

Forum: The Environment Committee

Issue: The implementation of sustainable renewable energy in LEDCs

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Introduction

Perhaps one of the greatest challenges in our world today is to diminish the inequalities concerning the development of energy, such as the imminent inequality between the divide of energy between the More Economically Developed Countries (MEDCs) and Less Economically Developed Countries (LEDCs). Not only is energy used to provide electricity for a nation's industries but to fuel domestic homes as well. Although the MEDCs do not have many difficulties with securing an energy supply for their country's needs, LEDCs on the other hand, require sufficient access to such resource. A more economically developed country's economic power and sovereign influence upon other countries, poses difficulties to other countries, in particular less developed nations that are unable to do the same resulting in global inequalities. Household's access to electricity forms the basis of survival for many and several governments already prioritize energy as a solution for increasing the living standards of the poorest in these countries.

Not only is there an inherent need to provide households with running electricity in LEDCs but it is also enables industrialization to be undertaken and thus ultimately, economic growth. The use of non-renewable energy, in the form of fossil fuels (coal, oil, gas etc.) can be deemed unsustainable for countries; in particular the LEDC's because of the discontinuous access to affordable energy and the supply of these non-renewables are soon to run out with an approximate of 50 years left. Although the main objective of the implementation of sustainable renewable energy; such as but not limited to tidal, wind and solar energy – is to provide energy security for countries such as in the LEDC's it can also be considered viable in solving the growing development gap between MEDCs and LEDCs.

The United Nations have placed the development of such sustainable renewable energy

sources at a high level of importance, highlighted by the actions taken by The General Assembly, which constructed a resolution (reference: 62/197), which endorsed the need of action from member states of the full Plan of Implementation of the World Summit on Sustainable Development (WSSD) as the intergovernmental framework for energy for sustainable development. Furthermore, The Johannesburg Plan of Implementation also calls for action at all levels to 'with a sense of urgency, substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply'. The General Assembly hence encouraged member states of the United Nations and other relevant organizations to continue raising awareness of the importance of energy for the needs of sustainable development and poverty eradication, which included the need for the promotion of new sustainable renewable sources of energy and the increased role such sources could play in the global energy supply.

Definition of Key Terms

Energy

Energy is can be defined as being 'a fundamental entity of nature that is transferred between parts of a system in the production of physical change within the system and usually regarded as the capacity for doing work'^[1]. Energy is what produces or provokes change, such as temperature change, movement, light, or another form of physical change. Energy can thus be used for many things such as heating stoves for cooking or for the generation of electricity, which can be consumed for both households and industries alike. Electricity can be used for a further variety of things like supplying appliances with the energy needed for it to run like lighting or fridges.

Energy Development

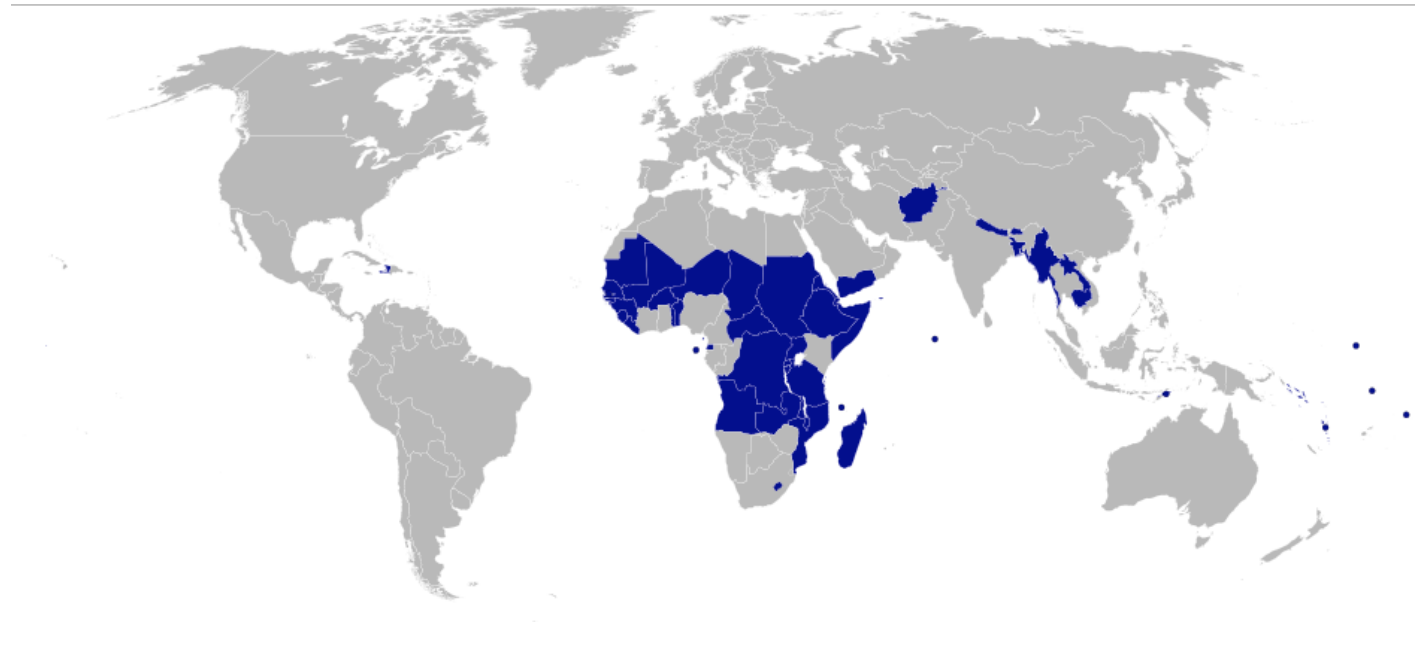
In the modern era, energy can be accessible through the means of the generation of electric power in power stations. Of which are driven by heat engines fueled by the burning of fossil fuels or by nuclear fission. The burning of fossil fuels such as coal and oil is becoming increasingly discouraged on a global scale by many people, due to its detrimental environmental drawbacks such as carbon dioxide emissions. Models of energy development are emerging, mainly in MEDCs, as part of the promotion of energetic sustainability such as biofuel technology, wind and solar power stations.

Energy Security

Energy security is the term used to define the long-term stability of energy in the form of prices and the guaranteed accessibility to energy. Energy security concerns the industrial sector as the instability of such energy prices can prevent industries becoming vulnerable and thus hindering economic growth. Energy security also concerns individuals in the sense that the rise of energy prices reduces the accessibility to this energy, mainly in LEDCs, where households are more susceptible to such inflexions.

LEDC

Less Economically Developed Country: a country which can be said to have a lower living standard, a less developed industry and a less developed economy relative to other countries. Some examples of LEDCs that play a vital role in the context of energy security include particular those in the Sub Saharan African region like Nigeria and Angola and the likes of Ghana and Senegal, as well as many others in the Asian region like Thailand and Nepal.



Caption #1: Map showing the distribution of Less Economically Developed Countries- highlighted in blue

MEDC

The idea of the LEDC is opposed to the idea of a MEDC (More Economically Developed Country). The nations of Egypt, Mali, Haiti, Ghana, for example, are LEDCs while the countries of United States of America, Japan, France, Singapore and Australia are MEDCs.

Sustainability

Sustainability can be described as the capacity to last or to endure. As energy is central to achieving many nations' sustainable development goals; the challenge with energy and sustainability resides in the necessary conciliation of the strong demand for energy with sustainable models of energy production that can reduce or eliminate the impacts of energy development on the environment.

Sustainable renewable energy

The United Nations Secretary General Ban Ki-moon has defined sustainable energy, as "Sustainable energy is the golden thread that connects economic growth, social equity, and a climate and environment that enables the world to thrive."^[2] Sustainable energy can be thought of as energy that has low negative impacts to human health and the functioning of ecological systems, and that will be available for future generations on earth. These forms of energy include but aren't limited to: solar thermal, solar photovoltaic, wind, hybrid wind-solar, fuel cell, geothermal, hydroelectric, tidal and wave.



Caption # SEQ Figure * ARABIC 2:
Image of solar photovoltaic cells on a solar farm



Caption #3: Image of a geothermal power station

Fossil Fuels

Fossil fuels are fuels created from matter formed by the decomposition of organisms. Decomposition occurs over a period of several million years. Fossil fuels include petroleum, coal and natural gas and are composed of hydrocarbons. The fact that fossil fuels take millions of years to form makes them non-renewable and thus, an unsustainable source of energy.

Biomass

Biomass describes organic material such as vegetation or agricultural waste of which is used

as a fuel (biofuel) or as a direct energy source, when directly burned. The combustion of biomass such as firewood, especially in rural areas, constitutes a significant portion of energy development models. Although there are clear environmental effects of combustion, biomass has the advantage of being renewable, which fossil fuels are not. Significant amounts of research have been carried out with the intentions of introducing and developing the use of biofuel to power automobiles for example with biodiesel made from vegetable oils and animal fat. Biomass and more particularly biofuel are expected to represent a more important portion of total energy development and as an alternative for the use of fossil fuels.

Geothermal

Heat energy emitted from within Earth's crust, usually in the form of hot water or steam, which can be used to produce electricity or as direct heat for buildings, industry, and agriculture.

History

The status of sustainable renewable sources of energy

The contribution of renewable energy in the world energy mix is increasing in some regions of the world, in particular LEDCs of which rural areas have become the most prominent location that renewable energy technology is implemented in order to provide access to energy and thus foster economic development. Renewable energy plays an important role in providing billions of people who depend on traditional sources of energy such as the burning of firewood and fuels such kerosene. An approximate of 1.5 billion people across the world lack the access to electricity that many others take for granted, often relying on kerosene fueled lamps and candles for lighting. However, twice that number of people (an approximate third of the global population) rely on wood, straw, charcoal and biological waste to cook food, and warm themselves. Although biological waste can be used as for biomass related energy providing sources – it is an inefficient fuel and harmful for the environment, in which the release of methane gas from animal waste has adverse effects on the environment, namely contributing to the greenhouse effect.

It is economically prohibitive to allow for every single rural household to be connected to the national grid, and such cost competitive alternatives such as renewable energy systems in the form of

biogas generators can allow for unprecedented opportunities for rural villages to transition to modern energy facilities.

Even in the most remote areas, renewable energy technologies such as household PV systems, micro-hydro powered mini-grids, biomass-based systems, and solar pumps can provide sustainable energy services such as quality lighting, communications, and heating and cooling. Mechanical wind and solar photovoltaic pumps can eventually replace diesel pumps and generators used in rural and remote areas to pump water for both agricultural and domestic uses, just to name an example; and thus simply and contribute to increasing the living standards of those living in LEDCs.

Many countries in the Sub Saharan region; in particular have relatively large capacities to produce potential energy in the form of solar farms due their location in the equatorial region and large land masses available. Another country, Tanzania have been in the World's Bank interest as it has promoted the use of sustainable renewable energy off-grid solutions electricity solutions, particularly mini-hydropower generation, biomass cogeneration, and solar energy. The Bank has invested some \$22.5 million for support of a Rural Energy Agency, established in 2007, and will test new off-grid electrification approaches of which are expected to be scaled up in the future.

Key Issues

Slow growth in the implementation and commercialization of sustainable renewables in LEDCs

Although the adoption of sustainable renewable technologies over the past decade suggests that renewables have a prospective in the role of supplying global energy in the future. Significant investments are being made by countries in order to encourage the innovation, development, and commercialization of such sustainable and renewable energy technologies. However, there are many developing countries that believe that the hindrance of acquiring the access to new energy services such as green technologies is a prime factor of which is preventing achievement of sustainable development goals by the country. It is also apparent that not all LEDCs have the funds to provide their population with energy generated from non-renewable sources because not only is it still a developing

technology – making it costly to implement and thus adding to the cost of electricity thus making the economy less attractive for foreign businesses and investors to invest in the domestic economy and hinder its economic growth.

Major Parties Involved and Their Views

National Efforts

Countries hold the issue of the implementation of sustainable renewable energy at different levels of importance and thus each country has a varying use of policies in order to promote the ‘research, development, deployment and commercialization’ of sustainable renewable energy as stated by UN Energy. Countries such as China and India, to name a few, have invested a significant proportion of their funds into wind power amounting to approximately 44.7GW and 13.2GW at the end of 2010, in out of the world total of 198GW.

China

Although China can be classified as a newly industrialized country it sets many standards at a global level and is also an example to many in the Asian region. Under its Renewable Energy Development project, which ended in the year 2008; more than 400,000 solar heating stoves were sold to residents in the North Western region of China. Furthermore, the Three Gorges Dam project, the largest hydroelectric power project on the planet had been implemented in order to supply China with cheaper and more sustainable energy. Each of its 32 generators has the capacity of supplying energy at the level of a small nuclear power station. China’s Ministry of Agriculture also added an estimated 22 million biogas systems to benefit those living in rural areas with the provision of energy for cooking and heating requirements during the period of 2006 and 2010 – contributing to a cumulative of approximately 40 million systems in 2011. This is an example of a source of project finance in China in which the promotion of biogas digesters has the role of provide low-income rural communities with energy for domestic uses. More than 33,000 households are benefiting from the installation of these domestic digesters, replacing the requirement of such carbon intensive domestic fuels such as coal.

Nepal

Nepal has one of the lowest per capita incomes in the world at around US\$340, and more than 30 percent of its population lives below the national poverty line. Only about 15 percent of rural households have access to electricity. As a result, most Nepalese individuals have to satisfy their energy needs by burning wood or other biomass, damaging both the environment and human health. Nepal has a Biogas Support Program, which involves many entities such as private sector firms, microfinance organizations, community groups and non-governmental organizations and has proven effective since there has been an increase in the use of bio gas systems in Nepal over the last decade. In 2010 alone, 25,000 new systems were adopted cumulating the total number of biogas systems to an approximate figure of 225,000 systems. Not only has Nepal seen prospect in the use of biogas in rural areas of the country, but another program, namely the Village Micro Hydro Program, with the help of The International Development Association (IDA) which is the part of the World Bank that helps the world's poorest countries, which arose from more than 30 years of low cost technology development and its management from community administration systems. Out of Nepal's 51 districts, 40 of them are identified to be of potential for such hydropower development in power generation. Rural electrification through micro-hydro is a credible option for Nepal since the country has exploited only 2 percent of its considerable potential. Although there are relatively high costs with the implementation of such system, the necessity with the cooperation of the communities have enabled the program to work through overcoming financial obstacles through the means of coping with initial capital costs in the form of financing mechanisms. These systems strengthen sustainable rural development through creating jobs, protecting the environment, allowing access to electricity to rural households.

Brazil

Brazil has implemented electricity generation subsidies and preferential loans, which are government sponsored initiatives to stimulate capital investment by advancing loans below the market interest rate, in order to promote the use using wind power, small hydropower and

biomass energy. Its main renewable energy sectors include ethanol for transportation with 36 billion liters produced annually.

India

India has used different policies to promote renewable energy such as by using feed-in-tariffs and preferential tax rates, for projects on renewable energy.

International finance institutions

Global monetary institutes play a vital role in the provision of resources, namely capital to promote new and renewable energy sources. One of these such institutions include the World Bank Group, who has provided loans which sum up to \$13 billion dollars during 2010 for the energy segment. A new record of over \$5.5 billion has been reached for providing monetary support for low-carbon energy projects. The World Bank has financed around \$17 billion for low carbon projects since 2003, of which \$14.2 billion consisted of investing in renewable energy and energy efficiency. Without accounting for large hydropower, new renewable energy investments contribute to \$4.9 billion. In 2008, the World Bank founded the Climate Investment Funds (CIF), a cooperative effort between multilateral banks. As of 2010, contributors in the CIF have promised \$6.4 billion in new funds to help fund new low-carbon energy projects. One of the subgroups of the CIF is the Clean Technology Fund, of which is intended help fund the increase of demonstration, deployment as well as the transfer of green technologies. The first category of such ventures includes concentrated solar power, wind power, bus rapid transit and energy efficiency. The African Development Bank has prioritized rural electricity access one of its top priorities, alongside renewable energy development and grid connections between different countries. The Asian Development Bank has also supported the development of clean energy and has attained a very high priority with over 25% of their entire approved loans to support projects for clean energy. Their policy is targeting annual lending for energy projects to reach \$2 billion by 2013. Since 1991, the Global Environment Facility (GEF) has funded a total of \$8.8 billion for clean energy projects, with \$38.7 billion additionally through co-funding. In 2010, this organization received a monetary boost in financing through the contribution of 30 donor countries, to reach a total of \$4.25 billion for climate change initiatives for the next four years. GEF invested \$1.1 billion by the end of 2009 for renewable energy projects in nearly 100 developing countries in addition

to \$8.3 billion through co-financing.

International Renewable Energy Agency (IRENA)

The International Renewable Energy Agency (IRENA) is an international institution that also promotes renewable energy. It was established in 2009, and currently, 148 states and the European Union have signed their Statute of the Agency. IRENA's directive is to promote the extensive and increased implementation and sustainable use of all renewable energy forms. IRENA works toward providing access to all applicable renewable energy information, including technical, economic and renewable resource potential data. IRENA will provide 'experiences on best practices and lessons learned regarding policy frameworks, capacity-building projects, available finance mechanisms and renewable energy-related energy efficiency measures' (IRENA).

The Global Environment Facility (GEF)

The GEF has invested \$2.7 billion to support climate change projects in developing countries, with another \$17.2 billion in co-financing. More than 1 billion tons of greenhouse gas emissions, an amount equivalent to nearly 5 per cent of annual human emissions, have been avoided with support from the Global Environment Facility.

Timeline of Relevant Resolutions, Treaties and Events

Date	Description of Event
Late 1880s	Hydroelectric power became commercially available and solar power discovered in Europe
1960	Organization of Petroleum Exporting Countries (OPEC) was formed and after Arab-Israel War began, Arab states announced an oil embargo against the USA and the UK for supporting Israel
1992	Agenda 21 is the term that describes an action plan implemented in 1992 by the United Nations for the UN, other multilateral organizations, and governments around the world.

can be executed at local, national, and global levels and aims to promote and gives means for sustainable development.

- 2000 The Millennium Development Goals established by the United Nations established in 2001 to fight poverty in LDCs during the Millennium Summit of the United Nations in 2000 defined the access to proper energy services as being part of vital infrastructures that should be improved in developing countries.

- 2002 Recognition that renewable energy is a critical component of sustainable development in the 2002 World Summit on Sustainable Development in Johannesburg, South Africa

- June 2005 Launch of the Renewable Energy Policy Network for the 21st Century

- 2009 The International Renewable Energy Agency (IRENA) was founded

- 2010 Rio 20 is the common name that is given to the United Nations Conference on Sustainable Development, which has a main theme of the access to energy in LEDCs.

- 2012 The United Nations has designated the year as the international year of sustainable energy for all

Evaluation of Previous Attempts to Resolve the Issue

Previous attempts to resolve this issue have been attempted by organizations such as UNEP and UNDP. These attempts involved educating both governments and the populations of LEDCs, as well as funding different projects in several LEDCs such as the IDA's attempt in Nepal, to make sustainable energy a reality in some countries. Their attempts were successful to a certain extent, because they got the knowledge through but little action was really taken physically, understandably though seeing as they are so few non-governmental organizations with limited amount of capital. Furthermore, many of the previous attempts made to resolve the issue of implementing sustainable

and renewable energy in less economically developed regions have been limited to the governmental focus of developing economic policies such as tax breaks, subsidies, feed in-laws and renewable energy quotas to name a few. Feed in laws oblige utilities to purchase power generated from renewables at a certain price, with a per-kilowatt-hour premium, set by the regulatory authority; they therefore offer producers of electricity from renewables a guaranteed feed-in tariff. When well designed and implemented, feed-in tariffs provide a long-term price guarantee that reduces the regulatory and market risk of renewable energy as well as attract investment. Wind power and solar photovoltaic especially have increased significantly as a result of feed-in tariffs.

According to at least 30 developing countries have enacted or substantially strengthened their policies and or programs as well as set targets aimed at accelerating the development and promotion for the increased use of new and renewable energy sources. These economic stimulus packages offered by several Governments around the world do indeed provide an opportunity to ensure cleaner and more sustainable economic growth but this as a primary method of encouraging the implementation for sustainable renewable energy methods are limited for less developed nations, landlocked countries as well as small island developing states as they do require additional financial, technical and capital support from relevant international institutions, bilateral and multilateral donors. Although change through these means has led to some form of change, it has been limited and perhaps creating and changing such government ensued sustainable energy policies is perhaps not the most viable and inherent solution to resolving this issue and thus calls for further and efficient means to resolve it.

Possible Solutions

It can be concluded that the issue of the implementation of sustainable and renewable energy technologies, involves the knowledge of sustainable and renewable means of generating energy and capital to create the generators. If MEDCs were willing to come together to fund organizations such as UNEP, UNDP or any other or new organizations, alongside financial institutions such as the world bank- in order for them to help fund the promotion of sustainable renewable energy through the means of research and development. Furthermore these organizations would also work to research for new

manners to generate energy sustainably and safely in a cost effective way. The UN body would monitor the transparency of the NGO's to make sure the money would be used in an effective manner.

It is understandable why many countries do not see the research and development of sustainable renewable energy a profit generating industry and it is this cause that severely limits the economic margins associate with innovation. The nature of the energy market, with its slow turnover times for capital stock and, in some cases, large-scale engineering requires costly and time-consuming demonstration projects, raises the costs and risks and may make other investment opportunities more attractive. On the demand side, energy prices also normally do not reflect the full costs of energy, as they do not include the external costs related to them. By removing the financial barriers of entry into the economy, technological transfers from the more economically developed countries into the less economically developed countries is made easier.

According to the report of the Secretary-General made in August 2009 (A/64/277) during the sixty-fourth session on the promotion of new and renewable sources of energy 40 countries have already implemented mandates for blending biofuels into current vehicles and these often require blending between 2 and 5% biodiesel with diesel fuel or between 10 and 15% ethanol with gasoline. In recent years, several new biofuels standards and plans that target future levels of biofuel use were enacted. Other existing biofuel policies are fuel tax exemptions and production subsidies. In recent years, however, and particularly spurred by the global food crisis, the sustainable production and use of biofuels has become a major concern and cannot solely be treated as a sustainable solution. Furthermore, in many countries around the world, conventional fuel in the form of diesel and petrol are still subsidised some more than others in particular, oil producing nations such as Saudi Arabia and Brunei Darussalam, to name a few. By subsidising conventional fuel prices, it distorts the price signals between consumer and producer and intervenes with the natural price mechanism of the goods and services obstructing the real levels of demand and supply in the global economy, thus creating unsustainable economic and environmental burdens. According to the IEA, World Energy Outlook published in 2008, the energy subsidies made in the 20 largest countries that do not belong to the Organisation of for Economic Co-operation and Development (OECD), a convention signed on the 14th of December in 1960. Such countries that belong to the OECD include the likes of Turkey, the United States of America and Switzerland.

Like the development of sustainable renewable energy in Nepal has shown, in recent years, more rural electrification policies and programmes, together with international donor programmes, have continued to emerge and progress, enabling increased percentages of the rural population to achieve access to electricity. The provision of electrification based on renewable energy can create local employment and business opportunities and improve local economies and social services, including in remote areas. It can allow further progress towards achieving the Millennium Development Goals by improving education, health and the standard of living in rural areas. However, with all policies, existing policy options have to be reviewed periodically to ensure effectiveness and suitability and phase them out where they are no longer required.

Bibliography

[1] Definition of energy taken from: "Energy." *Dictionary.com*. Dictionary.com, n.d. Web.

[2] Definition taken from "News." *World Bank Joins Leadership of Sustainable Energy for All*. N.p., 24 Sept. 2012.

Least Developed Countries Map.svg. Digital image. *Wikipedia.org*. N.p., n.d. Web.

<https://upload.wikimedia.org/wikipedia/commons/thumb/2/26/Least_Developed_Countries_map.svg/450px-Least_Developed_Countries_map.svg.png>.

Science.howstuffworks.com. Digital image. N.p., n.d. Web.

<<http://static.ddmcdn.com/gif/solar-thermal-power-1.jpg>>.

Digital image. N.p., n.d. Web.

<https://gs1.wac.edgecastcdn.net/8019B6/data.tumblr.com/832b9a4d4dcc51d93bd98f0c48939efe/tumblr_in_line_mxm3czTK781rugke7.jpg>.

Runge, C Ford. "The Case Against Biofuels: Probing Ethanol's Hidden Costs." *By C. Ford Runge: Yale Environment* 360. N.p., 11 Mar. 2010.

<http://e360.yale.edu/feature/the_case_against_biofuels_probing_ethanols_hidden_costs/2251/>.

Moon, Ban Ki. *Promotion of New and Renewable Sources of Energy*. Publication no. A/66/100. N.p.: n.p., n.d. Print.

Moon, Ban Ki. *Promotion of New and Renewable Sources of Energy*. Publication no. A/64/277. N.p.: n.p., n.d. Print.

"News." *World Bank Joins Leadership of Sustainable Energy for All*. World Bank, 24 Sept. 2012. Web.

Economic and Social Council. *ECOSOC Resolution 2010/3: Science and Technology for Development*. Publication. N.p.: n.p., 2010. Print.

Who's Winning The Clean Energy Race. Publication. The Pew Charitable Trusts, n.d. Web.

"Organisation for Economic Co-operation and Development." *Organisation for Economic Co-operation and Development*. N.p., n.d. Web.

World Energy Outlook. Rep. no. ISBN-13: 978 92 64 04560-6. N.p.: n.p., 2008. Web.

World Health Organization (WHO), and United Nations Development Programme (UNDP). *The Energy Access Situation in Developing Countries: A Review Focusing on the Least Developed Countries and Sub-Saharan Africa*. Publication. N.p.: n.p., n.d. Print.