

The podium of renewable energy

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Climate changes throughout the world have put countries into discussion and consideration on how they use energy. Many forums and summits have been conducted to bring universal solution to the harsh changes causing disasters across the world.

Countries are working towards positive and impactful changes for the good of societies and the world as a whole. The seventh and thirteenth Sustainable Development Goals (SDGs) discuss affordable and clean energy and climate action that are crucially important for other goals.

The Eritrean government is committed to sustaining the most and getting a relief by using renewable energy supplies while pursuing its national development agenda. Multiple programs are underway in partnership with the United Nations Development Program (UNDP) and local organizations so as to answer to the country's growing demand of energy with renewable energies such as solar and wind mills. Windmills are providing alternative energy for rural communities across Eritrea.

Goal number seven of Sustainable Development Goals discuss affordable and clean energy. This means ensuring universal access to affordable electricity by 2030 by investing in clean energy sources such as solar, wind and thermal. Thus, adopting cost-effective standards for a wider range of technologies would also reduce the global electricity consumption by buildings and industry by 14 percent. This means avoiding roughly 1,300 mid-size power plants. Expanding infrastructure and upgrading technology to provide clean energy in all developing countries is a crucial goal that can both encourage growth and help the environment.

People normally rely on traditional forms of energy such as coal, oil or petroleum and for the household use wood is the main source of energy. In the past, around 80% of the energy came from biomass. In addition, the conventional use of electricity results in greenhouse gas emission or CO₂ which is hazardous to people's health. However, between 1990 and 2010, the number of people with access to electricity has increased by 1.7 billion, and as the global population continues to rise so will the demand for cheap energy.

Thus, the introduction of renewable energies was imminent. In Eritrea it started with solar energy in the year 1995.

In 2013, 104 solar modules were installed on the roof of the building, producing a total of 15.5 kilowatts of electricity, enough to power the office for eight continuous hours a day.

According to director of Renewable Energy Center in the Ministry of Energy and Mining, Mr. Tesfay Ghebrehiwet, the currently addressed renewable energies in Eritrea are the Solar, Wind and Geothermal energy (only pre-feasibility study). Though the installment of solar energy is costly, Mr. Tesfay is confident that it is widely distributed across the country for household and any organizational uses. In 2010, there was only 2% coverage of the solar energy but now the figure has roughly increased into 10%. The reason for the widely use of solar energy, according to the director, is that it is modular, easily installed and applied. This type of energy is not sensitive to topography unlike the wind energy that is highly dependent on the topography of an area. As the temperature in the eastern and western lowlands of Eritrea is higher, the insulation of solar powered energy gets lower but in the highlands the insulation is higher and more reliable. Sometimes in the summer season clouds make it harder for the solar panels to charge and supply power. In these times hybrid energy power generation helps to keep the consistency of the power supply. Geothermal energy can assist the solar energy base load. Solar energy these days is used and applied in communication, agriculture, health institutions and household consumption. In agriculture it is used for refrigerators, incubators, veterinary machines and for storing vegetables and fruits.

Efficient use of renewable energy and quick transformation from biomass and fuel based power generation enabled Eritrea to comply with the clean energy goal. Mr. Tesfay stated that the country is not really a contributor to the global warming but a victim of its consequences. When seen in percentile, its contribution is negligible. On the safe side, using the smokeless stove or Adhanet has an immense impact on preserving trees and thereby protecting the environment from adverse damages. Economy wise, costs are high for oil based power generation. But using renewable

sources such as solar and wind boost power efficiency and are future oriented. Introducing efficient renewable energy minimizes the electricity consumption fee per kilowatt. If properly utilized, it makes a big difference on household and organizational saving patterns, and thus economy uplift of the country.

Moreover, using renewable energy reduces biomass energy use and enables people to focus on other investments rather than cutting trees. Further in agriculture, farmers are using solar energy to operate water pumps to fill their reservoirs and water their farms.

The Ministry of Energy and Mines in partnership with the Solarcentury, provided two solar powered mini-grids to power the communities of Areza and Maidma.

Financed by the Global Environment Facility and co-financed by the Eritrean government and the UNDP, the Eritrean Wind Energy Application project increased its national capacity to plan, design, install, operate and maintain wind energy systems in the country as part of the Eritrea's contribution to climate change mitigation efforts. Over the last decades Eritrea has made considerable progress in different fronts such as mapping of the Coastal Marine and Island Biodiversity resources and establishing an Integrated Coastal Area Management framework; piloting viability of application of renewable wind energy technologies.



Piloted by the government and the UNDP, there is a wind farm with a capacity of 750 kilowatts in the port city of Assab. Wind energy is applied in the southern Red Sea region in Eritrea. This type of energy, despite its higher logistic costs, provides optimal power energy. The 300 km wind potential area is likely to offer such energy to villages such as Rahayta, Gahro, Berasole, Edi, Beilul and Dekemhare. Places such as Dekemhare and Gizgiza are the wind corridors that feed wind to the other villages. In these villages there are six small stand-alone decentralized wind turbines installed. At present more than 35,000 people have direct access to reliable energy. Wind energy has improved the supply of electricity to water systems, schools, health facilities and small-scale businesses. The

project also provides lighting, ventilation, cooling systems, and fish preservation centers, which have improved the livelihoods of small-scale fishermen in the region. Such huge projects brought immediate environmental benefits, as fossil fuel consumption has been reduced. The diesel power plant in the port city of Assab is now saving approximately 680,000 liters of diesel per year, or nearly \$730,000 per year in diesel costs.

Smaller villages are also getting fuel savings. They save approximately 16,000 liters of diesel annually, or \$17,000. The result is a reduction of CO2 emissions by 1718 metric tons per year with the added benefit of minimizing smoke-related health complications. Despite the positive results wind energy installation requires skilled manpower to operate and continually monitor it. The running cost of wind energy is much higher than that of solar energy as it has moveable partitions.

Aside from the immediate economic and social benefits to local communities, the Eritrean Wind Energy Application Project is helping minimize the destruction of forests and reduce carbon emissions.

The Ministry of Energy and Mines looks for higher penetration of the renewable resources to get the optimal power services to the society and plans to make a 50% power supply using renewable sources of energy. The target is to give optimal service by using available renewable resources efficiently.

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