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Optimization of Chemical Environmental Protection and Energy Sustainable Development

Zetao He

School of Chemistry and Chemical Engineering, Tianjin University of Technology, Tianjin, China, 300384

ZetaoHe@outlook.com

Abtract. Chemical products are increasingly being used in all aspects of human life as science and technology advance. However, there are some drawbacks to chemical technology. For example, many chemical production will use large amounts of coal and petroleum, causing not only an energy shortage but also irreversible pollution to the environment. As a result, researchers' attention has gradually shifted to chemical environmental protection, energy sustainable development, and other disciplines subdivided from the chemical specialty. The research methods of literature review and information retrieval are used in this paper to investigate the application and development of chemical environmental protection technology in industrial production on the one hand, and more favorable methods for energy conservation on the other. This paper proposes targeted optimization measures for chemical environmental protection and sustainable energy development by analyzing existing problems in the chemical industry. People have the innovative ability to combine the benefits of the two and break free from the past recognition and reliance on traditional energy, which will play a critical role in promoting the development of social economy, ecological sustainability, energy utilization, and other fields.

Keywords: Chemical environmental protection, Energy, Sustainable development, Optimization measures.

1. Introduction

The chemical industry has long been the most significant basic industrial field in social evolution, playing an essential role in human survival, economic progress, and life enhancement. Its various chemical products represent the advancement of human civilization. Petrochemical firms, which are a cornerstone industry in China, are among them and play a very important role in the Chinese national economy [1]. However, the growth of petrochemical firms has resulted in major environmental contamination issues. Chemical waste from oil refineries will devastate the biological balance of soil, lake water, and the environment. As a result of increased environmental pollution and a scarcity of natural energy, the concept of chemical environmental protection and sustainable energy development has piqued the interest of many individuals. Many countries are now opting to employ renewable energy for safe and ecologically sustainable chemical manufacture. Renewable energy sources include wind energy, biofuels, and other natural energy sources. This article optimizes and examines the

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process of boosting these energy utilization rates based on current chemical technology and energy development.

Each country has its own reaction plan for chemical pollution and energy consumption. Domestic policies typically employ legislative or administrative mechanisms to limit energy consumption. It will also improve the control of chemical pollutant discharges. Foreign policies frequently investigate the link between sustainable energy development and the development of diverse parts of the country. However, both local and foreign governments have maintained the same position on producing new energy. This article, in the author's opinion, supports optimizing the energy use process. We cannot prevent producing chemical pollutants entirely, but we may employ safe and clean materials to degrade them. Meanwhile, I feel that if we want to extend the service life of traditional or new energy, the first step should be to increase energy usage. Their usage will decrease as long as the utilization rate of energy remains high.

The research methodologies of literature review and information retrieval are mostly used in this paper. First and foremost, identify the major sources of contaminants in chemical production. Investigate pollution prevention approaches and non-harmful treatment procedures [2]. The optimum design of a chemical system is then investigated. It is the best answer for long-term energy development since it improves every link in chemical manufacturing and maximizes energy utilization.

Chemical products and the energy sector are steadily changing in the twenty-first century as a result of the high usage of natural energy and the ecological problem caused by global warming. Optimizing the process of sustainable development of chemical environmental protection technology and energy can not only protect the living environment on which humans rely, but also contribute to China's economic and social development, as well as improve the social and economic benefits of the chemical industry itself.

2. Optimization strategy of chemical pollution and environmental protection

2.1. Main sources of chemical pollution

In the chemical industry, there are three types of pollutants: waste water, waste gas, and waste residue. First and foremost, chemical wastewater is distinguished by its complicated chemical composition. It combines a variety of organic compounds and hazardous substances, including oily wastewater, salty wastewater, and reverse osmosis wastewater, all of which are difficult to treat again [3]. If the wastewater is dumped into the river, it will instantly kill the aquatic life. When individuals eat fish that dwell in wastewater unknowingly, it can result in the spread of many diseases that adversely disrupt people's health. Second, the majority of chemical waste gas is produced by the volatilization of raw materials and final products, as well as dangerous gases produced during the manufacturing process. Sulfuric acid gas will be produced as a byproduct of petrochemical manufacture. After constant fluctuations, this gas will produce sulfuric acid rain in the atmosphere. Sulfuric acid rain will erode soil, plants, and buildings. Third, chemical waste residue is a waste residue produced by the chemical industry. Investigation reveals that the waste residue comprises a high concentration of metal elements, primarily chromium residue, arsenic residue, salt mud, mercury residue, phosphorus residue, cyanide-containing waste residue, phosphogypsum, and so on [4]. In addition to harmful compounds, these chemical waste residues contain a huge number of resource substances, which will squander resources if stacked haphazardly for an extended period of time without management. If we do not control this problem, it will indirectly raise the pressure on the development of the chemical industry economy and limit the growth of chemical companies.

2.2. Optimization measures for chemical environmental protection

Clean chemical technology has recently offered a framework for the efficient and clean exploitation of traditional chemical industry. Clean chemical technology is primarily used in chemical technology for the smelting of raw materials and the sorting of industrial waste. The required chemical substances are

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employed for chemical reactions in raw material smelting to remove some impurities and undesired elemental substances [5]. In the past, the intricacy of chemical reactions caused experimental errors, resulting in certain toxins entering people's living environments. In contrast to the traditional practice of randomly burning and burying chemical pollutants, contemporary clean chemical technology will assist chemical firms in better filtering dangerous compounds and degrading chemical wastes.

The most effective use of chemical environmental protection technology is to avoid pollution and reduce by-products and trash. Its ultimate goal is "atomic economy" and "zero emissions." Advanced clean technology in chemical production is intimately tied to the chemical industry's production efficiency. Because the raw materials used in clean chemical technology are completely safe and pollution-free, the negative impact on the environment can be decreased while ensuring product quality, and the utilization rate of resources can also be enhanced. Desulfurization technology, for example, is a critical clean chemical technology [6]. Chemical manufacturing frequently generates additional sulfide, and wastes containing sulfur elements that are immediately released into the environment have a high destructive force. At the moment, desulfurization technology can remove sulfur from wastewater and waste gas. This will contribute to increasing the industrial value of chemical production.

Maintaining the concept of chemical environmental protection alone through science and technology is far from sufficient. We also require public awareness and promotion from the government and community. As a result, the government has implemented a sustainable development policy. The state compels chemical companies and key government agencies to work together to implement the policy. The use of chemical environmental protection technology is the central concept of each chemical enterprise under this policy. It also believes that businesses will be able to invent and research chemical environmental protection technology. Chemical equipment used in technical research should also be optimized and updated by businesses. It would be preferable to reduce raw material waste and pollutant emissions from chemical equipment.

Furthermore, under the requirements of China's environmental regulations, every firm has the responsibility and obligation to develop the pollution control system. According to the content of the legal rules, chemical businesses can organize duties relating to their responsibilities to the work scope of certain personnel for the pollution control system. For example, chemical companies can organize specialized workers to ensure that their pollution emissions do not exceed the entire quantity authorized by the state. Chemical companies can also utilize computer Internet technology to determine the characteristics and metal content of contaminants. The state and government encourage and support chemical environmental protection technology research, as well as increase investment in technology research funding, which will undoubtedly ensure the expanding development trend of advanced technology.

3. Optimization strategy of energy sustainable development

3.1. Contents of sustainable energy development

The research on energy sustainability stems from the research on sustainable development. The blind manner of economic expansion would devastate world resources and the environment, as well as represent a severe threat to human life and development. Humans have increasingly discovered that they are confronted with a number of serious issues in the economic, social, and environmental domains. As a result, the notion of "sustainable development" was explicitly proposed in 1987. With the passage of time, the philosophy of sustainable development has been widely disseminated throughout the chemical sector. Fossil energy exploration, production, transportation, and consumption are no longer at the forefront of industrial development. Energy sustainability has emerged as one of the world's most pressing challenges. All governments throughout the world have prioritized sustainable energy development as the major goal of chemical production. The national government promptly develops an energy development strategy. They seek to find a means to not only

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assist economic development, but also to ensure that the negative impact of energy exploration, development, and consumption does not violate environmental, economic, and social criteria.

As we all know, there are numerous types of energy and classification systems. The most frequent is to categorize energy as renewable or nonrenewable. Renewable energy refers to primary energy with self-recovery and sustainable utilization properties, such as hydropower, wind power, solar energy, bioenergy (biogas), geothermal energy (including ground and water sources), and so on [7]. Nonrenewable energy mostly refers to naturally occurring substances such as coal, oil, and natural gas. Following WWII, coal and oil became the two primary energy sources in industrial expansion [8]. Their availability is decreasing as a result of the continued use of nonrenewable energy. The study of sustainable energy development has become a significant challenge for the government in order to boost chemical output.

The research on sustainable energy development can be classified into a variety of categories based on the geographical extent and characteristics of the study object. For example, it can be separated into research on the sustainable development of complete energy, research on the sustainable development of single energy (coal, oil or oil and gas, new energy), and research on the sustainable development of energy industry. Despite their differences, the research goals of energy sustainable development are consistent. The research's goal is to provide a long-term energy development strategy based on studying and solving present energy difficulties. This concept will ultimately provide energy security and achieve sustainable energy development. In a nutshell, the goal of sustainable energy development is for the energy we provide to support current and future sustainable economic and social development while being low-cost and efficient. Furthermore, the environmental pollution concerns created by energy use can be continuously improved in order to attain environmental sustainability.

3.2. Optimization of energy sustainable development process

The goal of sustainable energy development is to use energy as efficiently as possible. And sustainable energy development is a chemical industry-based research project. As a result, the chemical system is inextricably linked to the long-term evolution of energy. If we properly optimize the total process of chemical production, we can utilise the energy consumed in each connection to the greatest extent possible. At the same time, we can find and develop new energy utilization talents. The main advantage of new energy over traditional energy is that it can be recycled indefinitely and does not degrade the earth's environment [9].

Chemical engineering system optimization is divided into two parts: optimization of the whole process of chemical engineering and optimization of people technology. We demand professionals to carefully calculate from the beginning of the process design to the middle of the operating process in the first phase. Each phase of the chemical manufacturing process necessitates numerous simulation tests in order to obtain a reference standard that can be used to finish the comparative analysis. In the second portion, no matter how long the chemical industry develops, the ability of operators always defines the height of development. As a result, enhancing professional skill levels must be prioritized in the process of developing sustainable energy. We have the ability to send operators for professional and rigorous training. Employees will be able to expand their expertise and widen their horizons as a result of this. We have the ability to send operators for professional and rigorous training. It has the potential to widen employees' knowledge and vision.

Furthermore, the advancement of energy utilization is supported not only by theoretical understanding, but also by practical conduct. As a result, we may create an evaluation index system that can research and evaluate various energy usage levels in an appropriate context. Meanwhile, professionals can create a set of evaluation tools based on the evaluation index system. To confirm whether the research process is up to standard, a standard must be set in the evaluation instrument. Allow knowledge and theory to constantly verify and agree [10]. Traditional energy is nonrenewable, and the quantity of energy that humans can consume is limited, according to decades of research. So, before we use new energy, we must test and analyze its sustainability once more. We can only change our reliance on traditional energy if we generate more new energy.

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4. Conclusion

To summarize, traditional fossil energy has nonrenewable properties. Through addition, hazardous compounds can be produced in chemical reactions, damaging the atmosphere, land, water, and other natural areas. The "greenhouse effect" will be caused by carbon dioxide produced in chemical manufacturing. As a result, countries around the world are attempting to overcome these difficulties by actively developing the energy utilization rate and continuously optimizing the energy consumption structure. Many academic researchers typically associate energy purity with the realization of sustainable energy development. Because the sustainability and cleanliness of energy are the guarantees for the social economy's future development. Popularization and implementation of clean chemical technologies, as well as improvements in energy consumption efficiency, have all contributed to the potential of sustainable energy development to continue.

The optimization of chemical environmental protection and energy sustainable development in the development of the chemical industry has substantially enhanced the efficiency of chemical industry production. Chemical environmental protection and energy sustainable development demand researchers to scientifically rethink each phase of the chemical system. Chemical reactions can make the most use of energy materials at each stage. Although the chemical industry's sustainable growth has yielded some initial successes, there is still much room for improvement. The most significant advance for the entire globe, in addition to enhancing the utilization rate of existing energy, is the discovery of a new type of sustainable energy. This will be done by limiting chemical pollution at the source.

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