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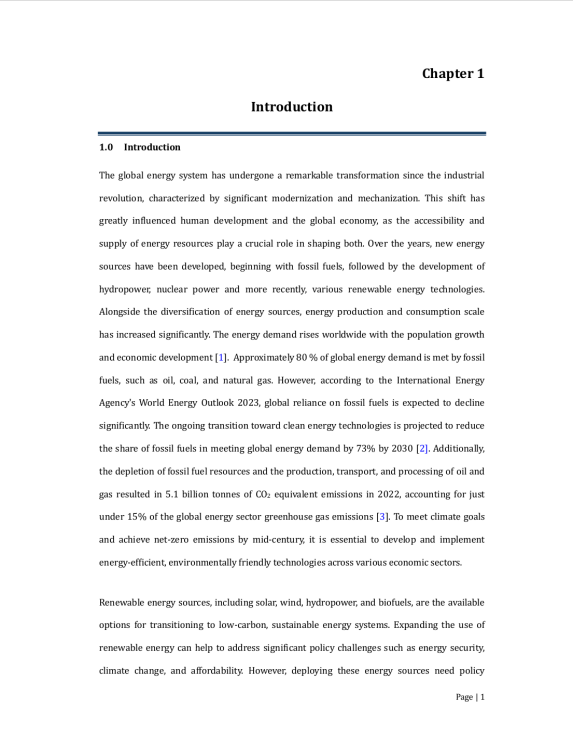

Chapter 1

Introduction

1.0 Introduction

The global energy system has undergone a remarkable transformation since the industrial revolution, characterized by significant modernization and mechanization. This shift has greatly influenced human development and the global economy, as the accessibility and supply of energy resources play a crucial role in shaping both. Over the years, new energy sources have been developed, beginning with fossil fuels, followed by the development of hydropower, nuclear power and more recently, various renewable energy technologies. Alongside the diversification of energy sources, energy production and consumption scale has increased significantly. The energy demand rises worldwide with the population growth and economic development [1]. Approximately 80 % of global energy demand is met by fossil fuels, such as oil, coal, and natural gas. However, according to the International Energy Agency's World Energy Outlook 2023, global reliance on fossil fuels is expected to decline significantly. The ongoing transition toward clean energy technologies is projected to reduce the share of fossil fuels in meeting global energy demand by 73% by 2030 [2]. Additionally, the depletion of fossil fuel resources and the production, transport, and processing of oil and gas resulted in 5.1 billion tonnes of CO_2 equivalent emissions in 2022, accounting for just under 15% of the global energy sector greenhouse gas emissions [3]. To meet climate goals and achieve net-zero emissions by mid-century, it is essential to develop and implement energy-efficient, environmentally friendly technologies across various economic sectors.

Renewable energy sources, including solar, wind, hydropower, and biofuels, are the available options for transitioning to low-carbon, sustainable energy systems. Expanding the use of renewable energy can help to address significant policy challenges such as energy security, climate change, and affordability. However, deploying these energy sources need policy

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STUDY ON PETROLEUM COKE AND BIOMASS CO-GASIFICATION IN DOWNDRAFT GASIFIER

by Adity Bora

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