ENERGY EFFICIENCY & CONSERVATION: A RECIPE FOR REDUCING GLOBAL WARMING

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Research has shown that the earth has twice as much carbon in it than it had two hundred years ago with much of the increment occurring within the last 30 years. This carbon is being generated by human activities chiefly from burning of fossil fuel. With increasing energy demand, the tendency to burn more fossil fuel to meet this demand will only increase, thus this paper looks into the application of energy efficiency in meeting the energy needs without necessarily increasing power generation from fossil fuel thus abating the rapid increase of Green House Gases (GHG) in the atmosphere. It proffers suggestions that government at all level must implement energy efficiency and conservation policies in order to achieve energy efficiency in the energy sector and consequently reducing GHG emission and global warming.

Key words: Global warming, CO_2 emission, energy demand, energy efficiency, Green House Gases (GHG).

INTRODUCTION

THE CONCEPT OF GLOBAL WARMING

The American Environmental Protection agency define global warming as an average increase in the temperature of the atmosphere near the earth's surface and in the troposphere, which can contribute to global climate patterns. Since the early 20th century, earth's average surface temperature has increased by about 0.80C, with about two- third of the increase occurring since 1980(1). This increment has been unequivocal and scientists are more than 90% certain that most of it is caused by increasing concentration of greenhouse gases (comprising mostly of CO_2) by human activities such as deforestation and burning of fossil fuels(2).

The effects of global warming are the ecological (drought, high sea level, cyclone, glacier retreat and earthquake e.t.c) and social (food insecurity, change in water and air quality, malnutrition) changes caused by the rise in global temperature. Evidences of climate change include the instrument temperature records, rising sea level and decreasing snow cover in the Northern hemisphere, these as well as increasing global average temperature since the mid-20th century.

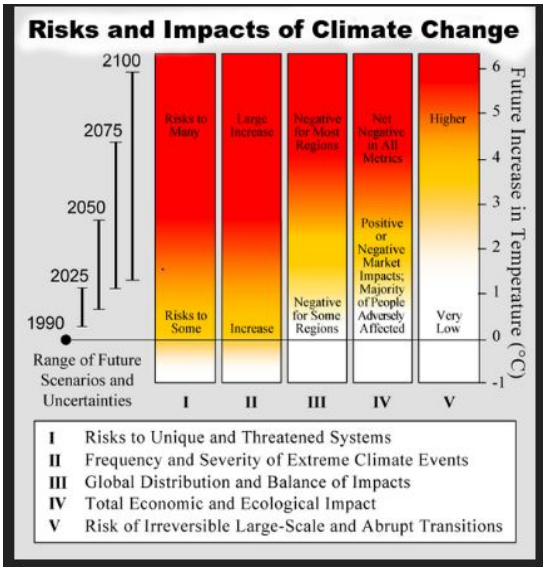

Fig 1: Effect of climate change

Source:

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The atmosphere as at 2007 had about 800 billion tons (725.6Gtonnes) of carbon in it, 200 years ago, it was 600 billion tons (544.2Gtonnes) of carbon and in the depth of the ice age, approximately 2,000yrs ago, it had about 400 billion tons (362.8Gtonnes) of carbon in it. Looking back through the ice age records, it goes back and forth between 400 and 600 billion tons of carbon in about 100,000yrs cycle(3). Of this quantity of CO_2 in the atmosphere, the energy related contribution is estimated at about 18 Gtonnes in 1980 through 20.9 Gtonnes in 1990 to 28.8 Gtonnes in 2007 while it is expected to rise to 34.5 Gtonnes by 2020 through 40.2 Gtonnes in 2030 (an average ratio of growth of 1.5% per annum). Furthermore, of this CO_2 from energy related processes, CO_2 from power sector contributes around 11.9 Gtonnes (2008) and is projected to peak at close to 14 Gt in 2030.

With this alarming increase in the emission of CO_2, concrete effort should be made to reduce the rate of emission of CO_2 into the atmosphere, so as to check the negative effect of such action on the environment and human existence.

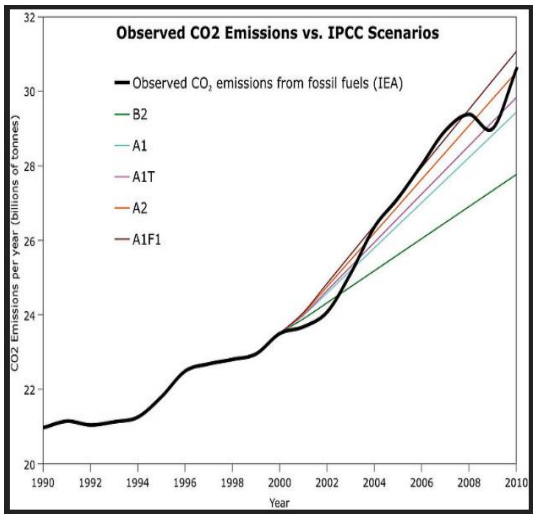

Figure 2: observed CO_2 emission from fossil fuel

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Efforts driven towards this goals includes the use of less polluting technology, implementing policies of emission reduction, promoting the use of RE and increase energy efficiency and conservation.

ENERGY DEMAND: Past, Present Status and future projection.

As population and economy is expected to grow, so is the demand for electricity. Government forecast that much of that energy will come from fossil fuel which of course, could result to increasing the amount of global warming and pollution from power plants.

Today more than 1.4 billion people worldwide lacks access to electricity: 585 million people in Sub-Sahara Africa

(including over 76 million in Nigeria and some 69 million in Ethiopia) and most of the rest in developing Asia (400 million in India, 96million in Bangladesh). 85% of those without access live in the rural areas. (4)

In order to meet the MDG target of eradicating extreme poverty by 2015 and beyond, investment will have to be made in the area of power generation so as to reduce the number of people lacking access to electricity.

According to IEA, the total global installed power generation capacity is projected to increase from 4,722GW in 2008 to about 8,600GW by 2035. Between 2009 and 2035, total gross capacity addition amount to 5,900GW, with more than 40% installed in 2020. This equate to average capacity addition of 213GW/annum over the period 2021-2035(4). In Nigeria, the demand which stands at 5,746MW in 2005 projected to rise to 119,200MW by 2030. In meeting up this demand, the national installed capacity is projected to rise from 6440MW in 2005 to 136,879MW within the same period (5). Meeting this demand requires the installation of new generating plant. At least 50% of these facilities will burn natural gas or other fossil fuel, emitting CO_2 – a leading global warming pollutant.

Increasing demand also makes it more difficult to retire older, high-emitting power plants that serve areas with limited transmission capacity. IEA forecast the carbon dioxide emission from electricity will increase 1.8Gtonnes/annum by 2035(4).

Under these circumstances, reducing global warming and pollution from electricity sector is bound to be difficult and expensive.

ENERGY EFFICIENCY TO THE RESCUE

Reducing carbon dioxide emission from power plants doesn't have to be a hard task. By tapping into the potential for energy efficiency, nations can service growth in electricity demand while still reducing global warming and pollution.

Efficiency and conservation programs produce long lasting enhancements to buildings and equipment that saves energy, reducing energy waste without reducing levels of service. Efficient products deliver the same amount of light, heat, cooling, work [Energies] and access to information and entertainment as their counterparts- with less energy input. According to IEA, improved energy efficiency in buildings, industrial processes and transportation could reduce the world's energy needs in 2050 by one third and help control global emission of greenhouse gases.(7)

Energy efficiency investment can thus provide the energy needed by a growing population and economy, while reducing pressure to build new power plants or operate older facilities to maintain reliability. Without this pressure, reducing global warming and pollution will become easier to achieve.

Energy efficiency can also reduce the cost of cutting global warming and pollution. Efficiency reduces costs to consumer in several ways. First, individuals that implement energy efficiency see direct reduction in energy cost over time. Electricity consumers also benefit from reduced cost to generate and supply power, particularly at peak periods when

electricity is at high demand and is most costly to supply. The concept of energy conservation and efficiency also makes energy available to other users. Finally all consumer benefit from reduced demand for fossil fuels, such as natural gas, which are used in several sectors of the economy as reduced demand will force down price.

In 2004, by implementing a statewide efficiency policy, the state of Vermont (USA) through a program called efficiency Vermont was able to save 58million KWh annually achieving this at 37% of the cost utilities would have paid to purchase that energy on the wholesale market and deliver it to customers. This program was also able to reduce the growth in the state's energy need by 44% and cut summer peak energy demand by 9MW (6). In Nigeria, by practicing efficiency in household lightning alone, it is estimated that the country can save up to 168W of electricity per household on the conservative side (assuming 4 incandescent bulb of 60W/ household is replaced by CFL of 18W).

The adoption of various renewable energy technologies [LHP, SHP, Wind System, Solar Photovoltaic, Biomass Technology, Hydrogen and other emerging energy systems] can also play a great role in mitigating the global warming and pollution phenomena since they have all proven to be eco-friendly.

CONCLUSION

The concept of global warming has increased since the mid-20th century due to activities of man, mainly as a result of the industrial revolution going on throughout the world. A major part of this emission causing the global warming is contributed by energy related activities.

With increasing energy demand, there is tendency of more CO_2 emitting technology being employed to meet the demand hence contributing to global warming in contrast to trying to reduce it.

However, the practice of energy conservation and efficiency will provide the energy needed by a growing population and economy without necessarily requiring the building of new power plants, hence, making reduction in global warming and pollution easier to achieve.

It is thus pertinent that government initiate policies that will encourage the practice of energy efficiency in all facets of life of its citizenry so as to check the increasing atmospheric temperature and hence eliminate the expected hazard of global warming and climate change.

POLICY RECOMMENDATION

Having considered the concept of global warming and its effect viz-a-viz the impact of increasing energy demand on global warming, there is no gain-saying that out of the many ways of tackling this problem, energy efficiency remain a very viable solution; hence the need to implement these recommendations:

States should make energy efficiency and conservation a central part of their planned energy policies. In Nigeria, this is already the case as it is being captured in the National Energy Policy NEP (ECN; 2003: 47). However, stricter enforcement needs to be put in place.

States should put in place policies targeted at reducing CO_2 emitted from fossil fuel powered plants. Many countries (developed) are already implementing this, but more countries have to come on board.

States should also pursue a comprehensive set of energy efficiency policies outside of and in parallel to the cap-and-trade program, including but not limited to:

Establishing dedicated efficiency program and ensuring enough funding to tap achievable efficiency potential;

Improving residential and commercial building codes.

Setting minimum appliance efficiency standards.

Stimulating the deployment of combined heat and power technologies; and

Educating consumers about energy efficiency opportunities.

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