Chapter 6
Accelerating Green Energy Adoption to Combat Climate Change:
Innovations and Pathways to a Sustainable Future

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ABSTRACT

Climate change is a pressing concern. It demands a rapid transition to green energy sources. In order to mitigate climate change and make the transition to a sustainable future, green energy adoption must accelerate. Significant progress has been achieved in renewable energy technologies, including solar, wind, and energy storage, which have increased efficiency and decreased costs. But issues like funding, regulations, and infrastructure constraints continue to be major roadblocks. Furthermore, to guarantee a smooth transition, significant funding and legislative assistance are needed for the integration of green energy into current systems. To overcome these obstacles and promote widespread adoption, cooperation between the public and commercial sectors is crucial. In light of the aforementioned, this chapter examines the technological advancements in renewable energy. Through the promotion of efficient regulations, increased investment, and innovation, society can hasten the adoption of green energy and clear the path for a low-carbon, sustainable future.

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INTRODUCTION

Every continent has obvious signs of climate change, which has an impact on both the environment and numerous economic sectors. In order to lessen adverse effects on the climate and ecology, state governments, the global economy, and businesses are all adopting drastic actions (Lesnikowski et al., 2021; Crecente et al., 2021). Decarbonization, protecting water and green spaces, and implementing creative solutions integrating energy, transportation, and construction businesses are just a few of the problems that come with efforts to eradicate climate change (Borowski, 2022). Widespread changes in weather systems brought on by rising global temperatures intensify and increase the unpredictability of natural disasters including hurricanes, floods, and droughts. Our generation is increasingly seeing extreme weather occurrences that may have only occurred once in the lives of our grandparents. However, the impacts won't be the same everywhere: In certain areas, climate change may result in extreme drought, while in others, it may increase the likelihood of flooding (Borowski, 2022).

The main cause of CO2 emissions is the global energy system. Therefore, cutting emissions from the energy sector is crucial to preventing global warming. If global warming can be kept well below 2°C, the energy systems of the future will be considerably different from those of today. The way energy is supplied, transformed, and utilized will change from what it is now. There is an amazing array of opportunities and obstacles in achieving and adapting to these developments (Metz et al., 2007). Making the switch to clean and renewable energy sources is one of the best ways to fight climate change. Renewable energy comes from naturally replenishing resources like sunlight, wind, and water, whereas clean energy comes from sources that emit less greenhouse gases (Nowotny et al., 2018). Any form of energy produced from natural resources, such sunshine, wind, or water, is referred to as green energy. Although there are some distinctions between renewable and green energy, it frequently originates from renewable energy sources. A resource must not emit pollution, like fossil fuels do, in order to qualify as green energy (WTI, 2022). This indicates that not all of the sources that the renewable energy sector uses are environmentally friendly. Because of the CO2 created during the burning process, electricity generation that uses organic material from sustainable forests, for instance, may be renewable but not always environmentally friendly. Unlike fossil fuels like coal or natural gas, which can take millions of years to generate, green energy sources are typically naturally replenished (Jaiswal et al., 2022). Additionally, green sources frequently steer clear of drilling or mining activities that could harm ecosystems. Wind, solar, and hydroelectric power—including tidal energy, which harnesses the energy of the sea's tides—are the primary sources. Small-scale production of solar and wind energy can take place in people's homes, or it can be produced on a larger,