

Research on Treatment and Resource Utilization of Solid Waste in Power Industry

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Abstract: With the rapid development of the power industry, energy consumption and solid waste generation are increasing. Improper treatment of solid waste will not only occupy a large amount of land resources, but also cause pollution to the environment. For this reason, how to handle and resource utilization of these wastes effectively has become an important issue. This paper proposes a series of effective treatment and resource utilization strategies through an in-depth analysis of the characteristics of solid waste in the power industry and solid waste treatment methods. These strategies aim to improve the treatment efficiency of solid waste in the power industry, reduce the pollution of the environment, and at the same time realize the effective utilization of resources. Therefore, this paper aims to discuss the treatment and resource utilization of solid waste in the power industry to provide theoretical support and practical guidance for the sustainable development of the power industry.

1. Treatment Technologies for Solid Waste in the Power Industry

1.1 Landfill Technology

Landfill technology for solid waste treatment in the power industry is a common disposal method. However, landfill technology is not suitable for all types of solid waste. When choosing the treatment method, comprehensive consideration should be made according to the nature, quantity and environmental factors of the waste. Specifically, landfill technology involves transporting solid waste to a landfill site for landfilling [1]. Before landfilling, compaction and covering are usually required to control, reduce and eliminate hazards of the waste. After landfilling, biodegradation and impermeability treatments are also required to ensure that the waste does not pose a hazard to the environment and human health [2].

1.2 Incineration Technology

Incineration technology involves the decomposition and transformation of hazardous substances in solid waste into harmless ones by means of high-temperature combustion. During the incineration process, the combustible materials in the waste are burned and the heat generated can be used for power generation or heating, etc., the advantages of which are shown in Figure 1.

Nevertheless, incineration technology also has some drawbacks, such as the need for large amounts of energy consumption and the generation of secondary pollution [3]. Therefore, when choosing to use incineration technology, it is necessary to comprehensively consider its advantages and disadvantages, and take corresponding measures to reduce the generation of secondary pollution. In general, incineration technology is an effective solid waste treatment technology for the power industry, but it is necessary to pay attention to controlling the generation of secondary pollution when applying it, and to realize the recovery and reuse of energy.

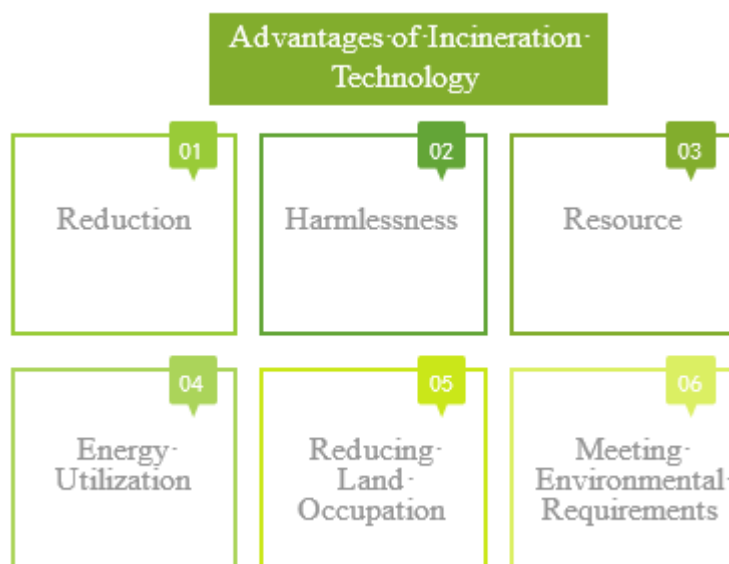


Figure 1: Advantages of Incineration Technology

1.3 Comprehensive Utilization of Technologies

Incineration technology is an important technical means in the comprehensive utilization of solid waste in the power industry, and is specifically applied in the following three aspects.

1) Generate electricity: By incinerating solid waste, steam or hot water can be generated, which in turn drives a turbine or generator to generate electricity. This method is called waste power generation, which can convert the energy of waste into electricity and realize the recovery and utilization of energy.

2) Thermal energy utilization: In addition to generating electricity, the thermal energy generated by incineration can also be used for heating or industrial purposes. Through the waste heat recovery system, the heat energy generated by incineration can be converted into hot water or steam, which can be supplied to factories, residential areas and other uses.

3) Material Recovery: During the incineration process, valuable materials such as metal and glass in some solid wastes can be separated and recovered. Through specialized equipment and technical processing, valuable materials can be extracted from the waste for reuse.

1.4 Emerging Treatment Technologies

As China's comprehensive strength is enhanced increasingly, various emerging technologies have been widely applied and have achieved remarkable results. For example, intelligent sorting technology which is an important technology in the field of industrial solid waste treatment. Through the high-precision sorting of solid waste, the efficient extraction of recyclable resources can be realized, so as to achieve the purpose of solid waste resource utilization [4]. In incineration

technology, intelligent sorting technology can help to categorize and screen solid waste, which will select waste suitable for incineration and improve incineration efficiency. Waste heat recovery technology refers to the technology of recycling the waste heat generated by waste combustion. In the incineration of solid waste in the power industry, this technology can convert the heat energy generated by waste combustion into electrical energy or thermal energy, improve the utilization rate of energy, and promote the sustainable development of solid waste treatment in the power industry.

2. Strategic Recommendations for Treatment and Resource Utilization of Solid Waste in the Power Industry

2.1 Enhancing Policy Guidance and Support

Enhancing policy guidance and support is one of the important measures to promote solid waste treatment and resource utilization in the power industry, which should be analyzed from different perspectives to provide strong policy support for the sustainable development of the power industry, and the specific process is shown in Figure 2.

1) Setting clear policy objectives: The government should clarify the objectives of solid waste treatment and resource utilization in the electric power industry and incorporate them into national energy and environmental protection policies. The objectives should include reducing the generation of solid waste, improving the efficiency of resource utilization, and reducing environmental pollution.

2) Developing incentive policies: The government can encourage power industry enterprises to strengthen solid waste treatment and resource utilization through financial subsidies, tax incentives and other incentive policies. At the same time, enterprises adopting advanced technologies and equipment can be given certain incentives or subsidies to promote the promotion and application of the technologies.

3) Strengthening regulation and enforcement: The government should strengthen the regulation and enforcement of solid waste treatment and resource utilization in the power industry to ensure the strict implementation of relevant policies and standards. Enterprises that violate the regulations should be penalized in accordance with the law to serve as a deterrent.

4) Establishing an information sharing platform: The government can establish an information sharing platform for solid waste treatment and resource utilization in the power industry to promote information exchange and cooperation among enterprises. Through information sharing, enterprises can understand industry dynamics, technological advances and market trends so that they can better formulate strategies for solid waste treatment and resource utilization.

5) Guiding public participation actively: The government should strengthen publicity and education on solid waste treatment and resource utilization in the power industry to increase public awareness and participation in environmental protection. Through media publicity and community activities, the public should be made aware of the importance of this, so as to form a good atmosphere of common concern and participation of the whole society.

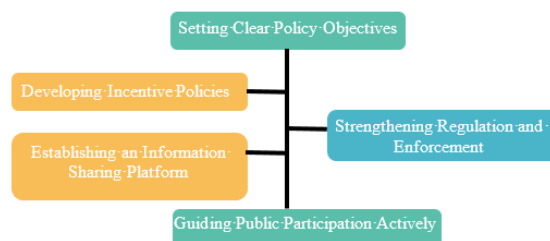


Figure 2: Approach to Policy Guidance

2.2 Promoting Advanced Technology and Equipment

It is important to promote advanced technology and equipment to improve solid waste treatment and resource utilization in the power industry. First of all, the government and enterprises should increase investment in research and development on solid waste treatment and resource utilization in the power industry, which will encourage scientific and technological innovation and technological progress. Through the establishment of scientific research projects and the provision of research and development funds, the research and development and application of new technologies and equipment should be promoted. Secondly, we should introduce advanced solid waste treatment and resource utilization technologies from abroad positively, strengthen cooperation and exchanges with international advanced enterprises, absorb their advanced technologies and experiences, and improve the technical level of solid waste treatment and resource utilization in China's power industry. Furthermore, in view of the characteristics of solid waste in the power industry, advanced treatment and resource utilization technologies such as high temperature melting technology, supercritical water oxidation (SCWO) and biological treatment technology have been promoted [5].

These technologies can realize efficient and environmentally friendly treatment and resource utilization, which can improve the comprehensive utilization efficiency of solid waste in the power industry. In addition, cooperation among enterprises, universities and research institutions should be strengthened to promote the combination of integration of industry, academia, research and application, so as to promote the transformation and application of scientific and technological achievements. Through cooperation and innovation, the research and development and application of new technologies and new equipment can be accelerated, and the overall level of solid waste treatment and resource utilization in the power industry can be improved. Finally, training and education activities are carried out for technicians and managers in this field to improve their technical level and professional ability. Through training and education, the skill level of them can be strengthened which will provide talent guarantee for solid waste treatment and resource utilization in the power industry.

2.3 Strengthening Regulation and Information Disclosure

In order to meet the needs of the sustainable development of the power industry, it is more than not less important to strengthen the information regulation and disclosure. The government should strengthen the supervision of solid waste treatment and resource utilization in the power industry, and establish a sound system of relevant laws, regulations and standards to ensure the strict implementation of relevant policies and standards. At the same time, the government should strengthen the supervision and management of enterprises to ensure that they handle and utilize solid wastes in accordance with the standard requirements. In addition, the government can establish an information sharing platform for solid waste treatment and resource utilization in the power industry to promote information exchange and cooperation among enterprises. Through information sharing, enterprises can understand industry dynamics, technological progress and market trends, so that they can better formulate strategies for solid waste treatment and resource utilization. At the same time, the government can strengthen its supervision and guidance of enterprises through the information sharing platform, and promote the standardization of solid waste treatment and resource utilization. In addition, the government should strengthen the information disclosure of solid waste treatment and resource utilization in the power industry by publishing the treatment and utilization status of relevant enterprises in a timely manner and accepting social supervision. At the same time, the government can encourage social organizations and the public to participate in the supervision and promote the transparency and standardization of

solid waste treatment and resource utilization. Finally, the government should strengthen the training and education of technicians and managers of solid waste treatment and resource utilization in the power industry to improve their technical level and professional ability. With training and education, the skill level of technicians and managers can be strengthened so that the talent guarantee can be provided.

2.4 Strengthening International Exchanges and Cooperation

Strengthening international exchanges and cooperation is of great significance in promoting solid waste treatment and resource utilization in the power industry, promoting technological progress and innovation, enhancing international competitiveness, promoting environmental protection and sustainable development as well as promoting economic and social development. Promoting the establishment of international cooperation mechanisms in the field of solid waste treatment and resource utilization in the power industry actively. For example, signing bilateral or multilateral cooperation agreements and establishing international cooperation platforms. Through international cooperation, technical exchanges, experience sharing and resource sharing can be promoted to advance the development of solid waste treatment and resource utilization in the global power industry. The government and enterprises should participate in international conferences and seminars in the field of solid waste treatment and resource utilization in the power industry actively, to understand the latest international technological developments and trends, and to strengthen exchanges and cooperation with their international counterparts. At the same time, the opportunity of international conferences and seminars can be used to demonstrate the achievements and experiences of solid waste treatment and resource utilization in China's power industry. The government and enterprises should introduce international advanced solid waste treatment technologies and equipment actively, strengthen the cooperation and exchange with international advanced enterprises, and absorb their advanced technologies and experiences. Through the introduction of international advanced technologies and equipment, the technical level of solid waste treatment and resource utilization in China's power industry can be improved and the sustainable development can be promoted. The government and enterprises can strengthen cooperation with international advanced scientific research institutions and jointly carry out scientific research projects on solid waste treatment and resource utilization. Through scientific research cooperation, technological innovation and development can be promoted, and the progress of solid waste treatment and resource utilization in China's power industry can be promoted.

3. Conclusions

The treatment and resource utilization of solid waste in the power industry is an important way to achieve sustainable development of the power industry. Nevertheless, the treatment and resource utilization of solid waste in the power industry is a complex and long-term process that requires the joint efforts of the government, enterprises and all aspects of society. For the future, we need to strengthen policy guidance and support continuously, promote advanced technology and equipment, improve the efficiency of resource utilization and diversified utilization pathways, strengthen regulation and information disclosure, and promote the construction of corporate social responsibility. At the same time, we also need to strengthen international cooperation and exchanges, the introduction of advanced concepts and technologies to provide more ideas for the treatment and resource utilization of solid waste in the power industry. After long-term efforts, the treatment and resource utilization of solid waste in the power industry will achieve more significant results and make greater contributions to the sustainable development of the power industry.

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