Offshore Platform Operational Risk Management in Extreme Weather Conditions

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Social Conflict and Environmental Challenges in Non-Conventional Energy Projects

Abstract

The development of non-conventional energy is one of the main strategies in dealing with the global energy crisis and climate change. Energies such as solar, wind, biomass, and marine energy are promoted as more environmentally friendly alternatives to fossil energy. However, behind this positive image, there are various social conflicts and environmental challenges that are often overlooked in the implementation process. This perspective article aims to critically examine the dynamics of social conflict and environmental impacts that arise from the construction of non-conventional energy projects. The method used is a qualitative approach through literature study and conceptual analysis. The results of the discussion show that social conflicts are generally related to land issues, community participation, and inequality in the distribution of economic benefits. Meanwhile, from the environmental side, non-conventional energy development can trigger ecosystem disturbances, changes in land use, and uncertainty of long-term impacts. Therefore, a more inclusive, ecosystem-based, and social justice-oriented approach to development is needed so that the energy transition can run sustainably.

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1. Introduction

The energy crisis and climate change are two interrelated global challenges that are increasingly urgent to address. Dependence on fossil energy not only causes limited resources, but also contributes greatly to increased greenhouse gas emissions that have an impact on global warming. The impacts of climate change, such as rising global temperatures, extreme weather patterns, and rising sea levels, have been felt in many parts of the world and threaten the sustainability of human life and ecosystems. In this context, the development of unconventional energy is a strategic solution that is widely adopted by various countries as an effort to reduce dependence on fossil energy while reducing carbon emissions. Non-conventional energy, which includes solar, wind, biomass, and marine energy, is considered to be able to provide a more sustainable, renewable, and relatively environmentally friendly energy source [1].

As global commitments to sustainable development increase, countries are beginning to integrate non-conventional energy into their national energy policies. This is driven by international agreements related to climate change as well as the need to achieve long-term energy security. In addition, technological developments have also accelerated the use of non-conventional energy at

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increasingly competitive costs. Thus, non-conventional energy is not only seen as an environmental solution, but also as an economic opportunity that is able to create jobs and encourage green economic growth [2].

However, in practice, the development of non-conventional energy does not always go without obstacles. The narrative of "clean energy" often obscures the various social and environmental impacts that arise on the ground. Large-scale energy projects, while aiming to reduce carbon emissions, can lead to social conflicts, especially in areas that involve local communities as directly affected parties. These conflicts are often related to land tenure issues, lack of community participation in decision-making processes, and inequality in the distribution of economic benefits generated by energy projects. In some cases, local communities have been marginalized and lost access to the resources that previously supported their livelihoods [3].

In addition, the development of unconventional energy infrastructure also has the potential to put pressure on the environment. Although it generally has lower emissions than fossil energy, the construction of energy facilities such as solar power plants, wind turbines, and marine energy installations still requires intervention in the physical environment. Land use change, disturbance to natural habitats, and potential pollution from technological waste are important issues that need to be considered. In fact, in some conditions, the ecological impact can be long-term and not yet fully predictable [4].

These conditions show that the transition to non-conventional energy is not only a technical issue, but also involves complex social and environmental aspects. Therefore, the approach used in energy development cannot be partial, but must consider the interconnectedness between economic, social, and environmental dimensions as a whole. In this case, the concept of sustainability needs to be interpreted more broadly, focusing not only on reducing emissions, but also on social justice and ecosystem protection [5].

Therefore, it is important to study the development of non-conventional energy more comprehensively by considering social and environmental aspects in a balanced manner. This article aims to provide a critical perspective on social conflicts and environmental challenges in non-conventional energy projects, as well as offer a more inclusive and sustainable approach to their development. Thus, it is hoped that this study can contribute to enriching understanding of the complexity of the energy transition and become a consideration in the formulation of more equitable and sustainable policies.

2. Dynamics of Social Conflict in Non-Conventional Energy Projects

Social conflict is one of the main issues that often arise in the development of non-conventional energy projects. These conflicts are not only simple, but involve a variety of actors with different interests, such as governments, investors, and local communities. One of the most common sources of conflict is related to land use and control. Energy projects such as large-scale solar power plants or wind turbine farms require large tracts of land, so there is often a conversion of land that was previously used for agriculture or settlements.

In many cases, the land acquisition process is carried out without actively involving the community or without providing fair compensation. This caused resistance from people who felt disadvantaged. In addition, the lack of transparency in the planning and decision-making process also worsened the situation, resulting in low public trust in the project.

Social conflicts can also be triggered by the inequality of distribution of economic benefits. Although non-conventional energy projects are expected to improve well-being, the benefits are often uneven. Investors and developers tend to make greater profits, while local communities have only a limited impact, and in some cases even suffer losses. This condition shows that the energy transition does not always run fairly and can reinforce existing social inequalities.

3. Environmental Challenges in Non-Conventional Energy Development

In addition to social conflicts, the development of unconventional energy also faces various complex environmental challenges. Although this energy is known as clean energy, its construction

and operational processes still have an impact on the environment. One of the most significant impacts is disruption to ecosystems.

For example, the construction of wind turbines can disrupt the migration pathways of birds and bats, while marine energy installations can affect the habitat of marine organisms and alter current patterns. On land, large-scale solar power plant construction can lead to land-use changes that have an impact on natural habitat loss and biodiversity decline.

In addition, environmental challenges also arise in the form of technological waste, such as solar panels and batteries that have a limited lifespan. This waste management is an important issue because it can cause pollution if not handled properly. On the other hand, the long-term impact of non-conventional energy technologies is still not fully understood, considering that some technologies are still in the development stage. This requires a more cautious approach in project implementation.

4. Energy Justice Perspectives and Criticism of the "Clean Energy" Narrative

The concept of energy justice is important in understanding the dynamics of social conflicts and environmental challenges in the development of non-conventional energy. Energy justice emphasizes that access to energy, the distribution of benefits, and the impact caused must be felt fairly by all parties.

In practice, the narrative of clean energy often places more emphasis on environmental aspects, particularly the reduction of carbon emissions, without considering the broader social impacts. This leads to inequities in the distribution of benefits and burdens of energy projects. Local communities are often the ones who bear the brunt of the negative impacts, while the economic benefits are more enjoyed by external parties.

Therefore, it is important to critique the clean energy narrative and develop a more holistic approach. Truly sustainable energy must not only be environmentally friendly, but it must also be socially just and not damage the balance of the ecosystem.

5. Mitigation Strategies and Sustainable Approaches

To address social conflicts and environmental challenges in non-conventional energy projects, a comprehensive mitigation strategy is needed. One approach that can be taken is to increase community participation in every stage of development, from planning to project evaluation. By actively involving the community, potential conflicts can be minimized and trust in projects can be increased.

In addition, a comprehensive environmental impact analysis is also an important step in ensuring that the project does not cause significant damage to the ecosystem. An ecosystem-based approach needs to be applied to maintain a balance between energy development and environmental sustainability.

Inclusive and social justice-oriented policies are also indispensable. Governments must ensure that the benefits of energy projects can be distributed equitably and provide protection to affected communities. Thus, the development of non-conventional energy can run more sustainably and provide long-term benefits.

6. Conclusions

The development of unconventional energy is an important step in facing the challenges of the energy crisis and climate change. However, behind the benefits offered, there are various social conflicts and environmental challenges that cannot be ignored. Land-related conflicts, economic inequality, and disruption to ecosystems are the main issues that need serious attention.

Therefore, a more holistic approach is needed in the development of non-conventional energy, which not only focuses on technical and environmental aspects, but also pays attention to the social dimension as a whole. By integrating the principles of energy justice, community participation, and environmental sustainability, the transition to clean energy can proceed more fairly and sustainably.

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