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**Dr. Ivan Vera
Former UN-Energy Secretary
Former Chief Water, Energy and Capacity Development
Division for Sustainable Development
United Nations**

Energy Production and Consumption (SDG 7)

This presentation is about global energy production and consumption issues discussed within the context of the Sustainable Development Goal on energy SDG7 and its implications related to prosperity.

Although energy is a key factor in sustainable development, it is important to realize that energy is a “Means rather than an End”. We do not need energy just to have energy. We need energy for lighting, for transportation, for cooking, for heating, for cooling, for refrigeration, for industries, etc. Energy is indeed an important Means that affects the three major dimensions of sustainable development-- the economic, the social and the environmental dimensions. Therefore, the interlinkages between energy and the other SDGs are extremely important because energy impacts all the other factors and objectives related to sustainable development. Energy directly affects people, the planet, prosperity and peace.

The SDG7 calls for “Ensuring access to affordable, reliable, sustainable and modern energy for all”. The Goal includes three core Targets and two Targets related to the Means of Implementation. The three core targets refer to (1) achieving universal access to affordable, reliable and modern energy services, (2) increasing substantially the use of renewable energy and (3) doubling the rate of improvement in energy efficiency. The two Means of Implementation targets are about international cooperation to promote investment and to expand infrastructure and upgrade technologies.

Perhaps the energy Target of SDG7 that has the greatest impact on poverty eradication (SDG1) is the target on Access to Affordable, Reliable and Sustainable Energy. Today still about 40% of the population does not have access to sustainable energy. This is about 3 billion people and about 1 billion still live without electricity. This situation has serious implications in all the other factors affecting sustainable development. Most of the people without sustainable energy access live in Sub Saharan Africa and Developing Asia and about 80% live in rural communities where they also lack access to safe water, proper sanitation, medical services and education. The Sub-Saharan African region has the largest percentage of people without electricity.

The second target of SDG7 relates to renewable energy. World challenges, including impacts from climate change, limited natural resources, rapid increase in energy demand, and the loss of biodiversity, demand a greater reliance on renewable sources of energy. Two-thirds of global GHG emissions are from the energy sector. Currently, the share of renewable energy use is increasing only at a marginal rate and it stands at only 18% of total global final energy consumption even though the cost of renewable energy technologies has gone down at a dramatic pace in the last several years. The increase in renewable energy use can induce multiple benefits including millions of jobs and environmental and health benefits.

With respect to Target 7.3 related to doubling the global rate of improvement in energy efficiency, many countries are implementing energy efficiency programs. Most of them are based on energy building codes, energy standards for appliances and vehicles, and improving energy efficiency in energy production systems. Also, energy efficiency is being improved by the use of smart systems, information and communication technologies, and changes in personal behavior and Sustainable Consumption and Production. However, the current rate of progress in the global energy efficiency is well below the annual 2.7 per cent improvement needed between now and 2030. In general Energy Efficiency programs are very cost-effective strategies to achieve sustainable energy development. Multiple Benefits can be derived from improvements in energy efficiency including benefits related to economic growth, good health, less negative impacts from climate change, less indoor pollution, more jobs, reduction in fossil fuel imports, etc.

Summarizing the progress in relation to satisfying the Sustainable Development Goal on energy SDG7 and its targets, it is clear that much has been accomplished in the last decade; however, much more is necessary to achieve the goals and targets by 2030. Universal Energy Access is not expected to be achieved by 2030. On the contrary, it is expected that by 2030 around 2.3 billion people still will be without sustainable energy for cooking and 700 million without access to electricity. About 80% of these people will be in rural areas of Sub-Sahara Africa.

Renewable energy use is increasing but at current rate it will not be sufficient to achieve a considerable higher share. Achieving 60% share in power generation is feasible and should help achieving the climate change goals but the current rate of increase in the use of renewable energy will not be sufficient to achieve this target by 2030.

Doubling the Rate of Improvement in Energy Efficiency is not expected by 2030 either. Unfortunately, the current rate of improvement is lower than what is necessary.

Since energy is a Means rather than an End, it is important to assess the interlinkages between energy and other SDGs. Universal access to sustainable energy is strongly linked to poverty eradication (SDG1). Universal energy access is essentially related to access to modern energy fuels that can replace traditional biomass consumption for cooking, heating and lighting. It also relates to access to electricity. Traditional biomass is solid biomass used in an unsustainable manner and includes fuelwood, and agricultural and animal waste. It usually represents the only available or affordable fuel to the poor in many developing regions. The lack of

access to modern energy services correlates to high infant mortality, illiteracy and low life expectancy.

It is important to note that an alternative way to look at energy access is to review the consumption of electricity on a per capita basis. As we can see in this chart there is a big difference between per capita electricity consumption in developed countries like the USA, South Korea and France and in developing countries. Most of the countries in the Sub-Saharan Africa region consume less than 500 KWh per capita, compared to over 7,000 KWh or even over 10,000 KWh in many developed countries. The statistics point toward the importance of sustainable production and consumption especially in developed countries. On a per capita basis, people in the developed world could change their behavior to try to be more efficient. This would represent conservation or more efficiency in the demand side and a reduction of high levels of energy production that may not be necessary.

On the other hand, many countries in developing regions and in particular in Africa and developing Asia could benefit from more access to electricity so that they could satisfy basic energy requirements for refrigeration, lighting, communications, information, etc. Their low level of use of electricity implies that many of these basic electricity requirements are not being satisfied.

One of the areas in which the lack of access to sustainable energy has a major effect is Health (SDG3). For example, the use of solid fuels and the lack of ventilation in households in developing countries are associated with very high levels of pollutants such as particulates, carbon monoxide, and formaldehyde. Women and young children represent the segments of the population with the highest exposure to these pollutants. It is estimated that about 4 million premature deaths occur each year from household indoor pollution due to inefficient biomass combustion. This corresponds to more than the deaths attributed to malaria, HIV/AIDS and tuberculosis combined. Many of these premature deaths are young children and women.

Another important issue is the lack of electricity. Without electricity minimum health services are compromised. Electricity is needed for clinics to perform medical procedures during dark hours. Electricity is needed for refrigeration to keep vaccines and medications as well as other important basic foods such as milk. Also, many children are born during dark hours and the lack of electricity is a factor increasing the number of deaths of mothers as well as babies. The use of candles or wood for lighting is correlated with fires and burns both in clinics and households.

With advances in renewable energy and the drop in the cost of solar energy technologies in the last decades, efforts are underway to provide isolated areas and clinics, particularly in rural areas, with lighting and portable equipment that can be used for medical procedures required during dark hours. The availability of small independent renewable energy systems, usually based on solar or wind energy, is a major opportunity to support rural clinics and households where the electricity grid does not reach.

Another area in which sustainable energy access will make a big difference is in education (SDG4). Studies estimate that about 30% of students attending primary education in the world attend schools that lack access to electricity. Without

electricity schools are restricted to operate only during daylight. In addition, students cannot have access to communication and information technologies such as Internet, television, etc. Therefore, students attending these schools are having limited education compared to schools with electricity especially in the developed world with access to all kinds of electric and electronic technologies and devices.

The interlinkage between energy, water, agriculture and food security is indeed very strong. Energy is indispensable to ensure sustainable agriculture and food security which are the subjects of SDG2. Energy is also very important to ensure access and treatment of water which is the SDG6. An example of the connection among these three SDGs is the use of renewable energy, such as solar photovoltaic energy, for pumping water for irrigation of farms.

Energy is also a powerful factor that affects the lives of women all over the world (SDG5). We know that many women risk their lives and waste many hours every single day searching for wood fuel in order to perform duties in their households. Again, energy systems designed and implemented in integrated manners should be able to help women and allow for their empowerment by freeing them from these tedious and dangerous tasks. Furthermore, the use of sustainable energy systems coupled with capacity building activities and entrepreneurship training could empower families allowing for better economic situation and enhancing their well-being (SDG8).

An effective approach to the SDGs is the integrated or holistic approach also called the nexus approach. This approach takes advantages of synergies in the integrated implementation of SDGs. This will allow for finding more efficient solutions to concurrent problems. Also, it helps to avoid negative unintended consequences when sectoral solutions alone are implemented. By using a nexus approach, tradeoffs or competing alternatives to development can be assessed in an objective manner.

I will use a simple experience to illustrate the benefits of a holistic approach to sustainable development. Several years ago, we decided to support a school in the middle of the Altiplanos of Bolivia, in South America. The idea was to provide energy, through photovoltaic solar systems, in the form of electricity to this school of over 50 students and 3 teachers. The electricity was necessary for lighting, communication, radio, TV equipment for education and entertainment, and cell phone recharging. The place stands at an altitude of more than 5,000 meters with temperatures ranging from -5 to 15oC. As we worked with local NGOs in the implementation of the project, we realized that, in addition to lack of electricity for lighting, communication and information, many of the students were suffering health and malnutrition problems.

One of the health problems was related to water. The water available for the school was very cold due to the very low temperatures at that altitude. Therefore, people in that area could not wash their hands before eating and in fact they could not even take showers. The water is simply too cold in that area for these basic hygienic activities! The lack of hygiene translated into ingesting contaminated food reflected in students having digestive problems due to worms. With only a small addition to the budget, we provided not just electricity for lighting and communication but also a

solar thermal system for hot water and sinks for washing hands. In addition, the local government also collaborated with the construction of a shower facility, so that students could take hot showers and improve their hygienic conditions.

Another health issue observed in the school was respiratory problems resulting from indoor pollution. The school staff cooked lunches in a large room using wood and the teachers as well as the students were exposed to indoor pollution. Again, with a small addition to the budget, an efficient cookstove was provided with a chimney to eliminate indoor fumes also reducing the amount of wood needed for cooking.

Malnutrition was due to a diet based on the consumption of the only agricultural product that could be easily produced in the area – potatoes, also due to the very low temperatures. A greenhouse was built to provide a warmer environment for cultivation of other agricultural products and for raising a few animals. The simple greenhouse consisted of four walls and a semi-transparent roof and windows.

All these changes implemented in an integrated manner have improved the education, health, nutrition and hygienic conditions of both students and teachers in this school in addition to allowing energy and water access. This example shows the power of a holistic approach, especially in rural isolated communities. The project proved that synergies can be realized when development factors can be taken in an integrated manner and efficient solutions are implemented accordingly.