

## RENEWABLE ENERGY TECHNOLOGY: A TECHNOLOGY FOR HELPING TO ACTUALIZE THE VISION 20:2020

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### ABSTRACT

*Renewable energies have the potential to renew THE global economy, and policy-makers have it in their power to drive and shape that renewal. Renewable energies are clean, reliable, domestic sources of energy that cut greenhouse gas emissions, build energy security, reduce energy costs, improve public health, save water, and protect the local environment. Today, in the midst of an economic crisis of historic dimensions, government is taking a close look at renewable energies. This paper therefore, discusses Renewable Energy Technologies (RETs) and their roles in achieving the vision 20:2020. It also highlights the opportunities they offer for economic recovery and for laying the foundations for future prosperity.*

**Key word:** Renewable, Global economy, Greenhouse gas, Government, Energy

### 1.0 INTRODUCTION

Most renewable energy comes either directly or indirectly from the sun. Sunlight, or [solar energy](#), can be used directly for heating and lighting homes and other buildings, for generating electricity, and for hot water heating, solar cooling, and a variety of commercial and industrial uses [4]. Renewable energy uses natural resources such as sunlight, wind, rain, tides and geothermal heat which may be replenished, naturally. Renewable energy technologies are solar power, wind power, wind power, hydroelectric power, biomass, geothermal power and bio-fuels. Although, this form of energy has been widely criticized for being intermittent, yet the market is growing for many forms of it. It is estimated that wind power has a world-wide installed capacity of over 100 GW and it is widely used in Europe and USA

Renewable energy technologies are well suited to small off-grid applications, sometimes in rural and remote locations where energy is often crucial to human development [5]. Energy is one of several essential inputs to economic and social development. "Modern" energy services—provided by liquid and gaseous fuels as well as electricity—can greatly assist societies in reducing poverty and hunger and meeting the health, education, gender, and environmental elements of the vision 20:2020 Goals. A large amount of energy is needed to sustain industrial growth, agricultural development and other goals of vision. The existing sources of energy such as coal, oil, gas etc may not be adequate to meet the ever increasing energy demands. These conventional sources of energy are

also depleting and may be exhausted at the end of the century or the beginning of the next century [3]. Consequently, sincere and untiring efforts shall have to be made by scientists and engineers in exploring the possibilities of harnessing energy from several non-conventional energy sources. The various non-conventional energy sources include among others solar energy, wind energy, energy from Biomass and Biogas, Ocean thermal energy conversion, Tidal energy and Hydro-power.

It is only right as we now seek to transform a hope for 2020 into Vision 20:2020 to briefly recall the past if only to learn from our mistakes. From 1962 to 1966, the economy grew at an average of 7.6% per annum, then the tragic interruption of the first Military Coup of January 1966 and the second Coup of July 1966 and the Civil War. From 1970 to 1975, the economy grew at an average of just over 11.0% per annum. Then the watershed coup of 1975 which was followed by a mass purge of the Civil Service and the Public Services. The growth rate declined steeply. It became negative in 1981, and 0% in 1986. Per capita GDP fell from US \$800 in 1980 to US \$250 in 1990. Growth from 1990 to 1999 averaged 2.0% per annum while population grew at 3.0% per annum. The growth rate has improved since 2000 averaging over 6% per annum. However, we must emphasize that the better growth rates for this period are largely due to the unprecedented sustained long period of high crude oil prices. Nigeria is yet to embark seriously and consistently on restructuring and diversifying the economy. These figures explain why 70% of Nigerians are living in severe poverty.

## 2.0 RENEWABLE ENERGY TECHNOLOGIES (RETS)

RETs have advanced quickly in recent years, and as their cost has declined and their reliability has improved, they have emerged in some circumstances as a more affordable and practical means of providing essential energy services. Renewable energy sources capture their energy from existing flows of energy, from on-going natural processes, such as sunshine, wind, flowing water, biological processes, and geothermal heat flows. RETs are the technologies that harness these energy flows and turn them into energy services to meet the needs of individuals for heat, light, power, transport, and electrical energy. Depending on the scope and location RETs are classified as Grid-connected mostly Urban developed RETs and Off-grid RETs normally rural developed or generated. Grid-connected renewable energy is contributing a growing share of power generation, while Off-grid renewable energy-based systems make an important contribution in providing energy to rural and sometimes urban areas.

### 2.1 Role of Renewable Energy Technologies in Achieving Vision 20:2020

Renewable Energy Technologies reduce the risk of over-dependence on fossil fuels, risks that fall disproportionately on the poor and undermine efforts to meet the visions. Apart from having direct impact on future price increases in conventional fuels, RETs improve the balance of trade and create new economic opportunities. There is growing recognition that RETs can be a good investment, contributing to economic growth and poverty alleviation at the local level. The following sections assess the potential of renewable energy to contribute to some of the individual goals of vision 20:2020.

#### 2.1.1 Poverty and hunger

Around 80 percent of the expenditure on energy services by poor people is on fuel for cooking. Studies show that the majority of the developing world's poor spend 20 percent or more of their monthly income to obtain wood and charcoal. By using the RETs to provide sustainable energy for cooking and space heating at low operating costs, improved stoves and alternative fuels can reduce this drain on household income, while freeing up time for education and income-generating activities.

#### 2.1.2 Lighting, communications, refrigeration, and conveniences

Electricity contributes directly to poverty reduction by human capacity empowerment, that is, by making it possible to engage in commercial activity and reducing unit costs. Indirect contributions to poverty alleviation may come in the form of free time for

other productive activities, improved health and education, improved access to and supply of clean water, and reduced local environmental degradation. RETs such as solar photovoltaic (PV), biogas digesters, small wind-electric turbines, and micro-hydro systems are often ideal for providing electricity in rural areas, ranging from a few watts to thousands of watts, at a lower life-cycle cost than conventional alternatives such as dry cell batteries and generator sets. RETs can reduce the share of household income spent on lighting by replacing more-expensive conventional fuels. By making light more affordable and reliable; RETs also permit income generation beyond daylight.

#### 2.1.3 Education

In rural areas where conventional fuels are not affordable to the poor, RETs can make important contributions to education because a school without electricity, delivering quality education is a vast challenge as it means that schools can't use the technologies central to modern education, from computers to photocopiers. The most experienced and skilled teachers shy away from schools without electricity too. Hence Without good teachers and good technology resources, students predictably under-perform, drop out, and ultimately remain unemployed.

Therefore Energy is necessary to bridge the technology and education gap to enable rural areas to become more economically sustainable, and to reverse the trend of migration from rural to urban areas. The use of RETs to provide electricity in the home also frees time for education—home lighting enables reading and studying beyond daylight it also provide opportunity to engage in income-generating activities for longer hours, the extra earnings from which can be used towards school fees.

#### 2.1.4 Health

Studies from Asia, Africa, and the Americas have shown that indoor air pollution levels in households that rely on biomass fuel or coal are extremely high; and much of the disease burden is due to indoor air pollution and un-clean drinking water. There is consistent evidence that exposure to indoor air pollution can lead to acute lower respiratory infections in children under five and to chronic obstructive pulmonary disease and lung cancer (where coal is used) in adults.

According to World Health Report 2002, indoor air pollution is responsible for more than 1.6 million annual deaths and 2.7 percent of the global burden of disease, making it the second biggest environmental contributor to ill-health behind unsafe water and sanitation. The use of RETs for cooking reduces exposure to indoor air pollution as well, improving health, similarly RET interventions will help achieve a significant reduction in child mortality.

### 2.1.5 Sustainable Environment

Degraded ecosystems with a considerable amount of standing water and little natural control of invertebrate populations are ripe for high incidence of water and insect-borne disease.

The burning of fossil fuels and the cutting of forests are contributing to environmental degradation and climate change through GHG emission. And the burden of environmental degradation falls disproportionately on developing countries that are limited in their capacity to respond to climate change and depend on environmentally sensitive activities such as agriculture.

### 2.1.6 Improving Water Quality

Water and sanitation are among the most important determinants of public health and rank at the top of the World Health Organization's list of primary health care components. The control of endemic and emerging diseases is naturally linked to an intact ecosystem's ability to mediate climate change, mitigate water quality and distribution, and provide alternative hosts for existing and emerging disease vectors. By producing energy for pumping and sterilization, however, RETs can provide locally reliable and safe water supplies that are essential for sanitation and reduce time spent gathering water, thus increasing time available to engage in income-generating activities.

## 2.2 WAY FORWARD

As it has been with various global developmental campaigns, the issue of renewable energy requires full public and private sectors participation and commitment. Although energy is principally a private business in most countries, providing energy access for rural areas has traditionally been considered an essential public good for which governments are primarily responsible. Therefore Governments should increase investment on RETs, drive supportive policy development and integrate the energy generated into electrification plans for rural off-grid energy-service delivery.

Through Private sector involvement, Innovative financing mechanisms, particularly when integrated with targeted concessional funding, private sector can help to make renewable energy technologies more attractive for commercial funding and more

accessible to customers. Thus renewable-energy technologies and services are powerful tools for advancing the Millennium Development Goals, especially when considered in a multi-sectorial approach, and properly incorporated into the existing global development activities relating to poverty, health, education, environment and entrepreneurship.

## 3.0 CONCLUSION

Energy is critical in both how it impacts the global environment and how it is needed to protect the local environment. Access to clean energy is an essential component of sustainable development. But the major challenge is how to create a policy framework that allows renewable energy to be introduced where it makes long-term economic sense, and to allow poor countries to benefit from the declining cost curves that characterize renewable energy markets in many industrial countries. To meet vision 20:2020, Nigeria needs to invest the renewable energy which is cheap, clean, non-polluting and inexhaustible.

## REFERENCES

1. Ezeilo, C. O. (1998) Sun Tables and Charts for Nigeria Latitude. *Nigerian J. of Solar Energy* 3:75-82
2. Nasir, A. (2001) A Technology for Helping to Alleviate the Energy Problems: Solar Energy for Cooking and Power Generation, A paper presented at the 3<sup>rd</sup> Annual Engineering Conference of the Federal University of Technology, Minna.
3. Rajput, R. K. (2003) A Text Book of Power Plant Engineering, 2<sup>nd</sup> edition, Ixmi Publications (p) Ltd, New Delhi
4. Renewable Energy Technologies retrieved on 15<sup>th</sup> June, 2009 from <http://www.renewableenergyworld.com/rea/tech/home>
5. Solanke, A. A. Research and Development in Renewable Energy: Usage and Conversion Technologies. A paper presented at the public lecture organized by the Nigerian Society of Engineers Minna Branch. 2008.