### Mitigating Climate Change through Alternative Energy Sources

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Climate change has emerged as one of the greatest threats to sustainable development and it is causing a colossal gun shoot wound in the emerging economies characteristically to the Sub-Saharan Africa.
Throughout the Earth's history, there have been warm and cold cycles. Carbon-dioxide $CO_2$ emissions have been proven to be a result of anthropogenic (human) activity, a fact which has been significantly proven with hard evidence.
On the other hand it is believed and perceived that climate change is a result of Greenhouses gases (GHGs) for over the last 4 decades which has led to global warming but there are other greater inducers of climate change. GHGs occur due to the long-term industrially and agriculturally atmospheric gas generation and emissions such as carbon-dioxide ($CO_2$), chlorofluorocarbons (CFCs), ammonia ($NH_2$) and nitrous-oxides ($N_2O$). The above are known to absorb torrential radiations on the earth. Climate change has tremendously affected the availability of fresh waters, food production, and transmission of vector borne diseases like Malaria.
Africa's electricity consumption remains low, about 8% of global electricity consumption. Majority of the African population do not have access to electricity. In the year 2000, only 22.6% of the population in sub-Sahara Africa had access to electricity, compared with Asia – 40.8%, Latin America – 86.6% and Middle East – 91.1%. On the supply side, Africa's energy profile show low production and huge untapped potential and this is the potential which is needed. The continent has one of the highest average annual solar radiations; 95% of the daily global sunshine above 6.5kWh/$m^2$ falls on Africa during winter. African energy situation is characterized by high rate of demand driven mainly by demographic factors, while supply is lagging behind. About 11.3% of the electricity generated in Africa is wasted compared with world's average of 9.2%.
Therefore, in order to achieve supply of alternative energy sources there is need to use of informal market instrument, Priority investment on renewable energy, Removal of import tariff and other trade barriers, Policy formulation, Involvement of Private Sector, Training of African personnel, Awareness creation, Elaborate regional perspective in renewable energy development and Creation of special agency responsible for renewable energy and energy efficiency.

### Biochar Stability in Soil Depends on Feedstock Source and Pyrolysis Temperature

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The stability of biochar is the major determinant of its value in long-term C sequestration in soil. However, little research has been undertaken to quantify the stability of biochar applied to soil and its effect on 'native' soil C. In order to precisely quantify the magnitude and rate at which biochar C is decomposed in soil and released as $CO_2$, we have initiated a long-term incubation experiment using a novel method based on measuring the inherent differences in $^{13}C$ signature between biochar and soil. Briefly, biochars from a range of C3-biomass sources (bluegum wood and leaves, paper sludge, poultry manure on rice hull, and cow manure) produced at different temperatures (400ºC or 550ºC) and activation level (activated or non-activated), were applied to a clay-rich soil (Vertisol) from a C4-pasture (Astrebla spp.) field. Soil-respired $CO_2$-C and microbial-C and their associated $\delta^{13}C$ values have been measured over 2.3 years to date, and are continuing. Results show decomposition of biochar C varied depending on biomass source and pyrolysis temperature and only 0.3% to 6.0% of the applied biochar C was decomposed in the first 2.3 years of incubation. Biochar application enhanced decomposition of 'native' soil C; this priming effect on soil C was higher in soil amended with leaf or poultry manure biochars than wood biochars. Microbial biomass C was not affected by the biochar treatments, except for the low-temperature poultry manure biochar treatment which significantly increased microbial biomass C as compared to the control. Our estimates of mean turnover time of biochar-C, determined by fitting the two-pool kinetic model to the cumulative $CO_2$-C evolved under ideal conditions in the laboratory, ranged from ~100 to ~2000 years between biochar types. The low-temperature (400ºC) manure biochars decomposed substantially more quickly than the high-temperature (550ºC) biochars.

### The Potential for the Implementation of an Effective Mechanism for Improving Mountain Communities Knowledge of Adaptation to Climate Change

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Mountain territories not only are some kind of "barometre" of global climate changes, but their reaction have a significant impact on the further strengthening of these processes. Consequences of climate change exacerbated by anthropogenic impacts on the environment. Such problems arise because of lack of knowledge and environmental education. As we know progresivnye initiatives promoted at the schooling level. Meanwhile, environmental problems are mainly related to the activities of adults. But adult education - a more complex process, methods of environmental education of adults do not exist. To help address these issues Ecoforum implements the educational program. Ecoforum organizes round tables, trainings in the villages. Brochure "Environmental security of family and environment conservation" is published. It is the first in a series of books about the adaptability of the family to climate change (organic farming and rational grazing, the shift to new activities - sustainable tourism, national crafts, a knowledge of climate change consequences mitigation at the household level - ways of cleaning water, saving water and energy resources, rational wastes management). The peculiarity of this program - almost without a costs (which is important for developing countries) and has the maximum available coverage. Educational programs became national winners of two international Awards on Sustainable Development - Energy Globe.