

Monitoring will be conducted in collaboration with the government, private sector, NGOs and the project beneficiaries.

#### **1.2.10 Possible Complications/Challenges**

The biggest challenge is to get funding for the project. Other challenges include convincing the private sector, NGOs and development partners to support the project

#### **1.2.11 Responsibilities and Coordination**

The project will be coordinated by the Ministry of Energy in collaboration with the interested stakeholders. These include the following:

- i) R&D institutions
- ii) Academia
- iii) Print and electronic media institutions
- iv) The Kenya Bureau of Standards
- v) Immigration Department
- vi) Service providers: financial institutions; NGOs, industry and development partners
- vii) Project beneficiaries

### **1.3 Specific Project ideas: Promotion of Solar Dryers Technology and Capacity Building for Technicians and Farmers in Kenya**

#### **1.3.1 Introduction and Background**

The main economic activity in Kenya is agriculture that includes production of cereals mainly maize, wheat, rice, sorghum, millet and other produce such as beans, peas, vegetable and fruits etc. The export market is dominated by tea, coffee and horticultural products.

Traditionally direct solar drying has been used for processing and preserving food, vegetables, fruits and other crops by laying products out in the sun to dry. However for bulky products, the National Cereals and Produce Board of Kenya has dryers that use diesel in all its stations in the country. These diesel powered dryers contribute to emission of carbon dioxide. However, there is no baseline data on the level of emission.

At the various consultative meetings with relevant stakeholders, it has been suggested that the issue of the use of fuel-wood or fossil fuel in the drying of agricultural products be reviewed with a view to promoting application of green energy technologies such as solar energy as a mitigation option. The results of Multi-Criteria Analysis also placed Solar Dryer technology high in the list of prioritised technologies that can contribute to the socio-economic, environment and climate change mitigation.

In many other countries of the world, the use of solar thermal systems in agriculture to conserve vegetables, fruits, coffee, tea leaves and other crops has shown to be practical, economical and environmental friendly by reducing the use of fuel-wood and fossil fuel.

The development of this technology can be at different levels namely the family units, medium scale systems for groups or cooperative societies, and large scale commercial applications for large commercial farming operations.

### 1.3.2 Objective

The main objective of this project concept is to promote widespread use of Solar Dryers technology amongst Kenyan farming community and other commercial enterprises who hitherto have been using traditional sun drying in the open or using the diesel fuelled dryers and fuel-wood to dry their products. This will not only cut down on the use of fossil fuel and fuel-wood but will also reduce contamination of products and increase climate change mitigation potential.

### 1.3.3 Project Outputs

The project is intended to cover all the communities in the maize, wheat, beans, tea, coffee, vegetables, fruits, flower growing areas in the country, by ensuring that they adapt Solar Dryers for drying their grains and other products.

By the end of five year period, each of the 24 selected counties will have at least one commercial solar dryer to be used by the local community to dry their farm produce such as cereals, legumes, vegetables, legumes and herbs at low costs. All the 65 tea factories in the country will have shifted from using fuel-wood to solar dryers to dry their tea leaves. Again 300 coffee factories and 10500 farmers will be using solar dryers. Awareness on socio-economic and health benefits will have been created in the targeted 24 counties. Every county will have 40 trained technicians and 10 farmers trained to install, repair and maintain solar dryers. All poor farmers interested in the technology will be provided with financial incentives to access the technology.

### 1.3.4 Relationship to the Country's Sustainable Development Priorities

Energy sector is key as a driver to the pillars of Vision 2030

In line with the Vision 2030 to transform Kenya into a newly industrialised country and the desire to achieve low carbon developed society, the Solar Dryer technology will enable the country apply green technology and contribute to climate change mitigation. It will also positively respond to the National Climate Change Response Strategy and the National Climate Change Action Plan.

### 1.3.5 Project Deliverables

The project benefits include:

- **Reduced GHG Emission**

This technology will increase the country's climate change mitigation potential by reducing GHG emissions. However, so far there are no baseline data to rely on.

- **Running Cost Low compared to the use of fossil fuel**

On personal communication with the Kenya Cleaner Production Centre, it was revealed that a tea factory in Kericho that uses solar dryer has been able to reduce its energy cost by fifty percent.

- **Quality and Hygiene ensured**

The use of solar dryers reduces contamination of products and is therefore hygienically clean.

- The use of solar dryers will contribute to forest conservation and enhance carbon sinks
- Increased income to the farmers
- Prevent losses of products after harvesting

### 1.3.6 Project Scope and Possible Implementation Feasibility and Linkages to Current or Past Projects

The project is intended to be implemented in 24 counties amongst the farming communities especially in the areas growing maize, wheat, rice, sorghum, millet, beans, peas, vegetables, fruits, flowers, tea and coffee.

One tea estate in Kericho has installed a withering tea facility that uses solar energy. The government policy on renewable energy favours this project and the necessary enabling framework will encourage the private sector to be involved in promotion of this technology. The role of civil society in awareness promotion is very important.

It is expected that all the 65 tea factories and coffee factories in the targeted 24 counties and majority of farmers will have embraced the technology before end of the project.

### 1.3.7 Project Activities

The implementation of the project will involve many players including the government, the private sector, the civil societies and the individual farmers. The activities will include:

- Public awareness campaigns especially by the civil societies
- Training of technicians as well as farmers and other potential users of solar dryers technology in operations and maintenance of the equipment
- Marketing campaigns through publicity
- Provision of financial incentives to address the issue of initial cost of the technology
- Institutional collaboration amongst government, private sector and the civil society.
- Technology demonstration

### 1.3.8 Timelines

The project will be implemented in a time frame of five years.

**Table 1.4: Timelines**

Activity	Duration
Hiring of Project Manager and Deputy Manager and other project staff	01-3 Months
Institutional collaboration	01-60 Months
Training of technicians as well as farmers and other potential users of solar dryers technology in operations and maintenance of the equipment	09-60 Months
Public Awareness campaigns	06-60 Months
Marketing campaigns	09-60 Months
Provision of financial incentives to those who are unable to pay for the technology	12-60 Months
Technology demonstration	12-60 Months
Monitoring and evaluation	

### 1.3.9 Budget

The budget for the project for five years will be based on the activities mentioned earlier. This budget is proposed to cover the whole country and especially those counties that produce maize, wheat, rice, sorghum, millet, beans, peas, fruits, tea leaves, coffee and vegetables. Out of the 47 counties the initial focus will be in 24 counties. In each of the counties the project will target 500 farmers. Trained farmers will teach other farmers on installation, repair and maintenance of solar dryer technology (Trainers of Trainers-TOT). This number is expected to double every year and reaching 10,500 farmers before end of the project. The total project budget is US dollars 79,200,000. Details of the project budget are indicated in the table below.

**Table 1.5: Project Budget**

Activity	Target Group	Main actors	US Dollars	Justification
1. Public awareness campaigns. to educate and sensitize the farmers, industry and other potential users of the technology	Farmers and other potential users of the technology	Media and civil society	2,400,000	At US \$ 100,000 for each of the 24 counties
2. Training of technicians, farmers, industry and other potential users of the technology	Technicians; farmers and other potential users of the technology	Government; private sector; partners in development; and NGOs	24,000,000	10 technicians and 120 farmers per county for four years
3. Provision of financial incentives to enable poor farmers access credit	Poor farmers, cooperative societies; industry	Government; private sector; development partners; NGOs	24,000,000	500 farmers per county at US \$ 2000 per farmer for 24 counties
4. Marketing campaigns by private sector and civil society	Farmers, cooperative societies and other potential users of the technology	Civil Society; and private sector	2,400,000	At US \$ 100,000 per County
5. Institutional collaboration. This is to ensure harmony and avoid conflicts in the project implementation	Private sector; farmers; industry; civil society; and development partners	Government	1,200,000	At US\$ 50,000 per County
6. Commercial solar dryers for each county to demonstrate effectiveness of the technology	Farmers and business men/women	County government	24,000,000	At US \$ 1 million per county for five commercial solar dryers
7. Monitoring and Evaluation	Farmers	County governments, farmers, civil societies	1,200,000	At US \$ 50,000 per county
<b>Total in US Dollars</b>			<b>79,200,000</b>	

The above budget should cater for staff, consultants partnership etc.

### 1.3.10 Measurement/Evaluation

Monitoring and Evaluation is an important component of the project that should spell out mechanisms and procedures to ensure that activities occur as planned and that they remain directed towards stated objectives and that appropriate corrective actions are taken if

required. The exercise should ensure that resources have been used efficiently and effectively.

The project will have a project steering committee chaired by the Ministry of Energy. Other members will comprise representatives from the relevant government institutions, R&D institutions, academia, financial institutions, media, NGOs and project beneficiaries. The Project Steering Committee will be responsible for monitoring project implementation and will receive project progress reports from the Project Manager on quarterly basis

### **1.3.11 Possible Complications/Challenges**

The main challenges include:

- Soliciting for funding from development partners
- Effective involvement of the private sector and the civil society
- Giving false hope to the farmers that they will get free funding through the government

### **1.3.12 Responsibilities and Coordination**

The project will be coordinated by the Ministry of Energy which will recruit the Project Manager in collaboration with the interested stakeholders. These include the following:

- i) Government of Kenya
- ii) Civil society(NGOs)
- iii) Private sector
- iv) Financial institutions
- v) Development Partners