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Facilitating Remote Energy Access in the Arctic and Southeast Asia: Key Conditions and Initiatives

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SYNOPSIS

At the basic level, the energy transition challenges faced by remote communities are common across the world, the Arctic and Southeast Asia included. The primary mechanism to address these challenges is to develop off-grid energy systems that can be clean, affordable, easy to manage, robust and resilient. In addition to the technologies themselves, a proper governance framework has to be in place for the system to function effectively. In this context, both the Arctic and Southeast Asian regions bear similarities with their many remote communities that are cut-off from the main utility grid. This brief examines the role of the government in facilitating such off-grid energy systems for these communities.

KEY POINTS

- Technological advances in renewable energy and smart energy solutions have a positive enabling effect for remote communities all over the world, including those in the Arctic and Southeast Asia.
- However, remote communities face high barriers of entry in the deployment and operation of these energy systems; given their location and harshness of the local environment, thus raising transaction costs.
- The government has a critical role to play in support of these remote communities, by connecting technology providers, community adopters, and private sector investors.
- These remote communities would benefit from a regional energy strategy focused on remote energy systems. With greater harmonisation of energy markets, legislations and standards at the regional level, or even better, a regional energy and infrastructure blueprint, the deployment of these energy systems in remote communities could be further justified in the wider context of regional connectivity.
- Together, governments could identify the strategic and priority corridors for regional infrastructure network development. The bundling of such access services along these corridors would expand the impact factor of energy access for local communities, enabling greater individual mobility, social interaction, economic activity, and generate additional public benefits.

INTRODUCTION

Technological advances in renewable energy and smart energy solutions have a positive enabling effect for remote communities all over the world. This is particularly the case for remote communities in the Arctic and Southeast Asia which are not connected to a main grid and can benefit from such local renewable resources. As such, pooling relevant expertise from within and outside the Arctic to share experiences and exchange knowledge on sustainable energy challenges and solutions is one way to tackle common challenges.

To this end, the Energy Studies Institute, National University of Singapore organised an event entitled "Energy Transitions and a Globalised Arctic: The Role of Science, Technology and Governance" which consisted of a one-and-a-half-day workshop and a half-day conference from 17 to 19 August 2016 in

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Singapore. At this event, stakeholders and experts from the Arctic and Southeast Asia shared their experiences with one another and discussed sustainable energy initiatives surrounding remote communities that are relevant to their regions. This brief further elaborates and builds on some of the issues discussed at the event.

ANALYSIS

Key Characteristics of a Sustainable Energy Transition for Remote Communities

A key outcome from the event is the discussion on what a sustainable energy transition in a globalised Arctic would encompass, with five key elements identified. While the focus here is on the Arctic region, these following elements are generally applicable to remote communities all over the world; Southeast Asia included.

- First, the development of clean, affordable, and accessible energy, using local resources and smart infrastructure to drive sustainable and equitable development in the region.
- Second, the building of local capacity, drawing on local resources, developing manufacture and maintenance capabilities, and connecting to smart, remote support systems.
- Third, a strong business case has to be identified and communicated, for both investors and local communities. For this, research into the potential growth of renewables and other key resources is needed, as well as the development of local enterprise and infrastructure.
- Fourth, there is a need for greater inter- and intra-regional connectivity for the Arctic region, in order to reduce the gap in access to services and opportunities. This would require new sources of capital, such as Asian investment, and a commitment for the building of local capacity.
- Fifth, as initial steps towards these goals, polycentric governance models that empower local communities while supporting long-term peace and resilience will need to be further developed. This will enable the deepening of understanding between the local communities and stakeholders in terms of the opportunity space, and to engage potential investors.

Facilitating Deployment Through Public Private Partnerships

Beyond technological advances and technical considerations, the advent of renewable energy options raises a larger question concerning the rights of remote communities and the obligations by their governments on the issue of energy access. A question arises as to the degree in which energy projects should be regarded, at one end, as an essential service the government should provide as a Public Good; and at the other end, be contingent on bankable projects with private sector involvement.

Ideally, these projects should be able to simultaneously fulfill government objectives and attract private sector involvement. This is in line with the global trend on Public Private Partnerships (PPP) - which refers to partnering relationships between public and private sectors to deliver services. Under this framework, which involves the use of both public finance and private investment funds, projects would be required to demonstrate tangible benefits for the community and be financially bankable.

High Barriers of Entry

However, remote communities face high barriers of entry in the deployment and operation of these energy systems, given the harshness of the local environment, raising transaction costs. First, equipment would have to be transported over difficult terrain and long distances across remote areas. Second, given the harsh environment, the equipment would need to be made more robust and resilient to withstand the challenging local conditions. Third, there may be design modification requirements to facilitate on-site repairs, given costly transportation costs. Fourth, the local community staff would have to be trained to operate, service and repair such equipment.

Developing a Conducive Market Environment through Local Engagement

PPPs often entail the government's outsourcing of manpower and services. While this translates to increased private sector involvement in the delivery of public services,

the government will have to continue in playing a critical role to prepare for and facilitate such an outcome. To spur private sector participation and tap into their resources and capabilities, governments have to first develop a conducive market environment.

First, early community engagement is crucial in order to develop the social license to operate at local community level. Every local community has different attributes. Taking into account their requirements and understanding their unique challenges, the government has to work with the community to develop a capacity-building programme. This is keeping in mind that competence-development and capacity-building at community level is essential for the sustainability of such energy projects. In particular, the ability of remote communities to stem local brain drain and retain technical experience to manage the local energy systems installed will be crucial.

Second, and on a related note, the government needs to develop nuanced environmental impact assessment (EIA) criteria to ensure that siting and deployment are based on environmental sustainability considerations given the delicate eco-systems that typically exist in these remote areas. Furthermore, it needs to account for the views of local communities, in particular the indigenous settlements, since these projects may profoundly impact their livelihoods and traditional way of life.

Third, the government needs to develop a sound regulatory and viable investment environment based on local conditions of these varying remote communities. This is to help facilitate private sector engagement and at the same time safeguard the public funds used for these projects.

Fourth, to facilitate decisions on investment, the government will have a key role to play in data collection and data harmonisation efforts pertaining to renewable energy. Key examples would include information on resource supply and demand, investment opportunities and capacity potential, traditional and local knowledge, available best practices, economic and demographic characteristics of communities, willingness to pay for improved energy access, list of on-going projects, and local environmental features such as information on sea-level changes, coastal erosion, etc. The availability of data would enable outside actors to better assess and access these regions, which would in turn expand the potential pool of expertise and funds available for such projects.

Fifth, the government has to be able to monitor the performance and enforce the obligations of the private sector actors involved in such projects. This will have to be carried out in coordination with the local community.

A Regional Energy and Infrastructure Blueprint for Remote Communities

In addition to the attention accorded at the local community level, the governments in these regions would benefit from a regional energy strategy focused on remote energy systems. With greater harmonisation of energy markets, legislations and standards at the regional level, or even better, a regional energy and infrastructure blueprint, the deployment of these energy systems in remote communities could be further justified in the wider context of regional connectivity. For example, the deployment of energy systems in remote areas, including communities and industrial sites could include the installation of telecommunication towers, providing signal coverage for the “last mile”.

Together, governments could identify strategic and priority corridors for regional infrastructure network development. The bundling of energy and connectivity services along these corridors would expand the impact factor of energy system deployments for local communities, enabling greater individual mobility, social interaction, economic activity, and generate additional public benefits.

For instance, the installation of remote area communications systems powered by hybrid or renewable energy systems installed in remote communities could facilitate search and rescue missions, humanitarian assistance and disaster relief operations, site inspections and real-time environment and health

monitoring services. These services could create greater job opportunities for the local communities, who would be able to leverage their traditional knowledge while providing these services.

Key Examples of Institutional Efforts

There are already multilateral institutional efforts underway in both the Arctic and Southeast Asia focusing on institution-building and norms-creations.

In the Arctic region, the Sustainable Development Working Group under the Arctic Council has three projects focused on Arctic energy issues. The first is the *Arctic Energy Summit* (http://arcticenergysummit.com/), a multi-disciplinary event which gathers industry officials, scientists, academics, policy makers, energy professionals and community leaders to discuss energy issues in the Arctic. The next summit will be held in September 2017 in Helsinki, Finland under the theme, "Arctic as a Leader in Renewable Energy Development, Knowledge and Expertise".

The second is the *Arctic Remote Energy Networks Academy (ARENA)* project (http://arena.alaska.edu/) which focuses on developing community energy experts to ensure affordable, reliable, renewable source energy solutions for Arctic communities. The third is the *Arctic Renewable Energy Atlas (AREA)*, a project to produce a comprehensive online portal, to be launched in 2017. It will provide information on renewable energy resources, local energy generation and supply-demand profiles, and highlight best practices on energy projects gleaned from traditional and local knowledge.

In Southeast Asia, energy security and sustainability is a key goal for the Association of Southeast Asian Nations (ASEAN). In the context of remote energy access, an example is the publication, *ASEAN Guideline on Off-grid Electrification Approaches* released in 2013 by the ASEAN Centre for Energy (ACE), an intergovernmental organisation which falls within the ASEAN structure. This report contains practical recommendations and general guidance on how to design off-grid rural electrification projects based on renewable energy technologies, drawing on lessons from past projects in the region.

Another key example, aimed at facilitating increased private sector activity and investment in the ASEAN renewable energy sector is the RE (renewable energy) Guidelines online portal (http://www.re-guidelines.info/) that is jointly implemented by ACE and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). This Southeast Asian portal provides information on administrative procedures, legal and regulatory provisions and permits, country-specific challenges, and information on how to obtain financial closure.

WHAT TO LOOK OUT FOR

- The ability to integrate new and rapidly changing renewable and storage technologies into existing energy systems.
- Success of institutional and norm-building efforts in facilitating remote energy developments.
- The development of regional energy and infrastructure blueprints for remote communities.

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The report for the Singapore Arctic event is available for download on the ESI website: Energy Studies Institute, *Energy Transitions and a Globalised Arctic: The Role of Science, Technology and Governance, 17 – 19 August 2016*, Event Report (Singapore: Energy Studies Institute, 2016).