energy is projected to account for more than 80% of the world's electricity generation by 2050 [1]. Changing management from fossil fuels framework to renewable energy can be challenging. The literature highlights the following challenges:

The high capital costs of renewable energy infrastructure and technologies can hinder their adoption [2]. The lack of financing options and the high cost of borrowing in developing countries can further exacerbate this challenge [3]. Both of these cases will result in a slow change management process.

The intermittent nature of renewable energy sources, such as wind and solar, can pose technical challenges for grid integration and management [4]. Additionally, the lack of adequate energy storage solutions can limit the effectiveness of renewable energy sources [5].

Clear policies and regulations for renewable energy can hinder their adoption [6]. Furthermore, the lack of political will and support can limit the effectiveness of the regulatory framework [7] and change management.

The shift towards renewable energy can also have social implications, such as job losses in the fossil fuel sector [8]. The lack of public awareness and support for renewable energy can also hinder its adoption [9].

Several countries have successfully transitioned from fossil fuels to renewable energy sources, providing valuable insights into effective change management practices. For instance, Costa Rica has generated nearly 100% renewable energy, primarily hydropower, wind, and solar [10].

Similarly, Denmark has made significant strides in transitioning towards renewable energy sources and aims to be completely fossil-free by 2050 [11]. Through its Energie Wende policy, Germany has also made significant progress in shifting towards renewable energy, with renewable sources accounting for over 40% of its electricity generation in 2019 [12].

These case studies highlight several critical success factors in change management within the energy sector, including:

Clear policy frameworks: A clear and comprehensive policy framework that supports renewable energy adoption is critical in

facilitating the transition, which includes policies incentivizing renewable energy development and addressing regulatory barriers [13].

**Stakeholder engagement:** Effective stakeholder engagement is crucial in building support for the transition and ensuring that the needs and concerns of all stakeholders are addressed [14].

**Technological innovation.** Developing and deploying innovative technologies can address technical challenges like grid integration and energy storage [15].

**Public awareness and education:** Promoting public awareness and education about renewable energy sources is essential in building public support and addressing social challenges [16].

Denmark's Journey to clean energy has been rewarding. The small Scandinavian Country of Denmark is known for its innovative energy sector, mainly well known for wind energy and wind power technologies [17].

Surrounded by the sea, the Country is naturally rich in wind resources. Throughout history, Danish people have harvested wind power in various ways. Wind power and wind power technologies have deep-seated historical roots in the Country, and historically, wind power and wind power technologies have been popular among the Danish public [18]. Denmark has been a leader in the wind energy sector since the formation of the industry after the 1973 Arab embargo that starved the Country of oil. The Country achieved energy independence and did it with clean energy; the change management process took some time. The biggest hurdle was culture; farmers had to share their lands with wind turbines [19]. The Country has embarked on a project to construct artificial islands in the North Sea to install wind turbines and harness the power, after which it will sell to other neighbouring countries in Europe. Denmark's greatest strength in clean energy is wind power. Its sensitization policy informs of the competitive

advantage of clean energy, which assisted its change management process.

The Kingdom of Norway is a humble, clean energy leader. Norway's remarkable Journey towards clean and renewable energy started with a solid commitment to sustainability and a rich endowment of natural resources; Norway has successfully changed its energy sector towards cleaner alternatives. Norway's energy landscape's historical overview highlights vital milestones, policy frameworks, and technological advancements. The area and geographical position, with its abundant water resources, provides a complete advantage to cheap energy and more robust economic growth. This study highlights Norway's achievements, challenges, and prospects in change management, pursuing a sustainable energy future through a comprehensive analysis of the Country's renewable energy sources, including hydropower and wind energy [20].

Norway's commitment to clean and renewable energy has positioned the Country as a global leader in sustainable development. Norway's Journey towards clean energy, tracing its historical development, policy frameworks, and technological advancements. By harnessing its abundant natural resources, particularly hydropower and wind energy, Norway has made significant strides in change management by reducing its carbon footprint and achieving a sustainable energy future while taking its people along on the Journey through effective communication.

Norway's transition to clean and renewable energy dates to the early 20th century, when it began harnessing its vast hydropower potential. The construction of large-scale hydropower plants, such as the Rjukan Falls plant in the 1930s, laid the foundation for Norway's clean energy revolution. Subsequently, Norway implemented robust policy frameworks, including feed-in tariffs and renewable energy targets, further

accelerating the deployment of renewable energy technologies [21].

Hydropower has played a pivotal role in Norway's clean energy journey, contributing to over 95% of its electricity generation. The Country's topography and abundant water resources provide a favourable environment for developing hydropower projects. Furthermore, Norway has increasingly invested in wind energy, capitalizing on its vast offshore and onshore wind potential. The Country's advancements in wind turbine technology and offshore wind farm developments, such as the Hywind Tampen project, have further diversified its clean energy portfolio.

Norway's commitment to clean energy has yielded remarkable achievements. The Country boasts a nearly carbon-neutral electricity sector and is on track to achieve its goal of becoming a fully decarbonized society by 2050. However, challenges remain, including grid integration of intermittent renewable sources and electrification of other sectors, such as transportation and heating. Norway is exploring innovative solutions to address these challenges, such as battery storage and power-to-x technologies. Furthermore, international collaborations and investments in research and development will be crucial in driving Norway's clean energy change management process and achieving its ambitious climate targets [22]. The Country has a more diverse energy mix with hydropower leading clean energy systems.

The challenges of clean energy and Pakistan. The mismatch between energy demand and supply over the last two decades has been increasing because of the domination of expensive imported oil in the energy mix of Pakistan. This mismatch is creating hurdles in the change management process. To import crude oil, the Government paid US \$ 9 billion in 2008–2009 to meet the energy demands of the Country, which put a heavy load on the national economy. A country's sustained

economic condition is due to its energy sector's sustainability [23].

China, India, and Pakistan (CIP) contain nearly 40% of the world population and are best described as developing regions desperately seeking energy resources to meet growing economic requirements. CIP are three major Southeastern Asian countries with nuclear capability and have more significant potential for energy sharing for regional prosperity and socio-economic development. China and India consume 3682.15 million tons of Oil Equivalent [24].

After the renewable energy policy in 2006, the green path change management for sustainable energy development in Pakistan could not be executed. Currently, the share of hydro projects renewables is less than 4% (less than 900 MW) of total installed electricity capacity against the medium-term plan of having a minimum capacity of 9700 MW in 2030. With several strategies and goals established in place to support the development of renewables, however, it is not well organized and managed to find a compelling renewable energy mix for the Country according to targets [25]. Pakistan is no doubt encountering problems with changing to a clean energy policy.

## Discussion

In comparison, Low-carbon energy will remain attractive as the world pursues a balanced environment with clean air [26]. Denmark adopts more wind-based systems in their drive to renewables. This is evident in the many wind turbines used with support from burning straws and by-products from agricultural processing and solar photovoltaics. Denmark's change management process was a success, and its operating strategy now generates so much energy that it often sells to its neighbours. Power generation and transportation are the largest and most sensitive economic sectors to apply clean

energy. These sectors utilize large amounts of power for their operation.

The Kingdom of Norway quickly fixed this problem by installing electric trains and implementing high taxes on fossil fuel-operated vehicles and power systems. Norway's core clean power source is hydropower plants supported by wind and solar plants. The Country is a fossil fuel and gas producer, but most of its production is exported. Given its population size and displacement, Norway continues to lead in the change management process to clean energy systems for the world.

Denmark and Norway were able to build cultural adjustments over many years, a culture of clean energy systems, and citizens were well-informed with adequate research and development for cheaper clean energy.

Pakistan can be a clear example of change management to its energy mix that went wrong. The Country is unable to meet its renewable obligations. The current economic problems regarding inflation, the high cost of living, and political difficulties further exacerbate this problem.

The economic position seemed bleak; Pakistan has an excellent opportunity to enact reforms to enhance the drive for clean and renewable energy through energy independence.

Lessons for Guyana. Guyana is a small country in the continent of South America; the world's largest river, the Amazon, runs through Guyana. Guyana is the land of many waters. The Country is prosperous, with many natural resources such as gold, diamond, silver, bauxite, and other precious metals. The Country discovered oil and gas deposits offshore in 2015 and started crude production in 2019 with two FPSOs. Despite all the good tidings, the Country's population consists of only 800,000 people. The GDP growth rate for 2023 has just been revised to 37.2% by the IMF. Few countries around the world are projecting this level of growth currently.

Guyana is in the early years of its oil success story [27].

The Country has changed its energy mix to include Solar and hydropower stations and is constructing the largest natural gas-to-energy station. This energy diversification will reduce the electricity cost by 50% for every citizen, commercial and private.

The context of Guyana presents several unique challenges and opportunities for change management in the energy sector. The Country's significant oil reserves have the potential to generate substantial revenues but also pose a risk of overreliance on fossil fuels. Additionally, the Country's small size and limited resources may pose challenges in financing the development of renewable energy infrastructure [28].

However, Guyana's abundant natural energy resources, such as solar and hydropower, present significant opportunities for renewable energy development and change. The Government has already taken steps towards this goal, developing the Amaila Falls hydropower project and establishing a renewable energy department within the Ministry of Public Infrastructure. The Country's main framework to manage development in this area is the Low Carbon Development Strategy 2030.

This strategy framework will assist in shifting the change management process of the Country's energy systems in a clean direction by using an LNG Plant with several Hydro power stations and Solar systems.

## **Recommendation**

To effectively manage the transition towards a more clean and sustainable energy mix, the following are recommended:

Develop clear policy frameworks: The Government should develop clear policies and regulations that support renewable energy development and address regulatory barriers.

Engage stakeholders: Effective stakeholder engagement, including local communities, the

private sector, and civil society, is critical in building support for the transition and ensuring that the needs and concerns of all stakeholders are addressed.

**Promote technological innovation:** The development and deployment of innovative technologies, such as energy storage solutions, can address technical challenges and facilitate the integration of renewable energy into the grid.

**Invest in public awareness and education:** The Government should invest in public awareness and education campaigns to promote the benefits of renewable energy sources and build public support.

The Low carbon development strategy can be amended to emphasize Wind Farms and Nuclear Energy.

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## Conclusion

In conclusion, the displacement towards a more sustainable energy mix in Guyana presents challenges and opportunities. By learning from successful change management practices in other countries such as Denmark and the kingdom of Norway and addressing the unique context of Guyana, effective change management can facilitate the transition towards a more sustainable energy future.

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## Conflict of Interest

There are no known conflicts of interest by the author at the time of production and release of this academic journal.

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