

COBENEFITS of the new energy world of renewables for the people in Vietnam

Vietnam is in the midst of an energy transition, with important social and economic implications depending on the pathways that are chosen. Vietnam's chosen energy pathway will define the basis for its future development, including economic prosperity, business and employment opportunities as well as people's health. At the same time, current policy and investment decisions in Vietnam's energy sector will have a substantial impact on combatting global warming and securing the livelihoods of people in Vietnam and elsewhere.

In view of the social and economic implications of the course set by the Government of Vietnam, political decisions on Vietnam's energy future link the missions and mandates of many government departments and agencies beyond energy and power, such as environment, health, labour as well as green industrial development and investments. Hence, the timely debate on Vietnam's energy future boils down to a single question:

How can renewables improve the lives of the people of Vietnam?

Employing scientifically rigorous methodologies and the most recent technical data, the study at hand contributes to answering this question. It also provides guidance to government departments and agencies on further shaping the enabling political environment to unlock the social and economic co-benefits of the new energy world of renewables for the people of Vietnam. Under their shared responsibility, the Green Innovation and Development Centre (GreenID), as the COBENEFITS Vietnam Focal Point, together with the

Institute for Advanced Sustainability Studies (IASS) invited ministries and government agencies such as MONRE, MOIT, MPI, MOLISA, MoH and VUSTA to join the COBENEFITS Council Vietnam to provide guidance to the COBENEFITS Assessment studies along with the COBENEFITS Training Programme and Enabling Policies Roundtables. Since its constitution in August 2017, the COBENEFITS Council Vietnam has guided the programme in framing the topics of the COBENEFITS Assessment for Vietnam and in ensuring their direct connection to the current political deliberations and policy frameworks of their respective ministries.

We are also indebted to our highly valued research and knowledge partners, for their unwavering commitment and dedicated work on the technical implementation of this study. This COBENEFITS study was facilitated through financial support from the International Climate Initiative (IKI) of Germany.

Vietnam, among 185 parties to date, has ratified the Paris Agreement to combat climate change and provide current and future generations with opportunities to flourish. With this study, we seek to contribute to the success of this international endeavour by offering a scientific basis for harnessing the social and economic co-benefits of building a low-carbon, renewable energy system while facilitating a just transition, thereby *making the Paris Agreement a success for the planet and the people of Vietnam.*

We wish the reader inspiration for the important debate on a just and sustainable energy future for Vietnam!

Nguy Thi Khanh
COBENEFITS
Focal Point Vietnam
Director, GreenID

Sebastian Helgenberger
COBENEFITS
Project Director
IASS Potsdam

Executive Summary



Electricity access and local value creation for the un-electrified population in Vietnam

Assessing the co-benefits of decarbonising the power sector

Energy access is essential for economic and human development and is an important driver for the economic development of a country. Access to modern forms of energy, especially electricity, becomes even more important for the socio-economic development of rural areas (which lag behind urban areas in terms of infrastructure development). “Full electrification” to achieve social and economic development goals (and SDGs) in Vietnam requires 24/7 electricity access for every household, family, farming settlement and local enterprise, even in rural communities. To achieve this goal, the government of Vietnam has focused primarily on providing access by extending the centralised grid. Approximately 98% of households in both urban and rural areas of the country have been electrified through this means, but electricity access to the remaining 2% of the population, predominantly located in regions with terrain unfavourable to grid expansion, has become a techno-economic moot point. To this end, discussions have explored whether cost-effective, off-grid renewable

energy (RE) alternatives could assist the electrification of these remaining populations and further drive the socio-economic development of these population groups.

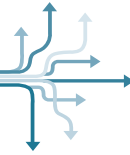
Thus, this study centres on providing answers to two main questions:

- What is the best approach to provide electricity access to the remaining 2% of Vietnamese households located in rural areas: grid expansion or off-grid renewable energy options?
- Can cheaper off-grid alternatives engender local value creation in rural areas?

This study is carried out in the context of the COBENEFITS project with the aim of assessing the range of additional benefits¹ resulting from a low-carbon energy transition in Vietnam.

- **Policy message 1:** Vietnam has tremendous potential for off-grid renewable energy systems, which are cost competitive against grid extension in rural areas with challenging terrain that hinders navigation and connection. Deploying low-wind-speed wind turbines to electrify clusters in rural areas with a levelised cost of 9087 VND/kWh is the cheapest means of providing low-cost energy access to remote areas of Vietnam.
- **Policy message 2:** The private sector or organised community groups need to be encouraged to invest in the off-grid renewable energy sector and be made exempt from import taxes for supplying electricity to households or businesses in rural communities. If effectively implemented, this can stimulate the localisation of skills for the off-grid solar PV and small wind turbine value chains in Vietnam.
- **Policy message 3:** In order to effectively drive the adoption of low-cost off-grid renewable energy systems in remote areas of Vietnam, there has to be close dialogue between the government, private sector and financial institutions at the national and provincial levels concerning suitable financing mechanisms for farming communities (with low electricity consumption levels) located more than 10km away from the nearest medium voltage line.

¹ The term ‘co-benefits’ refers to simultaneously meeting several interests or objectives resulting from a political intervention, private-sector investment or a mix thereof (Helgenberger et al., 2019). It is thus essential that the co-benefits of climate change mitigation are mobilised strategically to accelerate the low-carbon energy transition (IASS 2017a).



KEY FIGURES:

- Renewables are a cheaper way to provide electricity to rural areas especially with off-grid wind being 20% cheaper (9,087 VND/kWh [$\$0.392^2$ /kWh]) than extending the grid (11,300 VND/kWh [$\$0.487$ /kWh]).
- For more remote areas where the distance from the nearest MV line exceeds 25km, the cost advantage for off-grid wind even more than doubles against extending the grid (17,445 VND/kWh [$\$0.752$ /kWh]).
- For smaller villages, off-grid solar (11,873 VND/kWh [$\$0.512$ /kWh]) is cost competitive with extending the grid (11,300 VND/kWh [$\$0.487$ /kWh]) for longer distances; this is particularly the case for villages with about 15 households that are more than 5 km away from the nearest MV line.
- To electrify households in rural areas, irrespective of distance from the nearest medium-voltage line, costs 9,087 VND/kWh ($\$0.391$ /kWh) with a low-wind speed wind turbine, while the cheapest grid extension cost is 11,300 VND/kWh ($\$0.487$ /kWh).
- It costs approximately 17,445 VND/kWh ($\$0.751$ /kWh) to electrify households and rural settlements with grid extension when the distance to the nearest medium-voltage line exceeds 25 km. This is approximately 8,358 VND/kWh ($\$0.360$ /kWh) more expensive than the cheapest off-grid renewable energy alternative.

COBENEFITS
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KEY FINDINGS:

- Communities in Vietnam that are far (>5 km) from the nearest medium-voltage distribution system **are best served by off-grid renewable energy technologies**. Grid extension is only viable in rural communities that have large clusters of households per unit area.
- **Small (locally manufactured) wind turbines** are the most cost-efficient means of electrifying most un-electrified rural households in Vietnam. Stand-alone solar PV is cost-competitive in rural locations with low energy or demand density.
- Access to electricity **improves rural households' access to information and value-added extension services** (e.g., in the agricultural sector), thereby improving opportunities to generate additional income.
- **Opportunities for direct employment** in the local renewable energy value chain can be fostered through effective collaboration between local technical schools and the private sector for planned projects; this essentially aids „localisation of industry“, which in turn drives local employment creation and skills transfer.

² 1 Dollar (\$) = 23201.9 Vietnamese Dong (VND): Exchange rate as of September 2019.