Chapter 5
Public Risk Perception Towards Power Generation by Municipal Waste Incineration: Word-Frequency-Based Decision Making

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ABSTRACT

Power generation by municipal waste incineration provides a template not only for waste reduction but also for energy recovery. However, incineration plants face considerably strong protests from local communities. In such context, this study investigates the public's risk perception towards an operating incineration plant by using a word-frequency-based decision making approach to provide insight into risk mitigation while enhancing public acceptance. An operating municipal waste plant located at Chengdu, Sichuan Province was used as a case study to examine the risk perception posed by the host communities. Face-to-face interviews through a structured questionnaire were applied to data collection. A word frequency analysis was used to identify the key factors that influence public's risk perception and construct a multi-attributive decision matrix for the risk assessment. Entropy-based fuzzy decision making was implemented to discriminate the risk semi-quantitatively. To alleviate possible conflicts, policy implications were given.

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INTRODUCTION

China, because of its large population and rapid urbanization, is expected to achieve an 8% annual growth rate of municipal waste in 2020, with over 300 waste incineration plants coming into use (Lu, Zhang, Hai, & Lei, 2017; Makarichi, Jutidamrongphan, & Techato, 2018). Despite the rapid development of power generation by waste incineration, due to the potential environmental impacts in the course of operation, such as dioxin and odor, the public shows different degrees of risk perception (Lin et al., 2018; Qi et al., 2017).

Risk perception is the evaluation by the public towards any target objects, including the public's demand for risk information and corresponding emergency behaviors, thus determining the public's reactions to existing and unknown risks (Pennings & Smidts, 2000; 2003). Zegans (2008) clarified that the public might have different choices in terms of various risk perceptions. As far as waste incineration is concerned, individuals may have different subjective judgements resulting in different levels of acceptance that even transform into a Not-In-My-Back-Yard (NIMBY) notion (Omanga, Ulmer, Berhane, & Gatari, 2014).

A number of empirical studies have identified influencing factors of public risk perception on construction projects, which are classified into external and internal factors. Regarding external factors, the public concerns may come from the potential harm caused by changes in the ambient environment to their own health, such as noise pollution, air pollution, water pollution, etc. (Ren, Che, Yang, & Tao, 2016; Yu, Huang, Qin, & Chen, 2018). Omanga et al. (2014) found that air pollution and water pollution were the main concerns of the public through investigations of residents in the vicinity of the industrial zone in Kenya. A similar conclusion was reached in the study by Ma, Gong, Fang, Liu, and Liu (2018), which focused on the public's acceptance of the Para Xylene (PX) project and showed that air and water pollution were the main concerns for the public's opposition to the project construction. Rajgor (2011) found that the potential impact of noise from wind power projects might lead to residents' resistance. Paiva, Cardoso, and Zannin (2019) pointed out that the public's perception to traffic noise was significantly positively correlated with noise exposure. Further, prior studies have found that governmental credibility and media disclosure are external factors that influence public risk perception (Liu, Sun, Xia, Cui, & Coffey, 2018). By taking Hong Kong's nuclear power construction as a case, Mah, Hills, and Tao (2014) confirmed that information transparency was a prerequisite for risk communication between the government, operators, and the public. Liu, Lyu, Pan, and Wang (2017) and Wang, Wang, Lin, and Li (2019), respectively, took a coal-fired power plant in Hunan, China, and a nuclear power plant in Jiangmen as case examples, and found that the major reason for local residents' resistance to such plants was information asymmetry especially

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www.irma-international.org/chapter/swarm-intelligence-based-on-remote-sensing-image-fusion/212945