



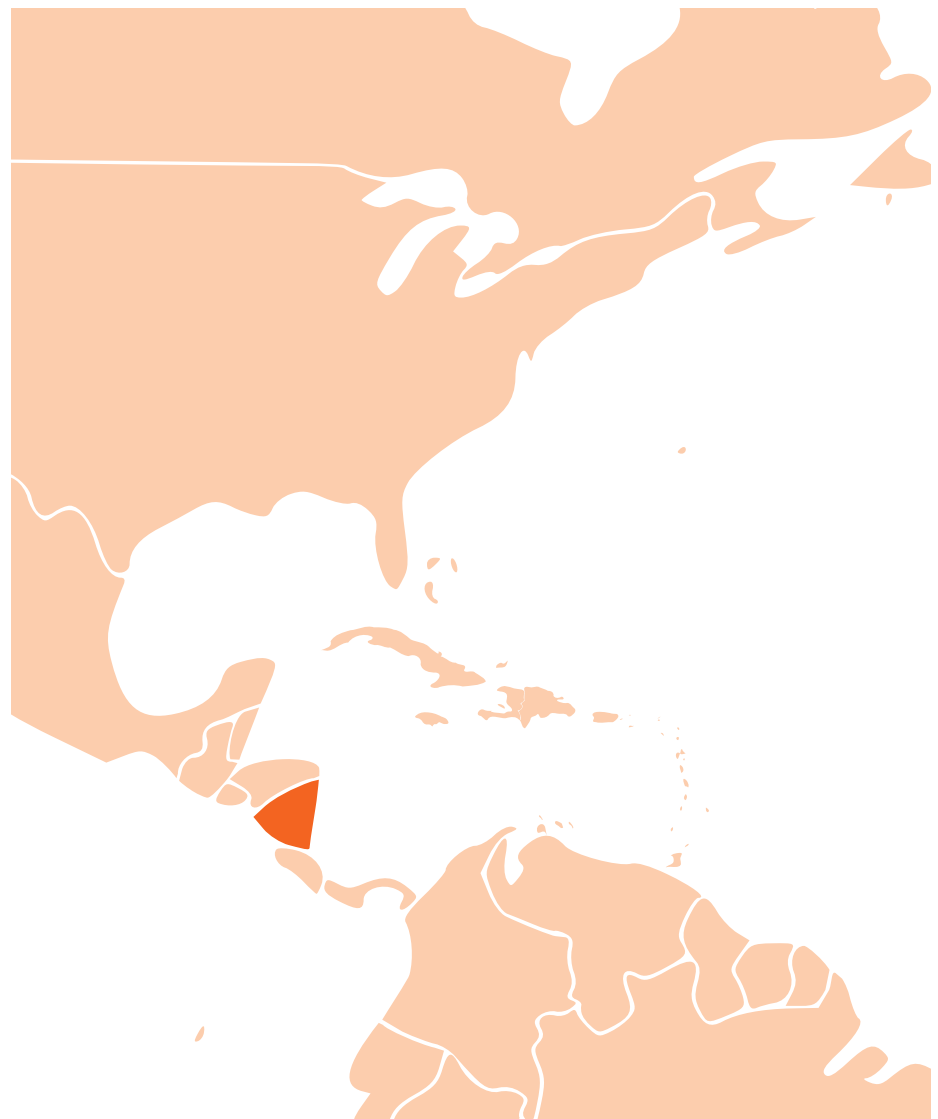
# Energy access in Nicaragua: the nexus between financial mechanisms and energy policies



Claudia Canales and Roberta Mutschler

Nicaragua's energy sector is facing one of the most important challenges of its history in terms energy infrastructure development and electricity access. As a result of substantial investments in grid extension and strengthening of distribution and transmission systems, official figures indicate that electrification rates increased from 47 percent in 2002 to 80 percent in 2014. However, the cost of grid extension has had consequences for electricity prices, and Nicaragua is the country with the highest average retail price per unit of electricity in Central America.

The Atlantic side of the country (RAAN, RAAS, Jinotega, and Rio San Juan Departments) has only 43.2 percent of the population with access to electricity and comprises the least developed and poorest areas of Nicaragua. In general, electricity access programmes have prioritised grid extension projects rather than localised off-grid systems. Due to the remoteness of Atlantic side communities, the cost of extension of the grid to them is prohibitive, hence there is little hope of electrifying them through grid extension in the near future. Furthermore, those communities with access to the grid are struggling to afford the electricity tariffs set



by the national distribution company. According to national statistics, they are part of the population 'served' but actually they are still living without

access to modern forms of energy. Designing innovative financial models and suitable policies is essential to encourage the adoption of renew-

able energy systems in rural areas and to provide electricity services to the underserved population.

Nicaragua faces important challenges that probably will take time to overcome, however the experience of key frontline workers offers a holistic view of those challenges and provides valuable information to help find new opportunities. This report summarises the conclusions and recommendations arising from a workshop held in Matagalpa, Nicaragua in April 2017. With the support of Nicaraguan experts, the event explored the main barriers to increasing electrification rates. The aim of the workshop was to understand the role of microfinancing and energy policies, and how both can facilitate access to electricity for the rural population of Nicaragua. Key findings and recommendations for policymakers, development organisations, and other relevant stakeholders interested in energy access matters are summarised in the following points:

1. Strategies and programmes for rural electrification in Nicaragua should be more specific in terms of scope and population targeted. Current programmes are mostly based on grid extension hence people living close to the grid are served, but thousands of dispersed and remote households are left behind with no opportunities for development. This lack of support for isolated areas is mainly attributed to a lack of knowledge of their demographic characteristics. The accuracy of the national measure of living standards is highly criticised for its narrow

scope, and data for the Atlantic side were mostly estimated due to its poor access infrastructure. The National Institute of Development Information (INIDE) needs to adopt a multidimensional approach to poverty measurement in Nicaragua. Development metrics must measure a wider spectrum of parameters, rather than just monetary thresholds, in order to inform the design of effective rural electrification programmes.

2. Wide-scale implementation of decentralised electrification projects requires substantial investments and the state-owned company, the Nicaraguan Electricity Company (ENEL), has sole responsibility for the generation and distribution of electricity to remote and rural areas of Nicaragua. While electricity utilities, such as ENEL, are essential to achieving long-term social and economic development, the extensive capital needed to meet the electricity needs of unserved rural communities is simply too high for one entity alone. Therefore, in order to achieve energy access goals, the government needs to promote and facilitate the participation of other players such as the private sector. Through carefully designed energy policies and regulations and cross-subsidy models Nicaragua could accelerate electrification efforts within the rural sector.
3. Electricity tariffs in Nicaragua reflect all the costs of providing grid extension, and the operational and maintenance costs of the system. Such tariffs are unaffordable for

many people living in poverty, therefore subsidising the delivery of electricity for a period of time is fundamental to making progress towards achieving prosperity for all Nicaraguans. Micro-grids based on renewable technologies that are connected to the grid but have the ability to operate autonomously are an opportunity to reduce tariff costs and to strengthen the reliability and resilience of electricity supply as long as the distribution companies buy the electricity at a cost-effective price. Designing subsidised feed-in tariffs that benefit the poorest segments of the population could lead to major development in rural Nicaragua.

4. Microfinance institutions offer an opportunity to support the supply and productive use of electricity in the rural sector. Through micro-credits, people are able to fund the capital costs of renewable energy systems and stimulate the local market at the same time. Yet, as renewable technologies for the rural sector are perceived as a high-risk investment, interest rates for loans are still excessively high. Reducing interest rates is a top priority for microfinance institutions since they work with the lowest-income segment of the population who are paying annual interest rates of up to 22%. It is necessary to develop financial innovations in Nicaragua to reduce the risk in addition to putting in place suitable microfinancing policies and regulations. Effective communication between microfinance institutions, technology suppliers and energy policymakers (the Ministry of

Energy and Mines) would enable an integrated vision of the financial issues of small scale credits to be developed and create opportunities to reduce interest rates.

From the community side, forming cooperatives is a good practice to increase bargaining power, reduce payback risks and to improve the value-for-money of the investments.

5. In contrast with Asian and African countries, Nicaragua lacks competition and investors in the renewable energy market. Solar and hydro are abundant resources in Nicaragua that if converted to electricity could greatly improve wellbeing in households and businesses. Similar opportunities are found for biogas in the rural productive sector. Solar energy is

becoming increasingly affordable and is a competitive alternative to fossil fuel based power generators. The provision of renewable energy services is a market that is worth boosting in Nicaragua. There are opportunities to strengthen the market by building partnerships between suppliers, microfinance institutions and organisations that provide technical support (such as NGOs or energy access organisations). In this way, the three parties are synchronised to provide a reliable service to clients. Alongside the synergy between business stakeholders, the government should contribute by designing a policy framework that minimises regulatory risks for renewable energy investors, as well as protecting the energy transition to renewables.

6. The inclusion of women and youth in the decision-making process as well as in the introduction of technological innovation and energy access for productive processes are crucial for the sustainability of renewable energy projects. The consideration of youth talent and gender equality during implementation and operation stages increases the impact of interventions, provides coherence to the effective use of electricity, and contributes to women's economic empowerment.

## Notes

We aim to provide policymakers, donors, and development agencies concerned with rural energy access with new insights on the real barriers to energy access in villages in developing countries—technological, financial and political—and how they can be overcome. We have chosen to focus on remote off-grid villages, where local solutions (home- or institution-based systems and mini-grids) are both more realistic and cheaper than national grid extension. Our concern is to ensure that energy access results in development and the creation of ‘smart villages’ in which many of the benefits of life in modern societies are available to rural communities.

### **The University of Central America (UCA)**

The Central American University (UCA) is the first private university created in Central America. It was founded in Nicaragua by the Society of Jesus on July 23, 1960, as a non-profit, autonomous, public service and Christian inspiration institution. The UCA is part of the Association of Universities Entrusted to the Society of Jesus in Latin America (AUSJAL), made up of 31 universities in 14 countries of the region and integrated into the network of institutions of higher education of the Jesuits in Europe, Asia and U.S.

### **Academy of Sciences of Nicaragua (ACN)**

The Nicaraguan Academy of Sciences (NAS) is a non-profit organization whose principal purpose is to promote and distribute information related to Science, Research and Science Education, which are fundamental elements for sustainable human development.

The NAS was preceded by the Nicaraguan Association for Science, also known as the Society for Science, which met for the first time in December of 2005 and was officially created during its VI General Membership Meeting held in July of 2006. The Association held a series of seminars entitled “Science and Society”, with speakers from the Nicaraguan science community as well as foreign scientists. The Association also established ties with other institutions such as the Nicaraguan Council on Science and Technology (CONICYT) and, on the international level, with the Inter-American Network of Academies of Science (IANAS), InterCiencia and the Caribbean Scientific Community (CCC). The journal Science, one of the most prestigious journals in the world, published a commentary announcing the creation of the Nicaraguan Association for Science and the interest in creating the Academy of Sciences in the future.

[www.e4sv.org](http://www.e4sv.org) | [info@e4sv.org](mailto:info@e4sv.org) | [@e4SmartVillages](https://twitter.com/e4SmartVillages)  
CMEDT – Smart Villages Initiative, c/o Trinity College, Cambridge, CB2 1TQ

© Smart Villages 2017

The Smart Villages initiative is being funded by the Cambridge Malaysian Education and Development Trust (CMEDT) and through a grant from the Templeton World Charity Foundation (TWCF). The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Cambridge Malaysian Education and Development Trust or the Templeton World Charity Foundation.

This publication may be reproduced in part or in full foreducational or other non-commercial purposes.