



Forum: Environmental Commission

Issue: Building Sustainable Energy Usage for Rural Areas

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Introduction

Rural communities often have higher carbon footprints than their urban counterparts as well as significant quality of air issues. This is due to a number of factors: the need to drive longer distances, a lack of energy choice leading to the use of polluting fuels (coal, heating oil, wood), and the agricultural output of greenhouse gases.¹ Excessive usage of fuel wood is already creating considerable environmental problems especially in the Sahel. Africa has all the potentials to solve its energy problems if appropriate infrastructural support can be provided for harnessing the abundant renewable resources in the continent, and if skills are pooled together and experiences shared in addressing the key issues.²

Key Terms

The word 'sustainable', as defined by the Oxford Dictionary is; able to be maintained at a certain rate or level, or, conserving an ecological balance by avoiding depletion of natural resources. In order to fully grasp this topic, this word must be understood parallel to 'energy'. Energy, in this context, is power derived from the utilization of physical or chemical resources, especially to provide light and heat or to work machines. A 'rural' area is relating to the country, country people or life, or agriculture.³

Peri urban; PV; UNDP; KfW; geothermal; bioenergy; biomass; solar; hydro; fuel; renewable

¹ http://www.rural-energy.eu/en_GB/solutions-4/sustainable-energy-solutions-for-rural-europe#.WKSyQ_196y

² <http://www.sciencedirect.com/science/article/pii/S1364032104001431>

³ <https://www.merriam-webster.com/dictionary/rural>

Countries and Organizations Involved

Over the past 20 years, UNDP has supported over 120 developing and middle income countries with comprehensive programs focusing on energy access, renewable energy, and energy efficiency. At the global and regional levels, UNDP has been advocating for sustainable energy in the context of broader development and poverty eradication efforts and is recognized as a senior partner of the Sustainable Energy for All (SE4ALL) initiative.⁴

Practical Action is an international non-governmental organization that uses technology to challenge the poverty in developing countries⁵. It brings technological solutions such as solar to developing countries such as Sri Lanka, Bangladesh, Kenya, Rwanda, Peru, Bolivia, Nepal, India, Zimbabwe, and Sudan. Aside from solar power and solar-powered water pumps, it also helps to bring in fireless cookers, biogas, micro hydro power, small-scale wind power, and other clean-tech solutions. Follow this link for a list of 40 companies and organizations bringing solar power to the developing world; <http://www.renewableenergyworld.com/ugc/articles/2014/11/40-companies--organizations-bringing-solar-power-to-the-developing-world.html>

Kenya is looking to geothermal energy to power its future and reduce reliance on costly electricity imports. As of 2015, [geothermal accounted for 51 percent of Kenya's energy mix](#) – up from only 13 percent in 2010. Kenya's also betting big on wind, with [Africa's largest wind farm](#) (310 MW) set to provide another 20 percent of the country's installed electricity generating capacity. Those two combined will help Kenya generate 71 percent of its electricity with renewables.

Morocco saw the largest concentrated solar plant on earth recently open in its land. With its accompanying wind and hydro plants, the mega-project will provide half of Morocco's electricity by 2020.

Denmark got [42 percent of its electricity from wind turbines](#) in 2015. Even with two wind farms offline, that's the highest percent of wind power ever achieved worldwide. The country aims to be [100-percent fossil-fuel-free by 2050](#).

Uruguay is now 95-percent powered by renewables after less than 10 years of concerted effort. The country invested heavily in wind and solar with no subsidies or increases in consumer costs. The secret? "[Clear decision-making, a supportive](#)

⁴ <http://www.undp.org/content/undp/en/home/ourwork/climate-and-disaster-resilience/sustainable-energy.html><http://www.undp.org/content/undp/en/home/ourwork/climate-and-disaster-resilience/sustainable-energy.html>

⁵ <http://practicalaction.org/about-the-organisation>

[regulatory environment, and a strong partnership between the public and private sector."](#)

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General Overview

Often, in this exponentially growing technological era, it is easy to overlook the areas that have no technology break through at all. Fellow peoples are left behind in the execution of our 'right to a standard of living adequate for the health and well-being of himself and of his family' (UN Universal Declaration of Human Rights Charter, Article 25). This topic serves to combat the advancement rift between urban and rural areas in terms of energy usage. What we face is this:

ISSUES	CONSEQUENCES
<i>The inability to refrigerate</i>	<ul style="list-style-type: none"> • Clinics that are unable to refrigerate vaccines greatly shorten their storage period. Considering that clinics near rural areas are most likely short in medical supply already, refrigeration can dramatically enhance the clinics' utility. • Most food (especially meats) cannot be stored without refrigeration for extended periods of time. As a result, either already scarce food is wasted or people are forced to consume it once it has expired.
<i>The lack of lighting</i>	<ul style="list-style-type: none"> • Particularly in developing countries and regions, education is a key to promoting social growth. However in rural areas access to education is rare, which leads to a repetition of the poverty cycle. Lighting is a small investment that brings huge positive effects by allowing schools to operate under insufficient natural lighting conditions (rainy, cloudy, during night, etc.), dramatically extending the hours of operation and potentially allowing more people to receive education. • The lack of lighting limits a community's economic productivity due to the inability to work during the night or disruptive weather conditions.
<i>Roadblock to modernization</i>	<ul style="list-style-type: none"> • Residents of rural area are forced to rely on inefficient sources of animal or manpower to sustain their economy. • Devices like cell phones and computers cannot operate without an electricity source, the lack of which isolates the community from the rest of the world.
<i>Emergency responsiveness</i>	<ul style="list-style-type: none"> • Real-time communication is not possible without the use of a phone or radio, making emergency response extremely difficult. • The inability to respond to crimes increases the crime rate

⁶ <https://www.climaterealityproject.org/blog/follow-leader-how-11-countries-are-shifting-renewable-energy>

and can threaten citizens' property and security.

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In addition, efficient farming practices are limited by the lack of machinery and the community's food store and livelihood deplete as a result.

As societies industrialized, they not only began to use more energy, but also began to use energy in different forms, typically switching—as household incomes rose—from such traditional fuels as wood, crop residues and dung to such commercial forms of energy (i.e., fuels that can be bought and sold) as oil, natural gas, propane and electricity.⁸ Rural areas are generally categorized as being a significant distance from the urban areas where such energy forms would be available, therefore because of distance this advanced energy usage could not be made easily available in rural areas. Furthermore, lack of equipment for correct storage, maintenance and distribution of such resources disables the community's capacity to access this energy usage. As economies have grown more electronic and more global, remoteness from this advancement has bred a constant regeneration of poverty which further disables rural households' aptitude to invest in more sustainable energy usage and even in higher education to encourage the discovery of more sustainable energy usage. In 1947 after World War II, Americans and Soviets laid away their constitutional conations and erupted international aid programmes that assisted in the rebuilding of post-war regions. Developing regions, however, have never received large-scale foreign aid through these plans. Slow economic growth has resulted in difficulty improving citizens' quality of life in developing regions such as many of the African countries. In addition, civil war continues in many of these regions, particularly in Africa. It is extremely difficult, if not impossible, for local governments to execute economic programs in an effective fashion in such unstable conditions and with insufficient manpower and resources.⁹ Energy usage in rural areas has therefore remained at the level of deforestation for wood and more farmland – whereas sustainable energy for machinery that prolongs soil fertility could be used – and high carbon emissions and non-renewable resource depletion from burning fossil fuels. The following includes a few case studies to put the current situation and what has been done so far into perspective;

⁷ <http://www.geni.org/globalenergy/research/sustainable-energy-solutions-for-rural-areas-and-application-for-groundwater-extraction/Sustainable-Energy-for-Rural-Areas-and-Groundwater-Extraction-D.Fong.pdf>

⁸ <https://sapiens.revues.org/823>

⁹ <http://www.geni.org/globalenergy/research/sustainable-energy-solutions-for-rural-areas-and-application-for-groundwater-extraction/Sustainable-Energy-for-Rural-Areas-and-Groundwater-Extraction-D.Fong.pdf>

CASE STUDY: MALI WATER SUPPLY

- Solar Diesel Hybrid for Water Supplies
- Extremely high solar irradiation and very limited grid access in remote areas. Access to water in warm Northern Mali is also a critical issue due to limited borehole capacity and Renewables, especially solar PV, provide a solution.
- BP Solar installs hybrid diesel/solar battery free pumping stations. Daily pumping is performed by the solar system while the diesel system allows for night pumping.
- Funding from KfW for part of the Mali National Water Policy aiming to develop rural infrastructures involving:
 - i) Community participation
 - ii) Appropriate technology
 - iii) Sustainable operation and maintenance
- The project included different steps: - social information, campaign for acceptance, community water management board for water selling and systems operation, - Local private sector involvement ensuring skilled labour and spares at affordable price and distance.
- Water to 80,000 inhabitants, at 120,000 litres/day. Over the 25 villages, this is more than 37 litres/inhabitant/day.
- This is an off- grid renewable energy solar diesel hybrid solution, with both community participation and private sector participation within an appropriate water policy framework. Financing was from KfW (Development Partner).

CASE STUDY: MOROCCO – RURAL ELECTRIFICATION

The PERG (“Programme d’Electrification Rurale Global”- Global Rural Electrification Program) is a large rural electrification plan set up by the Moroccan authorities and has reached 97%. Extremely favourable natural conditions for solar PV, wind and even hydro. Several favourable financing schemes have been or are being set up. Also water pumping projects, PV desalination projects, PV grid connected projects and solar thermal projects. The objective is to equip 9% 200,000 people of rural households with PV Solar Home System (SHS). Other technical solutions such as wind; mini grid and hybrid systems are being used but the core of the program is PV. Collaborative public private entity, for which the Moroccan public company delegates the management of decentralized systems and services to specialist firms. The specialist firm employs local technicians who have undergone technical training. They collaborate with local installers, and this contributes to local employment and the strengthening of local businesses. The main focus is solar PV and other renewable energy technologies such as wind and even hydro. It is a public and private partnership and the public entity delegates the management of decentralized systems to private management. The private company is responsible for supply, after sales service and fees collection. Local

capacity has been built through the training of technicians, increased employment and growth of businesses. Support came from the Government of Morocco and several Development Partners.

SENEGAL: BIOMASS MANAGEMENT

Senegal – PROGEDE Integrated Participatory Biomass Management

- Biomass contributes up to 60% of the country's total energy consumption
Energy Planning and Policy Making - Vegetation cover and assessment, participatory rural appraisals monitoring and evaluation systems, capacity building and institutional development for stakeholders.
Sustainable Wood fuels Supply Management - Community base forest management system of 378,161 hectares supplying 67,400 tons of charcoal per year, technical support and extension services, community based micro enterprises, beneficiary-operated improved carbonization units, apiculture cooperatives, collective women and individual agricultural diversification systems, livestock, poultry, art and crafts units, comprehensive communication strategy Generating incremental revenues of US\$ 12.5 million per year from 317 villages and benefited directly 250,000 people.
Demand Management and Inter-Fuel Substitutions - Urban charcoal trade reorganized and modernized; rural communities contracts with the urban traders; assistance to the urban charcoal traders diversify their businesses, promotion of LPG and Kerosene, Inter-fuel substitution; the dissemination of improved stoves to 250,000 families in peri urban and urban areas; establishment of an energy data base and energy boutiques, research and pilot activities, renewable household cooking fuels
- A transformation of the traditional energy sector from unsustainable form to a sustainably managed and socially progressive economic sector. Production and marketing of traditional biomass fuels can also be stabilized and arresting deforestation and contributing to ecological conservation; changes in the wood fuel's supply system and chains; an integrated approach poverty alleviation and rural development in general; and gender potential essential

Related UN Resolutions and Previous Approaches to Solving the issue

- ✓ Global Conference on Rural Energy Access: A Nexus Approach to Sustainable Development and Poverty Eradication - <https://sustainabledevelopment.un.org/index.php?page=view&type=12&nr=481&menu=1634&event=489>
- ✓ The secretary-general's advisory group on energy and climate change (AGECC) energy for a sustainable future report and recommendations, 28 April 2010, New York - [http://www.un.org/millenniumgoals/pdf/AGECCsummaryreport\[1\].pdf](http://www.un.org/millenniumgoals/pdf/AGECCsummaryreport[1].pdf)
- ✓ Transforming our world: the 2030 Agenda for Sustainable Development - <https://sustainabledevelopment.un.org/post2015/transformingourworld>

Appendix

- Energy access to Rural Areas in Sub-Saharan Africa - <https://www.assaf.org.za/files/2010/11/Energy-Access-for-Rural-Communities-in-Sub-Saharan.pdf>
- Sustainable energy for developing countries by Dilip Ahuja and Marika Tatsutani - <https://sapiens.revues.org/823>
- Sustainable Energy Solutions for Rural Areas and Application for Groundwater Extraction - <http://www.geni.org/globalenergy/research/sustainable-energy-solutions-for-rural-areas-and-application-for-groundwater-extraction/Sustainable-Energy-for-Rural-Areas-and-Groundwater-Extraction-D.Fong.pdf>