

United Nations Development Programme

Democratic People's Republic of Korea (DPRK)

Small Wind Energy Development and Promotion in Rural Areas (SWEDPRA) Project

Country	Democratic People's Republic of Korea (DPRK)
UN Strategic Framework Outcome(s)/Indicator(s):	Strategic Priority Two: Partnerships for Knowledge and Development Management - Strengthened national capacities and knowledge management for sustainable economic/industrial development and improved aid effectiveness. Outcome 2: Strengthened national capacities in sustainable economic development. Output 2.3: Strengthened sustainable and efficient use of conventional energy and accessibility of alternative energy sources for local communities and households. Indicators: National policies and strategies to promote sustainable development and use of conventional energy and alternative energy sources.
Expected Outcome(s)/Indicator(s):	The annual growth rate of Greenhouse Gas (GHG) emissions from fossil fuel-using activities is reduced through the removal of the major barriers to the development and widespread implementation of small-scale wind energy systems (SWES) to replace part of the current fossil fuel use in the DPRK.
Expected Output(s)/Indicator(s)	1) Assessed wind characteristics and energy potentials in the country and improved local capacity to carry out wind energy assessments on a regular basis after the Project, 2) Widely disseminated feasibility and benefits of wind energy technology applications to potential users in the country, 3) Established market for locally made SWES units and promoted both domestically and abroad, 4) Compliance of locally made SWES units with internationally acceptable quality and performance standards, 5) Improved manufacturing of locally made SWES units towards internationally accepted production practices and standards, 6) Installed, operated and monitored optimally designed and manufactured SWES units in selected sites, 7) Integration of energy planning and policy making into the country's development planning system.
Implementing Agency:	United Nations Development Programme (UNDP)
Responsible Parties:	State Academy of Science State Commission of Science and Technology

Brief Description

The goal of this project is the reduction of the annual growth rate of GHG emissions from fossil fuel using activities through the removal of the major barriers to the development and widespread implementation of small-scale wind energy systems (SWES) to replace part of the current fossil fuel use in the DPRK. This is carried out by assisting the nascent wind energy sector on the road to full-scale commercialization and improving the domestic market (particularly the rural areas), as well as the potentially viable foreign market, for locally manufactured SWES units.

Programme Period: 2005 – 2013 (Including suspension period from March 2007)
Programme Component:
Project Title: Small Wind Energy Development and Promotion in Rural Areas (SWEDPRA)
Project ID: PIMS 751
Project Duration: 50 months (18+32 months)
Management Arrangement: UNDP

Budget	<u>US\$ 875,000</u>
General Management Support Fee:	
Total budget:	<u>US\$ 875,000</u>
Allocated resources:	
• GEF	<u>US\$ 725,000</u>
• UNDP	<u>US\$ 150,000</u>

Agreed by (Government):

Ri Hung Sik
Secretary-General
National Coordinating Committee for Environment
Name, Title, Organization

25 Aug. 2010
Date

Agreed by (UNDP):

Jerome Sauvage
Resident Representative

Name, Title, Organization

23 Aug. 2010
Date

INTRODUCTION

This Project Document is a revision of the GEF-approved SWEDPRA Project Document and reflects the current context of small wind energy systems development and applications in the DPRK, particularly in relation to the new mandate and circumstances of UNDP's return to DPRK and the developments in the sector and local conditions affecting the SWEDPRA Project (hereinafter referred to as "the Project").

This Project was approved for resumption by the Executive Board (EB) in 2009 and is expected to restart from mid-2010 for a period of 32 months. The resumption of this Project is strictly adherent to the decision of the EB and the UNSC resolutions.

During the previous 18 months of Project implementation from October 2005 – March 2007 before its suspension, several activities had been completed and progress had been made on some. The specific achievements of the Project before the suspension were as follows:

- Wind measurement equipment purchased;
- Wind mast tower manufactured & installed (30 m height) in 1 province;
- Methodology for wind energy (WE) monitoring and simulation developed;
- In-house training on WE technology conducted;
- NRE information center established;
- Study tour abroad on WE system design and applications conducted;
- Promotional campaign conducted in some counties;
- Assessments of design specifications and performance conducted;
- Training on the optimal design and manufacturing of small-scale wind energy systems (SWES) conducted;
- Assessments of manufacturing capability conducted;
- New SWES manufacturing building constructed.

Between March 2007 and the present, there have been improvements in the policy environment and activities related to wind energy in the country. The major changes on the policy and institutional aspects are as follows:

- A new ministry called the State Commission for Science and Technology (SCST) was established on September 18, 2009. The SCST is a sectoral executive organization and a comprehensive ministry in the Cabinet that has the mandate to organize, direct, monitor and control science- and technology-related administrative work in a unified way in line with the Government's policies giving foremost importance to the development of science and technology. The SCST is thus accountable to the State and the Government for the development of science and technology as a central administrative guiding body in the field of science and technology. In this Project, the SCST will collaborate closely with the State Academy of Sciences (SAOS), which will remain to be the Executing Agency of this Project.
- The Center of Wind Energy Research and Development (CWERD), which was established in December 2005 under the SAOS and was not explicitly designed to be a participant in this Project, has since become the main institution that is driving the research, development and dissemination of wind energy systems in the country. Hence, at the resumption of the Project, CWERD will be involved in the implementation of the Project as the head of the Operation Groups/Teams that will be established in this Project.

During the suspension period of March 2007 to the present, the Government of DPRK continued some activities that have been initiated in the Project. These were baseline activities and were carried out using government resources as co-financing. The main activities that had been conducted are listed below. These activities are part of the original design as indicated in the Project Results Framework (PRF).

- Two masts of 60 meters high were erected in the two target provinces and wind data measurements are continuously being recorded using instruments procured by the Government. Wind data measurements/surveys have been started and continuously being conducted in four more provinces using mobile wind anemometers procured by the Project.
- Locally designed small wind turbines have been optimized for capacities of 300 W and 1 kW as per the State Design Department. A small wind turbine for 5 kW capacity has been designed but not yet considered optimized. The design of these prototypes has not yet been evaluated and considered optimum by an external expert.
- Prototypes of the three sizes of small wind turbines (i.e., 300 W, 1 kW and 5 kW) have been manufactured and installed with the following quantities:
 - 5 kW = 1 set
 - 1 kW = 3 sets
 - 300 W = 200 sets
- Presently, there have been about 700 orders for the 300 W system, and more are expected but the several manufacturers involved in the production cannot meet the order due to limited quality assurance process and manufacturing capability and capacity of manufacturers.

The above developments only serve to reinforce that the goal and objective originally set for this Project are in line with the DPRK Government's priorities and that they are relevant to the needs of the target beneficiaries.

The above changes, will not affect the overall objective of the Project as originally intended.

The experiences before and during the suspension of the Programme have shown that small-scale wind energy is a relevant solution to addressing the problem of absence/inadequate of energy supply to rural communities in DPRK. Some lessons that have been learned during the suspension period led the stakeholders to believe that certain aspects need to be strengthened when the Project is resumed. These aspects include the following:

- There is a strong need for adequate external training in the areas of: wind data processing, SWES design, and manufacturing quality control.
- Emphasis on improvement of manufacturing capability should be given priority as this is key for the production of systems that will meet the demand in both domestic and overseas market.
- Detailed investigation of the overseas market for SWES and development of a strategy and marketing plan for locally-made SWES to enter the market need to be conducted.
- Thorough planning and preparation for the development of the overseas SWES market.

At the time of suspension in March 2007, the Project has spent US\$ 341,526.59 (US\$ 265,073.40 from GEF and US\$ 76,453.19 from UNDP). Thus, the remaining budget available for the management and operations of the Project during its resumption for a duration of 32 months amounts to US\$ 533,473.41 (US\$ 459,926.6 from GEF and US\$ 73,546.81 from UNDP).

I. Situation Analysis

The DPRK lies on the northern half of the Korean Peninsula with China and Russia as northern neighbors. As of 2008 it had a population of 24,052,231, 60.6% of whom lived in urban areas. Population growth is estimated at 0.855% annually. More than 75% of the country is non-arable, mountainous terrain with agriculture concentrated in 17% of the nation, which it shares with urban areas mainly on the southern plains.

The DPRK energy sector is characterized by a heavy reliance on coal and coke (over 60% of demand in 1990). Petroleum, all of which is imported, accounted for only 7% of supply in 1990, electricity another 7% and biomass provided an estimated 24%. Industrial demand accounts for nearly half of all consumption, residential about a third (half of this contributed by wood and biomass). The remaining sectors (agriculture, military, transport, commercial and non-energy) all contributed about 3 to 5% to demand. The DPRK in the 80s built a heavily industrialized, energy intensive economy, which because of reliance on coal and older technology are now energy-inefficient. For example in 1990, primary commercial energy use in the DPRK was about 71 GJ/capita. This was some 3 times higher than China's commercial energy use and greater than 50% of Japan's. At the same time energy use per unit GDP output for Japan was 5 to 10 times lower (or more efficient) than the DPRK. In this regard, by replacing the current thermal power generation with wind energy, a reduction of about 100 kilo tons of CO₂ emissions will be reached by the end of the Project.

Since 1990, the country's economy has suffered. Much of this can be related to energy supply and demand causes. Vital infrastructure, such as that for electricity production and distribution or for transport, has declined drastically as a result. The decline has been felt nowhere more than in the agricultural sector. Shortages of diesel fuel and spare parts have severely hampered the mechanized agriculture production system as well as restricting the flow of products to and from markets. Moreover, electricity shortages have caused an estimated 25% reduction of irrigation capability in 1996 compared to 1990 levels. Irrigation is essential for rice production in the temperate climate of DPRK. Rural households as well have experienced an estimated 50% drop in service. Rural clinics, hospitals and schools suffer these same shortages. This has brought about declining standards of living.

Current Situation in the Rural Electricity Sector

The DPRK is made up of provinces, which are consisted of counties. The counties are made up of farms (State and Cooperative), and villages within farms. There may be as many as 15 to 20 farms per county. A farm might have 2000 or more households, while a village would typically have 500 households.

The Ministry of Electric Power Industry (MEPI) is responsible for all generation, transmission, and distribution of electricity. Its duties include design, installation and operation of the power system. The electricity distribution is based on allocation and quotas. The farm pays through State bank deposits for residential and other uses (which include irrigation pumping, workshops, threshing and common buildings). Actual gross amounts of electricity used by a farm are monitored from metered distribution leads at the County switching station. Leads extend to one or two farms. Each lead would have its own meter. Electricity quotas are set by MEPI in cooperation with County officials and confirmed by the State Council. Apparently, quotas are set according to the economic "importance" of the farm, its use of irrigation pumping and so on. In the quota calculation households are given allocations as are other important farm uses such as pumping and workshops. But it seems obvious households are limited in their consumption by the capacity of service.

Counties are enabled to install and operate their own small hydro facilities and to set fees according to cost recovery requirements. The County level as well may be a potential market for small SWES purchased privately and distributed to farm cooperatives.

Renewable Energy Resources

DPRK is rich in hydro resources providing an estimated 10,000 to 14,000 MW of potential. As of 2002, an estimated 4,500 MW had been developed. Of this 250 MW are moderate and small capacity and these are of a "run-of-river" design.

Tidal power potential has been estimated as 4,700 MW in 1991, although recent estimates, which include wave power place it as high as 68,000 MW.

Biomass, which includes wood and crop residues, is used extensively in rural areas for cooking and heating. DPRK has nine million hectares of forested area but only an estimated 3 million hectares is of commercial timber value. Efforts at reforestation are noted but the extent of improvement in the forest situation through these efforts could not be determined.

Solar resources are likely average for a temperate climate. Daily average measurements for three southern cities show annual average values of 3.5 to 4.0 kWh/m²-day, with monthly minimums of 1.6 to 2.0 kWh/m²-day and maximums of 4.5 to 5.8 kWh/m²-day.

Wind is a promising resource. Average velocities of 3 m/s are reported for coastal areas and up to 8 m/s for mountainous areas. Actual measurements of wind speeds are not available because of lack of measuring and monitoring instruments. The Meteorological Department has collected wind velocity data in 30 locations throughout the country for the last 20 years. These data measurements are more of estimates, as they were measured using crude instruments, and therefore are not adequate for detailed site SWES design. At best, they give an indication of potential. Unfortunately, the generally restricted nature of information in the DPRK has meant that this information has been only partially used on a site-specific basis.

Although the potential for wind as a resource to provide the energy requirements of some parts of the country instead of using fossil fuel, there are barriers to achieving this solution. The DPRK government is trying to improve the design and performance of SWES using local technologies and manufacturing techniques and to raise awareness of the public on the use of SWES in appropriate provinces. However, certain barriers listed here would continue without organized and systematic efforts to overcome them.

Barriers to the Widespread Use of Small Wind Power Systems in DPRK

Capabilities in DPRK are reasonably high with an educated and dedicated workforce. Efforts to widely deploy wind systems, however, have not been successful for a variety of reasons. Some barriers are immediate and lend themselves to direct project intervention. Others are more systemic (such as energy pricing policy), which the SWEDPRA Project must recognize and to the extent possible address through enabling activities which, while not overcoming the barrier, work with the existing situation to enhance project success. The key barriers in the development and application of SWES technology in the country are:

- Incomplete wind data and wind data assessment – This stems from the lack of meteorological instruments and lack of capacity (manpower and technical) of the Wind Resource Survey Team (WRST) of the SAOS and the Department of Meteorology (DMet). The wind data (collected for the

last 20 years) from the DMet are not generally available because of their "sensitive" nature. No accurate assessment of national wind energy potential has been made and lack of information has obvious consequences on planning wind installations. Unobtainable wind data reflects a general pattern in the DPRK where published status reports are not the norm and obtaining an energy balance requires State Council approval. Incomplete or inconsistent information can have serious negative consequences on SWES deployment.

- Lack of information and awareness – The rural areas are the target users of SWES. While people in these areas have limited knowledge about SWES, the Project proponents are confident that cooperative farms and rural households will like SWES because they need electricity badly. This barrier is more pronounced among the SWES developers and manufacturers who do not know the latest technology in designing and manufacturing wind energy systems. In the past, no serious attempt has been made to replicate projects. Demonstration projects have remained an isolated one of a kind effort to be observed for technical but not replication reasons. There is evidence that demonstrations are opportunities for technology copying and modification rather than market deployment.
- Lack of energy markets – The DPRK provides electricity at highly subsidized rates. The true cost of electricity to the user is not transparent to potential small wind users at the household and at the farm cooperative level. For this reason it may be difficult to find user markets without similar subsidies being applied to wind equipment. Application of these subsidies is complicated, bureaucratic and may be difficult. Considering the present situation where there is a dire need for electricity, there appears to be a sure market for locally made SWES within the country. However, the export of such products to other countries, which is viewed as a means of sustaining the development and use of SWES, is a problem because of the poor quality of such products that are presently made. Moreover, DPRK has to establish foreign markets to open up investments for manufacture and sale of locally made SWES.
- Lack of industrial manufacturing facilities for SWES – The present facilities and materials used in manufacturing SWES are not as modern compared to those in other countries like China. Presently, the manufacture and deployment of wind energy technologies have been almost entirely carried out by research agencies. Although improved designs are reportedly passed on by research agencies to manufacturers, this situation mitigates against these designs being deployed commercially. There is a very clear lack of capability to manufacture and test equipment for wind electric generators. For example, there are no local facilities to manufacture blades using advanced, lightweight plastic. Prototype units have been plagued by vibration problems and without the proper dynamic measuring equipment, problems cannot be rectified.
- Lack of appropriate SWES designs – The SAOS stated that presently the SWES designs are not yet optimized and that they are still testing prototypes. There is a lack of designs for SWES that incorporate improved techniques that are within the capabilities of industry to manufacture locally. Moreover, actual operating performances of SWES units that are already installed in some places around Pyongyang are not known.
- Lack of technology planning and analysis skills – Technical personnel of the SAOS lacks the capacity to do energy planning, project technical and economic analyses, and project management. They lack experience in feasibility analysis. Improvement of supply/demand analysis, full cost pricing and life cycle economic analysis are necessary to properly give priority to wind energy projects. Failure to take these approaches into account in the past has led to ad-hoc one-off demonstrations with no clear understanding of whether wind is appropriate in the energy supply mix.

The goal of this Project is the reduction of the annual growth rate of GHG emissions from fossil fuel using activities through the removal of the above major barriers to the development and widespread implementation of SWES to replace part of the current fossil fuel use in the DPRK. The purpose of the Project is the realization and advancement of the potentials and application of SWES in rural areas in the DPRK.

Baseline scenario

Recognizing the benefits that wind energy can bring about in the country, and in line with the Governmental Policy on Science and Technology, the DPRK will continue its current activities in the area of SWES development. However, nothing much can be expected in this area, considering the current state of affairs and economy in the country. On its own, the country will still pursue the development of its nascent SWES industry focusing mainly on the domestic users where the demand is presently high.

In a business-as-usual scenario, R&D activities in wind energy applications will still be pursued using presently available manpower and manufacturing facilities. Wind energy resource measurements (or estimates) will be continued using existing tools and methodologies. Technology information and awareness enhancement will be carried out through locally produced information and promotional materials. Resources will be provided for the manufacture of locally designed SWES units using existing manufacturing facilities and methodologies. The SWES units that will be produced are targeted mainly for the rural areas. As in the past, subsidies may be provided to allow the target users to afford these units. This will not contribute to the sustainability of the efforts to develop the country's wind energy resource. With the existence of the barriers to widespread development and application of SWES, DPRK's effort would not be able to significantly reduce GHG emissions from coal-fired power generation.

Alternative scenario

The envisioned GEF-supported alternative to the "business-as-usual" scenario is the implementation of program for exploiting the country's wind energy resource to support sustainable development. It will build on the existing activities of the government in developing the nascent local SWES industry. In order to effectively and accurately design wind energy projects in the country, the proposed alternative program will enhance the country's technical capacity for measuring and assessing wind characteristics and wind energy potentials. Relevant technical personnel will be trained in wind energy technology and wind energy system design and applications. Apart from carrying out more extensive information dissemination and promotional efforts, the promotion (hopefully leading to the institutionalization) of energy planning and policymaking will be covered in the proposed alternative program. To sustain the program of enhancing the development and application of SWES, the Project will build capacity, and demonstrate, to rural folks the application of SWES for livelihood support and income generation, thereby contributing to the socio-economic development of rural areas. One of the major features of the alternative program is the development of the foreign market for locally made SWES units. This is viewed as very important in ensuring the sustainability of the SWES industry, and is in line with DPRK's decision in the early 90s to encourage exports and attract foreign investors to increase foreign exchange earnings.

Rationale for GEF Financing

The DPRK is a signatory of the UNFCCC and has completed its First National Communications Report (FNCR). It has completed its GHG emissions inventory under the ALGAS project. In these projects, wind energy has been identified as a priority for the near term abatement of GHG emissions. Although efforts have been made to build up the nascent SWES industry, the widespread adoption and operation of SWES is hindered by institutional, technical, financial and informational barriers, which the country is not in a

position to address without outside assistance. This project, in line with GEF Operational Programme No. 6, will address the full range of these barriers and, to the extent possible, remove them. From a geopolitical perspective this project will encourage the DPRK to become part of a global endeavor, as this project will bring about significant global benefits that could otherwise be negated if no external support will be provided.

II. Strategy

Project Rationale

Wind energy development is a stated priority for the DPRK, especially now that the country faces shortages of conventional fuel and electricity, hardship in the rural sector and a rising concern for pollution caused by its one indigenous source of energy, coal. The wind resource is good particularly in the east and west seacoasts. Average speeds for the country are reported at 3 to 4 m/s although reliable data are difficult to find. Attempts at advancing the wind priority have not met with success in part due to lack of information, lack of ability to invest in the manufacturing sector and lack of understanding of wind technology markets.

The project aims to reduce CO₂ emissions by replacing thermal power generation with wind energy. At the same time it will contribute to improving the living conditions and livelihood of people in the rural areas. It will do this by building on Government stated priorities to develop an indigenous SWES industry.

There are good reasons for strengthening the country's manufacturing capability for SWES. There is evidence of a skilled industrial work force, which can be readily adapted to wind energy development and a nascent SWES industry already exists. The project will support the capacity development for SWES for power generation in the 1 – 5 kW range.

National Context

The Government of DPRK has adopted The Law on the Environmental Protection (1986), The Law on Land (1999), The Law on Forestry (1992), The Law on Protection of Beneficial Animals (1998), The Law on Water Resources (1999) and the Law on Preventing Sea Pollution (1997). The Government Policy on Science and Technology adopted in 1991 states that research and development activities in the area of renewable energy such as solar and wind energy should be further intensified to widen their utilization. Research has been carried out in national institutes on wind electric systems for the last 15 years directed by State policy.

The Government in 1993 issued the National Action Plan for Agenda 21 focusing on a transition to sustainable development. This document features the development of the country's renewable energy resource, in particular wind energy as one of the three priorities, along with solar and biomass energy. Later in 2002, as part of its First National Communication Report (FNCR) to the UNFCCC, the DPRK has reiterated its commitment to developing and disseminating wind energy technologies.

At the international arena, DPRK is a party to The Vienna Convention on Protection of the Ozone Layer and its Montreal Protocol as well as the UN Framework Convention on Climate Change and the Convention on Biological Diversity. DPRK acceded to the Stockholm Convention on Persistent Organic Pollutants, UN Convention to combat desertification and Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade.

Project Design and Strategic Considerations

For the last 15 years wind has been considered a potential source of energy in the DPRK especially for off-grid stand-alone services. Although research and demonstration have been conducted these have never led to successful development of a prototype, much less wide dissemination and marketing of the technology. This Project addresses the problems of technology design and commercialization by assisting in the advancement of wind energy at selected points in the research to commercial market development chain.

The technology focus of the Project is small-scale, from 500 W to 5 kW. This size range can meet the demand of rural households as well as small-scale farm activities. Designs will be developed both on a "best practice" basis and on the basis of cost effectiveness with the limitations of DPRK industry in mind. Equipment will be provided to support the manufacture and testing of such small units. Units will be commercially ready before they are demonstrated.

The capacity building focus of the Project strengthens research, feasibility analysis, SWES design, manufacturing and marketing capabilities. The project will coordinate these important elements in wind technology development and dissemination and take a more comprehensive approach to the problems than has been attempted in the past. Full stakeholder participation is important and will be sought at all points over the project to facilitate buy-in. Major emphasis is placed on sustainable replication of the technology and sales of locally made SWES units in the overseas market. Building of capacity will be emphasized amongst stakeholders so that at project conclusion the agencies involved will have an interest in replicating the results. Ways will be sought to further replication.

The rural areas are the main beneficiary targets for this project. From applications ranging from stand-alone units to wind power plant (with power distribution systems), this sector represents the greatest potential for replication because of severe electricity shortages. From a humanitarian perspective it is this sector where the need is greatest for an alternative form of energy. Moreover, the application of the SWES systems will not only sustain the development of the country's nascent wind energy industry, but also contribute to the socio-development of the country's rural areas.

Project Objective, Expected Outcomes and Outputs/Activities

The goal of this Project is the reduction of the annual growth rate of GHG emissions from fossil fuel using activities that will remove the major barriers to the development and widespread implementation of SWES to replace part of the current fossil fuel use in the DPRK. The purpose of the Project is the realization and advancement of the potentials and application of SWES in rural areas in the DPRK.

In order to achieve this purpose, and ultimately contribute to the realization of the Project's goal, the Project is designed to realize the following objective; i.e., the removal of barriers to widespread application of SWES in DPRK by assisting the nascent wind energy sector on the road to full-scale commercialization and improving the domestic market (particularly the rural areas), as well as the potentially viable foreign market, for locally manufactured SWES units.

By the end of the project, the achievement of the following outcomes is expected:

- Regular conduct of assessment of the wind characteristics and energy potentials in the country.
- The feasibility and benefits of wind energy technology applications are widely known to potential users in the country.
- Fully established and promoted market for locally made SWES units both domestically and abroad.

- Locally made SWES units comply with internationally acceptable quality and performance standards.
- Improved manufacturing of locally made SWES units towards internationally accepted production practices and standards.
- Successful showcasing of the installation, operation and monitoring of optimally designed and manufactured SWES units.
- Energy planning and policy making becomes part of the country's development planning system.

The following are the various activities designed to be implemented in order to achieve the proposed outcomes of the project, and the financial inputs needed to enable the required changes.

1. Wind Energy Resource Assessment (Cost: US\$ 177,200; GEF Cost = US\$ 127,200)

- a) Wind Energy (WE) Resource Survey – This will involve the provision of technical capacity building to the Wind Resource Survey Team (WRST) of the Center of Wind Energy Research and Development (CWERD) of the SAOS in the measurement and monitoring of wind parameters. Test equipment will be provided for this purpose to replace the crude instruments that are currently being used by WRST, including training on the use of such instruments. Wind energy resource surveys in 2 provinces where the potentials are high will be carried out. *GEF support is needed for TA in the wind monitoring and measurement and in the provision of wind monitoring instruments.*
- b) WE Resource Database Development – With the data generated in the wind energy surveys in 2 provinces, a wind energy resource database will be designed and develop. CWERD and NCEDC personnel will be trained in the maintenance and operation of the database. *GEF support is needed for the database development to include both software and hardware requirements.*
- c) Development of a WE Monitoring and Simulation Methodology – Using the data in the database, a computerized simulation program will be developed to be used in evaluating and predicting wind energy trends/patterns and characteristics in other areas in the country. *GEF support is required for TA in the development of the computerized simulation program.*
- d) Capacity Building Program for WRST Personnel – This will involve the conduct of in-house training courses for WRST staff members on: (1) wind data gathering, interpretation and analysis; and, (2) WE monitoring and simulation methodologies. The trainees are expected to train other CWERD personnel on the same subjects in the latter part of the project. *GEF support is required for TA in the in-house training courses.*
- e) Initial Wind Mapping - Using national meteorological wind data from the 30 recording stations in the country, work on the wind mapping of the country will be initiated. Together with the data gathered from the wind energy surveys, these will be analyzed to provide monthly national isovent mapping. *GEF support is required for TA in the development of the initial wind maps of the country.*

2. WE Technology Information and Awareness Enhancement (Cost: US\$ 148,800; GEF Cost = 111,800)

- a) NRE Information Center Establishment – This activity will involve the setting up of Center within the NCEDC that will cater to the information needs of the public and prospective investors on SWES. *GEF support is necessary for this activity.*

b) WE Technology Education Program – This activity will involve the conduct of both local and foreign training in the field of wind energy technology. The training program will include the following:

- In-house WE technology training course for NCEDC technical personnel
- Study tour on WE system design and applications for two NCEDC and two ITE personnel
- Short-term fellowship program for one NCEDC and one ITE personnel
- WE technology training course for County Science & Technology Division personnel
- Training course on the maintenance and operation of SWES for Cooperative Farms

GEF support is required for the provision of TA and the implementation of the training program.

c) Integrated WE Information Exchange Service – This activity will be carried out to enhance the provision of information on NRE technologies (including wind energy) to NCEDC and to the target clients of the NRE Information Center. It will involve the development of an information exchange services (local and regional), which will include:

- Publication of a newsletter containing information circulated through the information exchange service
- Monitoring of the performance of WE projects or installations in the country, and preparation of profiles of these
- Subscription to international journals/publications on WE technology
- Preparation of abstracts and/or information notes of relevant articles on WE technology and publication of these in the newsletter and their incorporation in the NCEDC database

GEF support is required for the provision of TA in the design of the information exchange service, as well as in the provision of information materials

d) Information Campaigns on WE Technology Applications in Rural Areas – The design of multi-media campaign materials and publication of information materials on WE technology will form part of this activity. Workshops will be held in different counties for the promotion of the utilization of SWES both for electricity and non-electricity uses. *GEF support is needed to supplement government funds for information campaigns.*

3. Locally made SWES Product Marketing (Cost = US\$ 232,400; GEF Cost = US\$ 96,400)

Development of Domestic Market for SWES – Part of the implementation of the following activities will be the establishment of a SWES Domestic Marketing Team comprised of core staff from the MEI and MoA. This team will assist and facilitate the design and implementation of government efforts to promote the marketing and utilization of SWES, particularly in rural areas.

a) Market Survey of SWES Users – This will involve the conduct of a market study in rural areas and a survey of previous and current users of SWES. *GEF support is required for TA in the design and conduct of survey and evaluation of survey results.*

b) Preparation of SWES Promotional Materials - Promotional materials for locally manufactured SWES units will be prepared and disseminated to the public. *GEF support is requested for the provision of TA in the design and printing of promotional materials.*

- c) SWES Products Demonstration – This will involve the conduct of regular SWES product demonstrations in the country’s Exhibition Hall, as part of the efforts to promote the use of SWES. *GEF support is not necessary.*
- d) Promotional Campaigns in Cooperative Farms – The Cooperative farms are among the prospective users of SWES. This specific activity is aimed at convincing these farms to use SWES and for that matter campaigns using the promotional materials that were developed under this component of SWEDPRA to these target users will be carried out under this activity. *GEF support is not necessary.*
- e) SWES Local Market Performance – This activity will involve the conduct of regular assessments and corresponding upgrading of the program on developing the local market for SWES. Recommendations for improving and/or sustaining the program will be provided. *GEF support is required for TA in the market assessment.*
- f) Sustainable Local Marketing Program – This activity will develop and recommend a program that will be approved by the Government that will ensure the sustainability of the local market for SWES. *GEF support is required for TA in the marketing program design.*

Development of Overseas Market for SWES – A SWES Overseas Marketing Team comprised of core staff from the MEI will be established. This team will assist and facilitate the design and implementation of government efforts to promote the local manufacturing and export of SWES products. It is expected that the Ministry of Foreign Affairs will fully support this endeavor. The activities will build on lessons learned from the International Economic Cooperation Programme (IECP).

- a) Preparation of SWES Promotional Materials for Foreign Markets - Promotional materials for locally manufactured SWES units will be prepared and disseminated abroad through the overseas offices of the DPRK. Inputs from the Research Institute for External Economies will be utilized in this activity. *GEF support is requested for the provision of TA in the design and printing of promotional materials.*
 - b) Capacity Building on International Trade and Foreign Investment Promotion – This activity will build on the experience derived from the establishment of the Rajin Business Institute that was established under the IECP. It will involve the conduct of a study tours for two SAOS technical personnel on foreign investment promotion and in the establishment of business partnerships for export of locally made industrial products (e.g., SWES units). *GEF support is required for the provision of TA in the design and the conduct of the study tour.*
 - c) Business Partnership Establishment – The Project will engage the services of international experts who will assist the overseas offices of DPRK in the establishment of business partnerships with other countries in the manufacturing and sales of locally made SWES units. *GEF support is required for the provision of TA in the establishment of business partnerships.*
4. SWES Design Improvement (Cost = US\$ 218,900; GEF Cost = US\$ 143,900)
- a) Performance Assessment of Installed SWES Units – This activity will involve the evaluation of the performance of existing installed SWES units in the country. This will cover SWES units installed in urban and rural areas irrespective of uses (electricity and non-electricity), and whether these are imported or locally made. An evaluation report will be prepared and the results will be

incorporated in the NCEDC database and the NRE Information Center's newsletter. *GEF support is needed for the provision of TA in the performance assessments.*

- b) Performance Evaluation of Locally Made SWES. – Performance testing of selected locally made SWES units at the shop floor will be conducted based on internationally accepted test procedures. SWEDPRA consultant(s) will provide adequate on-the-job training to the local manufactures and SAOS personnel on how to carry out the performance testing. *GEF support is needed for the provision of TA in the performance testing.*
 - c) Identification of Potential Improvements and New Designs – Based on the findings from the performance assessments of installed SWES units and performance testing of selected locally manufactured SWES units, potential improvements and new designs will be determined and recommended. *GEF support is needed for the provision of TA in the identification of design improvements.*
 - d) Technical Capacity Building on Improved SWES Design – This activity will involve the organization and conduct of a study tour for 2 technical personnel (one ITE, one MEI) on the design and manufacturing of SWES components. In addition, a training course for local SWES manufacturers on the optimum design and manufacturing of SWES components will also be designed, organized and implemented. *GEF support is needed for the provision of technical capacity building.*
 - e) Establishment of Optimum Designs of SWES Components – In this activity, optimum designs for four major SWES components will be developed. These components are the wind turbine blade, wind turbine generator, inverter and deep cycle battery. *GEF support is needed for the provision of TA in the optimum design development.*
 - f) WE System Equipment Standards Setting – In this activity, WE system equipment standards will be proposed, evaluated and set. The SWEDPRA experts will evaluate and determine the appropriate standards that will apply to locally made SWES units considering target realistic performance, material of construction and local wind conditions. *GEF support is needed for the provision of TA in WE system equipment standards setting.*
 - g) SWES Design Improvement Program Results Evaluation and Dissemination – This activity will involve the profiling of the operation of the optimally designed SWES units. A national workshop for presenting the results of the SWES Design Improvement Program will also be organized and held. *GEF support is needed for conduct of workshop.*
5. SWES Manufacturing Improvement (Cost = US\$ 436,500; GEF Cost = US\$ 128,500)
- a) Assessment of Local SWES Manufacturers' Capabilities – This activity will involve the conduct of an assessment of the capacity (technical, human, financial, etc.) of local SWES manufacturers including their manufacturing facilities. *GEF support is needed for TA in the conduct of the assessments.*
 - b) Improvements in SWES Manufacturing Process – The identification of potential improvements in the present SWES manufacturing process will be the main focus of this activity, with a view of improving the local capability to produce SWES units of capacity up to 5 kW. Expert advice will be provided to assess and adjust design and specification criteria to meet at least regional "best

practices". Recommendations to modify manufacturing and assembly techniques will be provided where required. *GEF support is needed for TA in the identification of potential improvements.*

- c) Capacity Building for Improved SWES Manufacturing – This activity will involve the provision of technical capacity building to local manufacturers in improving their processes for manufacturing SWES units. *GEF support is needed for TA in the conduct of the capacity building exercises.*
 - d) Implementation of the Optimum Design of SWES Components – This activity will involve the demonstration of the application of optimum designs of wind turbine blades, wind turbine generator, inverter and deep cycle battery. Prototypes of these SWES components will be produced, bench-tested, and monitored will be carried out (See Component 6). Baseline funds will be used for the provision of demo units of 100 W to 1 kW capacities. Recognizing the higher benefits that can be derived from the use of larger capacity units, GEF incremental funds will be provided for the provision of the demo units of 3 kW and 5 kW capacities. *GEF support is needed for TA in the prototype manufacturing, including the manufacture of some demo prototypes.*
 - e) Establishment of SWES Testing Facility - To support the development of the SWES industry, a SWES Testing Facility will be designed, specifying the testing facility requirements. Testing procedures will be developed for all aspects of SWES unit design and manufacturing. *GEF support is needed for TA in the design of the testing facility and the development of testing procedures*
6. SWES Technology Application Demonstration (Cost = US\$ 142,900; GEF Cost = US\$ 60,900)
- a) Demonstration Site Selection – Based on the wind energy surveys and market survey of SWES users, potential demonstration sites with proven wind energy potentials will be identified. A set of selection criteria will be developed based on various parameters like availability, frequency and speed of wind; electricity demand, and willingness to purchase SWES. The number of SWES technology demonstrations will depend on demonstration opportunities, potential productive and/or socio-economic development uses and overall budget. *GEF support is needed for TA in the selection of demonstration sites.*
 - b) Training Course on Livelihood/Productivity Projects – This activity will involve the conduct of training courses on the productive uses of RE-based electricity for income generation and socio-economic development in rural areas for: (1) local government institutions; (2) farm cooperatives; and, (3) rural folks, in the selected sites. *GEF support is needed for the experts that will carry out the training courses.*
 - c) Identification of Potential Productive Uses and Livelihood Support Activities in the Demonstration Sites - This will entail the identification and evaluation of potential productive use applications and other socio-economic development activities (aside from household activities) in the different demonstration sites. These would most likely be in line with the operations of the farm cooperatives. *GEF support is needed for TA in the identification and evaluation of potential productive use applications and other socio-economic development activities.*
 - d) Baseline Data Establishment – The selected sites will be evaluated to determine average wind characteristics, electricity demands in households and farms (including non-electricity applications), and some basic economic situation data. *GEF support is needed for TA in determining the baseline data.*

- e) Scheme Design – For each selected site, the appropriate SWES applications (e.g., stand-alone, wind farm type village power system) will be determined, evaluated and designed. All system and operation requirements will be identified and taken into consideration in the design, including the systems that will utilize the electricity (aside from household activities), and how the applications will be implemented, monitored and evaluated. *GEF support is needed for TA in the design of the demonstration schemes.*
- f) SWES Installation – This major activity will involve the installation of the SWES units in the selected sites. With local labor, the demonstration units will be installed. The local population in farm cooperatives will be involved in the installation to improve acceptance of the technology. *GEF support is not necessary.*
- g) SWES System Operation and Performance Monitoring – This will involve the monitoring of the electrical outputs and operating hours of the demonstration units for at least 6 months. The local people will be involved in the monitoring and maintenance of the SWES units in their localities. After a year, the operating and energy production performances of the demonstration units will be evaluated, as well as the impacts of the utilization of electricity generated from the SWES units on the socio-economic development of the demonstration sites. *GEF support is not necessary.*
- h) SWES Technology Application Demonstration Evaluation - This activity will involve the profiling of the operation of each demonstration sites. A national workshop for presenting the results of the SWES Technology Application Demonstration, including the performance of productive use applications, and their impact on socio-development of the demonstration sites will be organized and held. *GEF support is needed for conduct of workshop.*

7. Energy Planning and Policy Formulation (Cost = US\$ 63,300; GEF Cost = US\$ 56,300)

- a) Assessment of the Training Needs in Energy Planning and Policy Making – The capacity of the NCEDC personnel in energy planning and policy making particularly in the area of RE development and utilization will be evaluated and a recommended program for capacity development will be prepared. *GEF support is needed for TA in the conduct of the assessments.*
- b) Conduct of Energy Planning Training Courses – Two sets of training courses will be organized and conducted, foreign training and in-house training. Three foreign training courses will be conducted (2 persons) each on: (1) Energy Planning and Policy Making; (2) Energy Data Gathering and Analysis, and Energy Balance; and, (3) RE Project Development, Evaluation and Packaging. Correspondingly, in-house training courses for NCEDC technical personnel on the same set of subjects will also be conducted. The recipients of the foreign training will be conducting the in-house training courses. *GEF support is needed for TA in the conduct of the foreign training activities.*
- c) Conduct of Training on Project Management and Economic Feasibility Analysis. – This special activity will be for the Project Development Team in NCEDC. A foreign training for 2 NCEDC staff members in these 2 subjects will be conducted. As in the other training activities, the recipient of the training abroad will provide the in-house training course on these 2 subjects for the rest of the PDT members and selected NCEDC personnel. *GEF support is needed for TA in the conduct of the foreign training activities.*
- d) Policy Making and RE Project Development – This activity is intended to test the application of the capacity building activities that will be conducted under this project component. NCEDC will

develop, formulate and recommend these policies. Workshops for presenting recommended policies and RE project development and applications will be conducted. *GEF support is needed to supplement government budget for policy-making and conduct of workshops.*

Risks and Assumptions

The project has the following associated risks. The following describes these risks along with the suggested method of mitigating them:

- a) As this is one of the first externally funded RE initiatives in the DPRK, there will undoubtedly be problems encountered with the establishment of the project and in its implementation.

Mitigating Actions: It will be very important to clearly state all prior obligations and project conditions expected of the DPRK. Clarifying these in advance will allow the country to respond and to meet expectations. The project has also been designed so that targeted outside assistance serves to assist, rather than direct, project results suited to national priorities. This permits the autonomy important to the country. The provision of GEF funds is contingent to the following:

- The participation of responsible individuals from key State agencies (including the ones above) should be assured by the DPRK on all operations groups. The DPRK should provide adequate indication of appropriate technical and/or decision-making qualifications of all individuals selected for their roles.
- Cost sharing responsibilities of DPRK in terms of time provided by National experts and in terms of expenditures for equipment or other services such as transportation shall be agreed to by the DPRK prior to the project. The requirements of adequate proof of time spent and other expenditures shall be established prior to the project.
- Prior to project inception, an institutional mechanism shall be developed for the project and each of the operations groups for the full and transparent management of project activities and finances accountable to the UNDP.

Risk Status: Medium

- b) An economy organized according to centrally planned allocation and quotas has little understanding of market principles espoused by the GEF to create sustainability. At the same time it is important for the DPRK proponents to recognize the importance of sustainability as a guiding principle in project implementation. There is a risk that this principle will not be clearly understood or adhered to.

Mitigating Actions: An important prior obligation is the participation of State agencies concerned with the dissemination of rural energy technology such as the MEPI and MoA. The DPRK should ensure all possible assistance to fully promote and expand the use of wind. The provision of GEF funds is contingent to the following:

- The travel of county and farm officials is permitted and encouraged to pilot sites.
- The DPRK provides for the cost of SWES production and manufacturing units.
- The DPRK shares in the cost of the SWES demonstration units.

Risk Status: Medium

- c) A comprehensive assessment of DPRK manufacturing capabilities pertaining to small wind systems could not be made in connection with Project Definition. In order for significant investments to be

made for manufacturing equipment and to ensure the likelihood of sustainability it is essential that both the designs for wind equipment and the purchase of manufacturing equipment be in accordance with actual industrial capabilities. There is a risk both for these capabilities to be over-stated and for GEF funds to be inadequate to fully develop a manufacturing facility.

Mitigating Actions: The Project calls for appropriate design procedures and for a thorough investigation of industrial capacity and needs. Outside assistance will be used for this. The DPRK is cost sharing the development of a manufacturing facility including the provision of a dedicated building and basic production equipment. The provision of GEF funds is contingent to the following:

- DPRK guarantees the provision of an operational wind electric manufacturing facility with basic equipment and material for commercial production of SWES.
- DPRK agrees to the participation of GEF experts in the identification and selection of appropriate manufacturing agencies and demonstration sites.

Risk Status: Low

- d) To ensure sustainability of the industry, it is proposed that overseas markets for locally made SWES units will be a major project sub-component. It was made known during project design that DPRK does not plan or target this objective of developing overseas market for DPRK-made SWES units if there is not GEF support. This is because it is not confident about the quality of the SWES units that it currently produces. Much industrial production in DPRK has ceased altogether due to the absence of cheap energy inputs and also because the indiscriminating markets of the former socialist countries no longer exists. National capacity for investment promotion still remains limited. There might be a possibility that with limited than expected GEF contribution to the setting up of SWES manufacturing facilities, which the country initially expected, the development of overseas markets will not be carried out.

Mitigating Actions: The project will build on, and make use of, existing capacity of the Rajin Business Institute and the Research Institute for External Economies in the establishment of overseas markets for locally made SWES products. Moreover, the project will also consult with DPRK-established Rajin Free Economic and Trade Zone and the International Economic Cooperation Programme in establishing capacity in dealing with international markets and trade.

Risk Status: Medium

The overall risk status is Medium.

Sustainability

Initially, the indications for the sustainability of Project results are high:

- There is suppressed demand for electricity in rural cooperatives.
- Basic infrastructure and equipment will be met by the Project, so future expenditure on capital outlays will be low and primarily for cost recovery items.
- Nascent wind energy expertise and manufacturing capability exists. The Project will further strengthen and focus this ability.
- National priorities for wind development support continued development of the resource.

- The Project supports the commercialization of a tested and proven technology attractive to the market and appropriate to manufacture in the DPRK. The Project focuses on building capacity in country for replication of an indigenous technology.
- The Project supports the development of markets for sustainable dissemination of SWES technology.

In order to ensure long-term sustainability, the project will also involve the development of an overseas market for locally made SWES. This is in line with the DPRK Government's objective of achieving long-term economic modernization and development. The inclusion of productive use applications in the demonstration schemes will improve the awareness of the consumers (particularly in the rural areas) in the benefits of utilizing RE-based energy systems like the SWES in improving their welfare and well-being, as well as reducing poverty.

Social Impact

The Project will have significant positive social implications. As a project that seeks to develop the utilization of RE (particularly wind energy), it will produce tangible results such as the installation of SWES units and the provision of electricity to rural areas which are currently suffering from acute power shortages. These demonstration schemes will promote and accelerate the utilization of indigenous and environmentally friendly energy resources to provide energy/electricity services to the rural folks (and even in urban areas) of DPRK, particularly those without access to electricity in remote islands and areas, and promote livelihood support activities from the RE services. In addition, the Project is expected to facilitate the effective deployment of SWES and possibly other RETs, which can greatly reduce the DPRK's GHG emissions from fossil fuel utilization, and mitigate the health and environmental hazards posed by the consumption of fossil fuels. This Project will contribute to the improvement of people's livelihoods and living conditions in rural DPRK.

Replication Potential

National wind data have not been readily available and the Institute of Thermal Engineering (State Academy of Sciences) can only make rough estimates of the wind energy potentials. In any case these technical estimates do reflect cost-effective potential. Wind energy potential is estimated to be good in coastal and mountainous areas of the country where the average wind speed is at about 3 to 4 m/s annually. There is a rural population of about 8.8 million or 1.8 million households, which are the target users of SWES. Sources estimate an average household consumption of between 200 to 400 kWh a year. Other uses such as domestic water pumping, schools, clinics and bathing facilities could add 200 kWh per household-year. If 10% of all households replace uncertain grid electricity with a wind battery and/or wind pumping systems, about 108 GWh of coal-generated electricity would be replaced. This translates to a reduction of about 137 kilo tonnes of CO₂ emissions annually.

The replication potential goes beyond the direct replication of SWES for rural households. SWES (for the most part imported units) currently appear on top of buildings in urban areas. Assistance in removing barriers for an emerging SWES industry will mean this industry can expand its markets domestically and abroad and its capabilities to larger wind devices.

III. Results and Resources Framework

Project Strategy	Success Indicators			Means of Gauging Success	Assumptions/Resources ¹
	Description ²	Baseline ³	Target		
1. Project Goal					
1. The annual growth rate of GHG emissions from fossil fuel using activities is reduced through the removal of the major barriers to the development and widespread implementation of small-scale wind energy systems (SWES) to replace part of the current fossil fuel use in the DPRK.	1.1.1. GHG emissions reduction by end of project (EOP), kilo tons (compared to when no interventions are implemented).	0	100	Documentation of annual data on fossil fuel and WE utilization for power generation and heating from the Ministry of Electricity Power Industry (MEPI). Documentation of estimates of annual GHG emissions reduction from the replacement of fossil fuel by SWES in power generation and heating.	Monitoring activities under the project on wind energy utilization and GHG emissions are fully supported and implemented. Reports of estimates of GHG emissions reduction from various sources are consistent.
2. Project Purpose					
2. The potentials and application of SWES in rural areas in the DPRK are significantly achieved and advanced.	2.1.1. Annual growth in installed capacity of SWES (electricity and non-electricity) in the rural areas of the country by EOP, %.	0	30	Documentation of the number of cooperative farms and rural households that installed SWES.	Compliance of SWES users to the reporting requirements of the proposed SWEDPRA to NCEDC is assured.
	2.1.2. Cumulative installed SWES capacity in the rural areas of DPRK by EOP, kW.	70	700	Documentation of the annual inventory of SWES installed capacity from the NCEDC and CWERD.	
3. Project Outcomes & Outputs					

¹ The amounts of resources (in US\$) refer to the allocated resources during the Project resumption.

² Timing of expected results refers to the schedule during the Project resumption.

³ Figures inside the parenthesis refer to results accomplished between October 2005 to the present (before the Project resumption).

Component 1. Wind Energy (WE) Resource Assessment Outcome 3.1: Regular conduct of assessment of the wind characteristics and energy potentials in the country	3.1.1. No. of wind energy resource assessments conducted each year in the country starting Year 1.	0	5	Documentation of wind energy resource assessments prepared by the Institute of Geography (SAOS).	The wind resource mapping of the country is fully sanctioned by the government.
	3.1.2. No. of official wind maps produced by EOP.	0	5		
3.1.1. Completed WE resource data measurements	3.1.1.1. No. of comprehensive WE resource surveys completed by EOP.	0	2	Documentation of data gathered by the Institute of Geography (SAOS).	Procured measuring devices continue to provide accurate and reliable data.
3.1.2. Completed and operational WE resource database	3.1.2.1. Comprehensive WE resource database covering 2 provinces developed by Year 1.	0	10. 2011	Database installed at the CWERD's Information center. Database users survey	Adequate and up-to-date database equipment are provided.
	3.1.2.2. Cumulative number of researchers and investors that use the database by EOP.	0	50		
3.1.3. Completed and applied WE monitoring and simulation methodology	3.1.3.1. A suitable methodology for WE monitoring and simulation completed by Year 1 and regularly applied.	0	10. 2011	First edition of the guidebook on the use of the methodology for monitoring and simulation.	Wind specialists in the country will participate in this activity. 20,000
	3.1.3.2. Cumulative no. of acceptable simulation results achieved and used in wind maps by EOP.	0	90	Yearly updates of the methodology as printed in the guidebook.	This will be a regular and continuous activity of the CWERD. Assessment of international expert showing that the methodology developed is according to international standards.
	3.1.3.3. Cumulative no. of revisions/improvements on the methodology for WE monitoring and simulation by EOP.	0	83		

3.1.4. Completed capacity building program for WRST members	3.1.4.1. No. of personnel trained overseas on wind data gathering, interpretations and analysis by Year 1	0	5	Documentation of the training modules on wind data gathering and analysis, and list of trainees. Results of Post-Training surveys held 6 months before EOP.	Relevant personnel are interested and willing in participating in the training and in applying the knowledge/know-how they learn. 10,000
	3.1.4.2. No. of overseas trained personnel that are actively working on WE resource assessment activities by EOP.	0	3		
	3.1.4.3. No. of personnel trained overseas on the methodology of WE monitoring and simulation by Year 1	0	5	Documentation of the training modules on wind energy monitoring and simulation, and list of trainees. Results of Post-Training surveys held 6 months before EOP.	Relevant personnel are interested and willing in participating in the training and in applying the knowledge/know-how they learn. 10,000
	3.1.4.4. No. of overseas trained personnel that are actively working on WE monitoring and forecasting activities by EOP.	0	2		
	3.1.4.5. No. of locally trained personnel that are actively working on WE resource assessments and forecasting by EOP.	0	75	Documentation on the training provided by WRST members to other SAOS staff.	Follow-up trainings for other SAOS staff members are held. 7,500
3.1.5. Completed and approved wind maps	3.1.5.1. No. of preliminary wind maps for the country completed by Year 2.	0	1	Wind maps prepared by the WRST. Official WE project documents. SWEDPRA project reports.	Government approves the publication of the wind maps.
	3.1.5.2. No. of completed wind maps by EOP.	0	1		
	3.1.5.3. No. of WE projects that were designed based on the completed wind maps by EOP.	0	10		
Component 2. WE Technology Information and Awareness Enhancement Outcome 3.2: The feasibility and benefits of wind energy technology applications are widely known to potential	3.2.1. Cumulative no. of successfully conducted information dissemination and awareness raising activities for WE system users, developers and manufacturers in the country by EOP.	0	5	Documentation of the program/system of information dissemination and promotion on the application of WE systems. Survey of WE system users, developers and manufacturers.	Government sanctions the information and awareness enhancement program.
	3.2.2. No. of WE systems users, developers and manufacturers in the	0	100		

users in the country	country that are planning to implement WE projects by Year 1.				
3.2.1. Established NRE Information Center in NCEDC	3.2.1.1. Information Center on NRE matters established at the NCEDC and functioning by Year 1.	0 (1)	6. 2011	Documentation of the Official inauguration of the Information Center. Reports on services provided by NREIC Client surveys	NRE Information Center established in 2005 continues to disseminate the WE technology and information exchange service.
	3.2.1.2. Average no. of clients served by the NREIC starting Year 1.	0	2,000		
	3.2.1.3. Average percentage of clients that are satisfied with the services provided by the NREIC by EOP.	0	90		
3.2.2. Completed WE Technology Education Program	3.2.2.1. No. of personnel trained overseas (study tours and fellowships) on WE system design and applications by Year 1.	0 (2)	5	Satisfactory report on study tour; positive contribution by the study tour participants to subsequent project activities. Results of Post-Training surveys held 6 months before EOP.	The 5 staff of SAOS who attended the study tour to China & Germany conducted in July 2006 are applying their knowledge on commercial design and application of WE systems. 10,000
	3.2.2.2. No. of overseas trained personnel that are actively working on commercial design and application of WE systems by EOP.	0 (2)	5		
	3.2.2.3. No. of personnel locally trained on WE technology and WE system design and applications by Year 1.	0	50	Satisfactory report on fellowship awardees and their positive contribution to subsequent project activities. Results of Post-Training surveys held 6 months before EOP	Relevant individuals/institutions in other countries are interested in sharing their knowledge and know-how in WE technology. 3,000
	3.2.2.4. No. of locally trained technical personnel on WE system design and applications that are actively working on commercial WE system design, manufacturing and applications by EOP.	0	150		

	3.2.2.5. No. of completed comprehensive training courses on the maintenance and operation of SWES for rural area people (Cooperative Farms) by Year 1.	0	2	Satisfactory report on the SWES operation and maintenance training course and the documentation of the training course materials.	Target groups are interested and willing in participating in the training and in applying the knowledge/know-how they learn.
	3.2.2.6. No. of trained personnel that are actively involved in the operation and maintenance of SWES in rural areas by EOP.	0	150	Results of Post-Training surveys held 6 months before EOP.	3,000
3.2.3. Established and operational Integrated WE Information Exchange Service	3.2.3.1. A fully functioning information exchange services (IES) program operated by CWERD starting mid-Year 1.	0	6.2011	Documentation of the program operation, services provided, and comments of clients.	Government allows receipt of technical information from abroad, e.g., internet.
	3.2.3.2. Average no. of users of the CWERD-operated IES program starting Year 1.	0	100	Reports on the IES operations of the CWERD	
	3.2.3.3. Average percentage of users that are satisfied with the IES program by EOP, %.	0	90	Client surveys	
	3.2.3.4. No. of issues of newsletter containing information circulated through the IES (local/ regional) starting Year 1.	0	8	Published newsletters distributed to the target readers.	Government encourages public publication of technical reports.
	3.2.3.5. Average percentage of readers that consider the newsletter very useful by EOP, %.	0	90	Results of readership surveys.	2,000
	3.2.3.6. No. of WE projects or installations in the country monitored each year by CWERD starting Year 2.	0	At least 10	Documentation on the monitoring reports.	Government encourages public publication of technical reports.
	3.2.3.7. No of profiles of monitored WE projects or installations in the country prepared and updated annually by CWERD starting Year 2.	0	10	Published articles and/or profiles of WE projects implemented in the country.	Government encourages public publication of technical reports.
					2,000

	3.2.3.8. Average % increase in information materials on WE technology incorporated each year in the CWERD database starting Year 2.	0	30	Database compiling information on WE technology installed at NCEDC Information Center.	Database is used by researchers, scientists, and manufacturers.
	3.2.3.9. No. of Journals/Publications on WE Technology received regularly by the Information Center each year starting Year 1.	0	10	Compilation of journals/publications on WE technology.	Government allows the importation of foreign technical journals/publications. 2,000
	3.2.3.10. No. of Abstracts/Information Notes of relevant articles on WE Technology annually prepared by CWERD, printed in the newsletter and incorporated in the CWERD database starting Year 2.	0	50	Compilation of abstracts and information notes. Newsletters and NCEDC database.	NCEDC staff regularly, and are technically capable to, carry out abstracting of technical articles.
3.2.4. Completed Information Campaigns on WE technology applications in Rural Areas	3.2.4.1. No. of sets of printed information materials on WE technology promotion produced and disseminated bi-annually starting Year 1.	0	30	Promotional materials on WE technology. Results of client surveys and/or readership surveys.	Government endorses the use of SWES. 2,000
	3.2.4.2. Average percentage of recipients of printed materials each year that find them very useful or informative in promoting WE technology starting Year 1.	0	90		
	3.2.4.3. No. of designed multi-media campaign materials on WE technology applications produced and disseminated each year starting Year 1.	0	10	Multi-media campaign materials shown in print and broadcast media.	Government endorses the use of SWES. 3,000
	3.2.4.4. No. of workshops promoting the utilization of SWES for electricity and non-electricity applications conducted by end Year 1.	0	3	Proceedings of the workshops.	Relevant individuals/institutions are interested to participate and have relevant knowledge to share. 3,000

	3.2.4.5. No. of households that planned to install SWES each year starting Year 1.	0	1,000	Results of SWES users surveys. Results of manufacturers surveys.	
	3.2.4.6. No. of manufacturers that plan to invest on the manufacturing and sales of SWES by EOP.	0	6		
Component 3. Development of Domestic and Overseas Market for Locally-made SWES Outcome 3.3: Fully established and promoted market for locally made SWES units both domestically and abroad.	3.3.1. No. of local SWES manufacturers in the country by EOP.	0	6	Annual orders and sales of locally made SWES in the domestic market. List of local distributors and their volume of sales.	Domestic users understand the benefits of SWES and have the disposable income to invest on these. Capacity to manufacture low cost and reliable SWES is adequate.
	3.3.2. Average annual local volume of sales of SWES units by EOP, US\$ million.	0	0.15		
	3.3.3. No. of local SWES manufacturers exporting SWES products by EOP.	0	2	Annual orders and sales of DPRK made SWES in the foreign market. List of foreign buyers and their volume of orders.	Foreign business partnerships are established for the local manufacture of SWES to serve the export market.
	3.3.4. Average annual value of exported SWES products by EOP, US\$ million.	0	0.1		
3.3.1. Established Domestic SWES Marketing Team.	3.3.1.1. Established SWES Domestic Marketing Team comprised of core staff from the MEI and MoA by mid-Year 2.	0	4.2012	Established SWES Domestic Marketing Team.	Government supports local sales of SWES. 3,000
3.3.2. Completed market study in rural areas and survey of previous and current users of SWES.	3.3.2.1. Completed survey results and evaluation by mid-Year 1.	0	3.2011	Documentation of the survey results and recommendations.	Target groups will cooperate in the conduct of the survey.
	3.3.2.2. No. of surveys conducted and evaluated each year starting Year 3.	0	3		5,000
3.3.3. Prepared, published and disseminated promotional materials for locally manufactured SWES.	3.3.3.1. No of sets of promotional materials for locally made SWES units produced and disseminated by end-Year 1.	0	10	Promotional and advertisement materials for locally made SWES. SWES sales reports. SWEDPRA project reports.	Government endorses the use of SWES. 1,000
	3.3.3.2. No. of orders placed for SWES units each year starting Year 1	0	1,000		
3.3.4. Completed SWES product demonstrations in Exhibition Hall.	3.3.4.1. Cumulative no. of SWES product demonstrations conducted by EOP.	0	5	Schedule and documentation of the conduct annual SWES product demonstrations.	Government endorses the use of SWES. 6,000

	3.3.4.2. No. of orders placed for SWES units annually starting Year 1.	0	At least 1,000	Annual orders and sales of locally made SWES in the domestic market. List of local distributors and their volume of sales.	SWES manufacturing industry will grow after UNDP-GEF intervention.
3.3.5. Completed SWES promotional campaigns to Farms	3.3.5.1. Cumulative no. of annual promotional campaigns conducted for Cooperative Farms starting Year 1.	0	3	Schedule and documentation of the conduct annual SWES product demonstrations.	Government endorses the use of SWES.
	3.3.5.2. No. of orders placed for SWES units by cooperative farms annually starting Year 1.	0	At least 60	Annual orders and sales of locally made SWES in Cooperative Farms. List of local distributors and their volume of sales.	SWES manufacturing industry will grow after UNDP-GEF intervention.
3.3.6. Completed assessment and program upgrading on development of the local market for SWES.	3.3.6.1. No. of major suggestions based on assessments that are implemented each year to improve and/or sustain the program starting mid-Year 2.	0	At least 10	Quality and performance inspection reports from SWES manufacturers.	Quality inspections of manufactured SWES are regularly carried out and quality requirements are strictly enforced.
3.3.7. Developed and operational sustainable local marketing program of locally made SWES.	3.3.7.1. Govt-approved program for the sustainable marketing of locally made SWES implemented by Qtr2/Year 2.	0	2	Official launching of the program for sustainable marketing of locally made SWES both in the domestic and foreign markets. SWES sales reports. SWEDPRA project reports.	SWES manufacturing industry will grow after UNDP-GEF intervention.
	3.3.7.2. Average annual sales volume in the local SWES market by EOP, US\$ million.	0	0.15		
3.3.8. Developed and operational Overseas Market for SWES	3.3.8.1. Established SWES Overseas Marketing Team comprised of core staff from the MEI by start of Qtr2/Year 2.	0	6.2012	Established SWES Overseas Marketing Team.	Ministry of Foreign Affairs will cooperate on this endeavor. Build on lessons learned from the International Economic Cooperation Programme. 5,000

	3.3.8.2. No. of identified feasible overseas markets (i.e., countries) for DPRK-made SWES units by end-Year 2.	0	1~2	Report on analysis and investigation of overseas market and determination of the niche and target market of SWES DPRK product.	Existence of countries that have requirements for DPRK-made SWES. 30,000
	3.3.8.3. Average annual volume of sales of locally-made SWES units in the export market by EOP, US\$ million.	0	0.1		
3.3.9. Developed, published and disseminated promotional materials for locally-made SWES in overseas offices of the DPRK.	3.3.9.1. No. of sets of promotional materials for locally made SWES units produced and disseminated overseas by Year 3.	0	5	Promotional and advertisement materials for locally made SWES in countries with business/diplomatic relations with DPRK. Reports on overseas trading activities.	Inputs from the Research Institute for External Economies and from the country's overseas trade offices are expected. 3,000
	3.3.9.2. No. of DPRK overseas offices that are engaged in the commercial sales of locally made SWES units abroad by EOP.	0	1~2		
3.3.10. Completed Capacity Building on International Trade and Foreign Investment Promotion	3.3.10.1. No. of personnel trained overseas on foreign investment promotion and business partnerships for the export of locally made SWES by Year 2.	0	5	Satisfactory report on study tour; positive contribution by the study tour participants to the development of foreign markets for locally made SWES. Results of Post-Training surveys held 6 months before EOP.	Build on whatever success gained from the Rajin Foreign Technology Service Center under the International Economic Cooperation Programme. 10,000
	3.3.10.2. No. of overseas and locally trained personnel that are actively working on foreign investment promotion and business partnerships for SWES exports by EOP.	0	50		
	3.3.10.3. No. of personnel trained abroad on international trade, business strategy & partnerships by end-Year 2	0	5		
	3.3.10.3. No. of overseas and locally trained personnel that are actively working on international trade, business strategy & partnerships by EOP.	0	50	Results of Post-Training surveys held 6 months before EOP.	12,000
3.3.11. Established business partnerships with other countries in the manufacturing and sales of SWES.	3.3.11.1. No. of overseas companies that signed business partnerships with DPRK in the export and sale of SWES units by EOP.	0	1~2	Annual orders and sales of DPRK made SWES in the foreign market. List of foreign buyers and their volume of orders.	Relevant inputs/leads from the country's overseas trade offices are expected. 18,000
	3.3.11.2. Average annual volume of trade	0	0.1		

	achieved in the export market from the business partnerships by EOP, US\$ million.				
Component 4. SWES Design Improvement Outcome 3.4: Locally made SWES units comply with internationally acceptable quality and performance standards.	3.4.1. No. of local SWES designs that meet international design and performance standards by EOP. 3.4.2. No. of local SWES manufacturers that are qualified to produce internationally-accepted SWES designs by EOP.	0 0	3 2	Quality and performance inspection reports from SWES manufacturers. Official certification of manufacturers' qualification.	Local SWES manufacturers understand the benefits of optimally design products both for domestic and foreign sales.
3.4.1. Completed assessment of the current performance of installed SWES.	3.4.1.1. No. of completed assessment reports on the operating performance of installed SWES units in DPRK by Year 3.	0 (1)	15	Documentation of the assessment report.	Cooperation is provided by the owners of locally installed SWES.
3.4.2. Completed performance evaluation of locally made SWES.	3.4.2.1. No. of completed performance evaluations by Year 3. 3.4.2.2. % of locally produced SWES units that complies with internationally-accepted design & performance standards by EOP.	0 (1) 0	7 60	Documentation of the assessment report. SWEDPRA project reports.	Cooperation is provided by the owners of locally manufactured SWES.
3.4.3. Documented potential improvements and new designs for locally made SWES.	3.4.3.1. No. of recommendations on potential improvements and new designs for locally made SWES submitted to the State Design Department by Year 2. 3.4.3.2. No. of recommendations on potential improvements and new designs that were implemented by EOP.	0 (2) 0	3 3	Documentation of the recommendation report. Evaluation report on SWES design.	Provision by Foreign experts to local experts with advanced technology for improved and optimum design of SWES.
3.4.4. Completed technical capacity building assistance to local manufacturers in the improvement of SWES design.	3.4.4.1. No. of personnel trained overseas on the design of SWES components by EOP. 3.4.4.2. No. of overseas and locally trained personnel that are actively engaged in the commercial design of SWES units by EOP.	0 (4) 0 (4)	4 30	Satisfactory report on study tour; positive contribution by the study tour participants to the project activities related to design improvements in locally made SWES.	Trained personnel from overseas are transferring their knowledge to local personnel.

	3.4.4.3. No. of local manufacturers trained on the optimum design of SWES components by Year 3.	0 (2)	6	Satisfactory report on the optimum SWES design and manufacturing training course and the documentation of the training course materials.	Local experts are interested in we technology and know-how exchange among each other.
	3.4.4.4. No. of local manufacturers that are qualified and capable to design SWES units that comply with international design & performance standards by EOP.	0	2		
3.4.5. Established optimum designs for various SWES components.	3.4.5.1. No. of optimal turbine blade designs developed by local engineering & manufacturing firms by Year 3.	0	3	Documentation of optimum turbine blade designs developed and presented by local engineering & manufacturing firms.	International experts will teach/guide local experts on the conceptualization and preparation of design. 30,000
	3.4.5.2. No. of optimal designs for wind turbine, generator and inverter developed by local engineering & manufacturing firms by Year 3.	0	3	Documentation of optimum wind turbine, generator and inverter designs developed and presented by local engineering & manufacturing firms.	International experts will teach/guide local experts on the conceptualization and preparation of design. (Resources included in above budget.)
	3.4.5.3. No. of optimal designs for deep cycle batteries developed by local engineering & manufacturing firms by Year 3.	0	1	Documentation of optimum deep cycle battery designs developed and presented by local engineering & manufacturing firms.	International experts will teach/guide local experts on the conceptualization and preparation of design. (Resources included in above budget.)

3.4.6. Established RE System Equipment Standards	3.4.6.1. No. of standards set and enforced for the design and application of RE systems by Year 3.	0	6	Documentation on approved performance (energy and quality) standards of RE and WE systems. Survey of SWES manufacturing industry – specific to SWES product quality and performance.	Performance standards are in line with internationally accepted norms. 15,000
	3.4.6.2. No. of standards set and enforced for the design and application of SWES by Year 3.	0	3		
	3.4.6.3. Average % of SWES units produced annually that are compliant with set RE & WE standards by EOP.	0	60		
3.4.7. Documented results and evaluation of the SWES design improvement program	3.4.7.1. Overall level of success of program-assisted and promoted SWES designs as reported in a national workshop by Year 3, %.	0	95	Workshop proceedings. Report on the level of success achieved under the SWES design improvement program. Survey of SWES manufacturers.	Relevant individuals/institutions are interested to participate and have relevant knowledge to share. 2,000
	3.4.7.2. No. of local manufacturers that planned to adopt the designs by EOP.	0	6		
	3.4.7.3. No. of optimally designed SWES units that were successfully in operation by EOP.	0	1,000	Installed and operating optimally designed SWES. Documentation of test results.	Cooperation of manufacturers of SWES units is assured.
	3.4.7.4. % increase in installed capacity of WE-based power and energy systems in the country by EOP.	0	1,000	Documentation of the annual inventory of SWES installed capacity from the NCEDC.	Compliance of SWES users to the reporting requirements of the proposed SWEDPRA to NCEDC is assured.
	3.4.7.5. Cumulative total installed SWES capacity in the country by EOP, kW.	0	700	Survey of SWES installations SWEDPRA project reports.	
Component 5. SWES Manufacturing Improvement Outcome 3.5: Improved manufacturing of locally made SWES units towards internationally accepted production practices and standards.	3.5.1. No. of locally made SWES units that meet internationally-accepted manufacturing standards by EOP.	0	1,000	Quality and performance inspection reports from SWES manufacturers. Survey of local manufacturers.	Local SWES manufacturers understand the benefits of optimally manufactured products both for domestic and foreign sales.
	3.5.2. No. of local manufacturers that are qualified and capable to produce export quality SWES units by EOP.	0	6		

3.5.1. Assessment of the capabilities of local SWES manufacturers.	3.5.1.1. No. of completed assessments of the capacity (technical, human, financial, etc.) of local SWES manufacturers by Year 3.	0 (1)	6	Documentation of assessment reports.	Support and cooperation from local manufacturers is provided.
3.5.2. Identification of potential improvements in the SWES manufacturing process.	3.5.2.1. No. of recommendations on potential improvements in the SWES manufacturing process submitted to the State Design Department by Year 3.	0 (1)	3	Documentation of assessment reports. SWES production and product quality survey. SWEDPA project reports.	Support and cooperation from local manufacturers is provided.
	3.5.2.2. No. of recommendations on potential improvements in the SWES manufacturing process that were implemented by EOP.	0	3		
3.5.3. Provision of technical capacity building to local manufacturers in the improvement of SWES manufacturing.	3.5.3.1. No. of personnel trained overseas on improved manufacturing/QC of SWES components by Year 1.	0	5	Satisfactory report on training course participants and their positive contribution to subsequent project activities. Results of Post-Training surveys held 6 months before EOP.	Relevant foreign manufacturers with sufficient technology and know-how who is fully able to meet the training requirements can be found. 15,000
	3.5.3.2. No. of overseas and locally trained personnel that are actively engaged in the commercial manufacturing/QC of SWES units by EOP.	0	50		
	3.5.3.3. No. of local manufacturers trained on improved manufacturing of SWES components by Year 3.	0 (2)	6	Satisfactory report on study tour; positive contribution by the study tour participants to the project activities related to design improvements in locally made SWES. Results of Post-Training surveys held 6 months before EOP.	Personnel trained abroad are sharing their knowledge to local manufacturers. Qualified and capable personnel from local manufacturers are willing to attend training.
	3.5.3.4. No. of local manufacturers that are qualified and capable to manufacture SWES units that comply with international manufacturing standards by EOP.	0	2		
	3.5.3.5. Local SWES manufacturers start producing first batch of optimally designed SWES by Qtr4/Year 1.	0	1		

3.5.4. Implementation of the optimum designs of SWES components.	3.5.4.1. No. of prototypes of selected optimally-designed turbine blade completed by end Year 3.	0	3	Prototype optimum turbine blade design. SWES product survey results. SWEDPA project reports.	International experts will guide local experts manufacturing of the prototype. Some of the manufacturing equipment can be purchased by the Government. 73,546
	3.5.4.2. No. of SWES units produced each year that are fitted with optimally designed turbine blades starting Year 1.	0	700		
	3.5.4.3. No. of prototypes of selected optimally-designed turbine, generator, and inverter completed by end Year 3. 3.5.4.4. No. of SWES units produced each year that are fitted with optimally designed wind turbine, generators and inverters starting Year 1.	0	3	Prototype optimum wind turbine, generator and inverter designs. SWES product survey results. SWEDPA project reports.	International experts will guide local experts manufacturing of the prototype. Some of the manufacturing equipment can be purchased by the Government. (Resources included in above budget.)
3.5.4.5. No. of prototypes of selected optimally-designed deep cycle battery completed by end Year 3. 3.5.4.6. No. of SWES units produced each year that are fitted with optimally designed deep cycle batteries starting Year 1.	0	1	Prototype optimum deep cycle battery design. SWES product survey results. SWEDPA project reports.		
	0	700			

3.5.5. Provision of technical assistance in the establishment of SWES testing facility.	3.5.5.1. No. of testing facilities identified and evaluated for capabilities to test SWES units by Year 1.	0 (1)	1	Documentation of the WE system equipment testing facility design.	New SWES manufacturing building constructed in 2006 is transformed into a well equipped testing facility. Recommendations and technical service for SWES testing facility establishment are provided by foreign experts. 85,358
	3.5.5.2. Established SWES Testing Facility by Year 1.	0	3.2011	SWES Testing Facility.	
	3.5.5.3. No. of sets of testing procedures developed and implemented for major WE system equipment by end Year 1.	0	4	Established WE system equipment testing procedures.	
	3.5.5.4. Average no. of SWES units/components tested by the SWES Testing Facility each year starting Year 1.	0	50	SWES Testing Facility test reports.	
Component 6. SWES Technology Demonstration Outcome 3.6: Successful showcasing of the installation, operation and monitoring of optimally designed and manufactured SWES units.	3.6.1. No. of installed optimally designed and manufactured SWES demo units that are successfully in operation by end Year 3.	0	6	Actual installations in the demonstration sites. Documentation of the demonstration schemes.	Optimally designed SWES units are already being manufactured locally by Year 3.
	3.6.2. Cumulative collective electricity generation from installed SWES demo units by EOP, kWh.	0	34,000	Demo project monitoring reports.	
3.6.1. SWES Demonstration sites are identified and selected.	3.6.1.1. No. of confirmed SWES demonstration sites by Year 1.	0 (3)	3	Documentation of the demo site selection process and the final list of demo sites.	Support from provincial government is provided.

3.6.2. Training Course on Livelihood/Productivity Projects	3.6.2.1. No. of individuals trained on livelihood and productivity projects supported by SWES by end Year 1.	0	60	Satisfactory report on the training course and the documentation of the training course materials. Results of Post-Training surveys held 6 months before EOP.	Government supports, and relevant individuals and cooperative farms are interested in, learning livelihood support and productivity activities. 3,000
	3.6.2.2. No. of trained individuals that are gainfully engaged in livelihood and productive activities supported by SWES by EOP.	0	180		
3.6.3. Identification of Potential Productive Uses and Livelihood Support Activities in the Demonstration Sites	3.6.3.1. No. of productive uses and livelihood support activities supported by SWES units identified by Qtr1/Year 2.	0	10	Evaluation report on, and profiles of, potential productive uses and livelihood support activities. SWEDPRA project reports.	Government supports, and relevant individuals and cooperative farms are interested in, learning livelihood support and productivity activities.
	3.6.3.2. No. of villages that operate SWES that are engaged in livelihood and productive activities by EOP.	0	20		
3.6.4. Baseline data for each selected demonstration site are established.	3.6.4.1. No. of complete sets of baseline data established by Year 1.	0 (3)	3	Documentation of the baseline data and the site profile of each demo site.	Cooperation provided by local stakeholders in demonstration sites.
3.6.5. SWES application scheme in each demonstration site are determined and prepared.	3.6.5.1. No. of SWES demonstration schemes developed by Year 1.	0 (3)	10	Documentation of each scheme applied to each site.	Proposed demonstration schemes acceptable to, and agreed by, parties.
	3.6.5.2. No. of finalized SWES demo schemes by Year 1.	0 (3)	3		
3.6.6. SWES demonstration systems are installed in the selected sites.	3.6.6.1. No. of successfully installed 5 kW SWES demo units by Year 1	0 (1)	3	Actual installations in the demonstration sites. Documentation of the demonstration schemes.	Demonstration units installed as follows: 5 kW 1 kW 300 W 20,000
	3.6.6.2. No. of successfully installed 1 kW SWES demo units by Year 1	0 (1)	3		
	3.6.6.3. No. of successfully installed 300 kW SWES demo units by Year 1	0 (1)	3		
	3.6.6.4. No. of fully operational SWES demo units by end Year 1	0	3	Actual installations in the demonstration sites.	Sites are open to public visits.
	3.6.6.5. Average no. of days it took to design, engineer, install and commission each demo site.	0	150	Documentation of the demonstration schemes.	
	3.6.6.6. Average no. of visitors each year at each demo site starting Year 2.	0	200		

3.6.7. The operation and performance of each demonstration site are monitored and evaluated.	3.6.7.1. No. of operations report completed and submitted each year starting Year 2.	0	6	Evaluation reports for first batch of demo scheme implementations. Demo scheme monitoring reports Demo scheme energy production reports SWEDPRA project reports	Site personnel (e.g., farm hands) are adequately trained in the operating data gathering and monitoring. AOS regularly check the data gathering process to ensure reliable data.
	3.6.7.2. No. of performance evaluation reports completed and submitted by EOP.	0	12		
	3.6.7.3. Average capacity factor of each installed SWES demo unit by EOP.	0	0.3		
	3.6.7.4. Cumulative electricity generation from all installed SWES demo units by EOP, kWh.	0	34,000		
3.6.8. Results of program for SWES technology demonstration are presented and disseminated.	3.6.8.1. Overall level of success of SWES demo schemes as reported in a national workshop by Year 2, %.	0	80	Workshop proceedings. Report on the level of success achieved under the SWES demonstration schemes. SWES demo project monitoring reports, energy production reports. Survey of SWES installation owners & operators. Report on trade fair participation.	Relevant individuals/institutions are interested to participate and have relevant knowledge to share. 30,000
	3.6.8.2. No. of individuals or entities that planned to replicate the demo schemes by EOP.	0	10 villages		
	3.6.8.3. No. of operational SWES unit installations that are based on the SWES demonstrations by EOP.	0	500		
	3.6.8.4. No. of overseas trade fairs and exhibitions attended by Overseas Marketing Team and manufacturers by EOP.	0	2~3		
Component 7. Energy Planning and Policy Formulation Outcome 3.7: Energy planning and policy making becomes part of the country's development planning system.	3.7.1. No. of NRE projects developed and designed by NCEDC by EOP.	0	3	Reports produced by NCEDC on NRE project development and design, and energy planning inputs to the MEPI. Documentation of NCEDC mandate showing the inclusion of energy planning.	NCEDC is allowed to provide inputs to the energy planning functions of the MEPI.
	3.7.2. No. of energy planning activities carried out by NCEDC each year starting Year 1.	0	5		

3.7.1. Assessment of the training needs of NCEDC personnel in energy planning and policy making particularly in the area of RE development and utilization.	3.7.1.1. Completed assessment and recommendations regarding training needs in energy planning and policy making by end Year 1.	0 (1)	2	Documentation of the assessment report.	NCEDC is allowed to provide inputs to the energy planning functions of the MEPI.
3.7.2. Conduct of energy planning and policy making training courses.	3.7.2.1. No. of NCEDC personnel trained overseas on energy planning and policy making by Year 1.	0	3	Satisfactory report on the energy planning and policy making training course and the documentation of the training course materials. Results of Post-Training surveys held 6 months before EOP.	Relevant personnel are interested and willing in participating in the training and in applying the knowledge/know-how they learn. Foreign trainees to conduct the training. 9,500
	3.7.2.2. No. of NCEDC personnel trained in-house on energy planning and policy making by Year 3.	0	80		
	3.7.2.3. No. of local and foreign trained NCEDC personnel that are actively doing energy planning and policy making by EOP.	0	83		
	3.7.2.4. No. of NCEDC personnel trained abroad on energy data gathering and analysis, and energy balancing by Year 1.	0	3	Satisfactory report on the energy data gathering and analysis and energy balancing training course and the documentation of the training course materials. Results of Post-Training surveys held 6 months before EOP.	Relevant personnel are interested and willing in participating in the training and in applying the knowledge/know-how they learn. Foreign trainees to conduct the training. 9,500
	3.7.2.5. No. of NCEDC personnel trained in-house training on energy data gathering and analysis, and energy balancing by Year 3.	0	80		
	3.7.2.6. No. of local and foreign trained NCEDC personnel that are actively doing energy data gathering and analysis and energy balancing by EOP.	0	83		

	3.7.2.7. No. of NCEDC personnel trained abroad on RE project development, evaluation and packaging by Year 1. 3.7.2.8. No. of NCEDC personnel trained in-house training on RE project development, evaluation and packaging by Year 3. 3.7.2.9. No. of local and foreign trained NCEDC personnel that are actively doing RE project development, evaluation and packaging by EOP.	0 0 0	3 80 83	Satisfactory report on the RE project concept development, evaluation and packaging training course and the documentation of the training course materials. Results of Post-Training surveys held 6 months before EOP.	Relevant personnel are interested and willing in participating in the training and in applying the knowledge/know-how they learn. Foreign trainees to conduct the training. 9,500
3.7.3. Conduct of training on project management and economic feasibility analysis.	3.7.3.1. No. of NCEDC personnel trained abroad on project management and economic feasibility analysis by Year 3. 3.7.3.2. No. of NCEDC personnel trained in-house training on project management and economic feasibility analysis by Year 1. 3.7.3.3. No. of local and foreign trained NCEDC personnel that are actively doing project management and economic feasibility analysis by EOP.	0 0 0	3 80 83	Satisfactory report on the project management and economic feasibility analysis training course and the documentation of the training course materials. Results of Post-Training surveys held 6 months before EOP.	Relevant personnel are interested and willing in participating in the training and in applying the knowledge/know-how they learn. Foreign trainees to conduct the training. 9,500
	3.7.3.4. No. of NRE project developed by the Project Development Team (PDT) in NCEDC by Year 2.	0	4	Established Project Development Team at NCEDC. Project Documents of NRE projects developed by PDT.	NCEDC is allowed to develop energy projects.
3.7.4. Recommended policies and projects on RE development and applications.	3.7.4.1. No. of policies formulated and recommended each year by NCEDC starting Year 2. 3.7.4.2. % of recommended policies and projects that are approved and implemented by EOP.	0	3	Documentation of policy recommendations of NCEDC submitted to MEPI. Documentation of approved and enforced policy recommendations. SWEDPRA project reports	NCEDC is allowed to provide inputs to the energy planning functions of the MEPI.

	3.7.4.3. No. of participants in workshops for presenting recommended policies and projects on RE development and applications by EOP.	0	50	Workshop proceedings. Reports on the policies that were approved & implemented	Relevant individuals/institutions are interested to participate and have relevant knowledge to share. 2,000
--	---	---	----	---	--

IV. Total Work plan and Budget⁴

TOTAL PROJECT WORKPLAN AND BUDGET



United Nations Development
Programme

DPRK

Year: 2005-2013

Project Number: 00045469, 00045354

Project Title: **Small Wind Energy Development and Promotion in Rural Areas (SWEDPRA)**

GEF Outcome/Atlas Activity	Responsible Party	Source of Funds	Atlas Code	ERP/ATLAS Budget Description/Input	Amount (USD) 2005	Amount (USD) 2006	Amount (USD) 2007	Amount (USD) 2010	Amount (USD) 2011	Amount (USD) 2012	Amount (USD) 2013	Total (USD)
OUTCOME 1: Wind Energy (WE) Resource Assessment	UNOPS	GEF	63400	Learning:Capacity Buiding Training for WRST members								0.00
	UNOPS	GEF	72200	Equipment & Furn		30,210.05						30,210.05
	UNOPS	GEF	71200	International consultant								0.00
	UNOPS	GEF	74500	Miscellaneous		488.65	60.56					549.21
	UNOPS	GEF	75100	Facilities & Administration (8%)		2,920.99						2,920.99
	UNDP	GEF	75700	International Training				25,000.00				25,000.00
	UNDP	GEF	75700	In-country training					5,000.00	5,000.00	5,000.00	15,000.00
	UNDP	GEF	71200	International consultant					20,000.00	28,519.75		48,519.75
	UNDP	GEF	74500	Miscellaneous				1,000.00	1,000.00	1,000.00	2,000.00	5,000.00
				sub-total		33,619.69	60.56	26,000.00	26,000.00	34,519.75	7,000.00	127,200.00

⁴The Total Project Workplan and Budget: the figures in the 2005-2007 columns reflect the expenditure under UNOPS execution before the suspension of the UNDP programme in the DPRK whereas the figures in the 2010-2013 columns describe the allocated budget for the forthcoming project activities under UNDP direct execution.

OUTCOME 2:WE Technology Information and Awareness Enhancement	UNOPS	GEF	63400	Learning-WE Technology Education Program								0.00
	UNOPS	GEF	71200	International consultant								0.00
	UNOPS	GEF	71600	Travel		4,867.25						4,867.25
	UNOPS	GEF	72200	Equipment & Furn		19,945.00						19,945.00
	UNOPS	GEF	74500	Miscellaneous		22,086.34						22,086.34
	UNOPS	GEF	75100	Facilities & Administration (8%)		3,751.88						3,751.88
	UNDP	GEF	72500	Printing, publications, multi-media					3,000.00	3,000.00	3,000.00	9,000.00
	UNDP	GEF	75700	International Training					25,000.00	10,000.00	2,149.53	37,149.53
	UNDP	GEF	75700	In-country training					4,000.00	3,000.00	4,000.00	11,000.00
	UNDP	GEF	74500	Miscellaneous					2,000.00	1,000.00	1,000.00	4,000.00
				sub-total		50,650.47			34,000.00	17,000.00	10,149.53	111,800.00
OUTCOME 3:Locally- made SWES Product Marketing	UNOPS	GEF	63400	Learning -Capacity Building Training on International Trade and Foreign Investment Promotion								
	UNOPS	GEF	71200	International consultant								
	UNOPS	GEF	71600	Travel		6,026.77						6,026.77
	UNOPS	GEF	74500	Miscellaneous		16,094.60						16,094.60
	UNOPS	GEF	75100	Facilities & Administration (8%)		1,769.71						1,769.71
	UNDP	GEF	71300	Local Market Study				4,000.00				4,000.00
	UNDP	GEF	71200	International consultant						20,000.00		20,000.00
	UNDP	GEF	72200	Office Equipments for Marketing Teams					8,000.00			8,000.00
	UNDP	GEF	75700	International Training					22,508.92			22,508.92
	UNDP	GEF	72500	Printing promotional materials					3,000.00	3,000.00		6,000.00
	UNDP	GEF	72300	Product Exhibition & Demonstration					2,000.00	2,000.00	3,000.00	7,000.00

	UNDP	GEF	74500	Miscellaneous				2,000.00	1,000.00	1,000.00	1,000.00	5,000.00
				sub-total		23,891.08		6,000.00	36,508.92	26,000.00	4,000.00	96,400.00
	UNOPS	UNDP	63400	Learning -Capacity Building Training on International Trade and Foreign Investment Promotion								
	UNDP	UNDP	75700	International Training					20,000.00	10,000.00		30,000.00
				sub-total					20,000.00	10,000.00		30,000.00
OUTCOME 4: SWES Design Improvement	UNOPS	GEF	63400	Learning-Training on the improvement of SWES design								
	UNOPS	GEF	71600	Travel		687.71						687.71
	UNOPS	GEF	72200	Equipment & Furn		19,680.00						19,680.00
	UNOPS	GEF	74100	Assessment of performance of locally made and installed SWES		10,000.00						10,000.00
	UNOPS	GEF	74500	Miscellaneous		12,742.85						12,742.85
	UNOPS	GEF	71200	International consultant		20,655.74	468.92					21,124.66
	UNOPS	GEF	75100	Facilities & Administration (8%)		5,468.32						5,468.32
	UNDP	GEF	71200	International consultant					30,000.00	30,000.00	8,196.46	68,196.46
	UNDP	GEF	75700	In-country training						3,000.00		3,000.00
	UNDP	GEF	74500	Miscellaneous					2,000.00	1,000.00		3,000.00
				sub-total		69,234.62	468.92		32,000.00	34,000.00	8,196.46	143,900.00
OUTCOME 5: SWES Manufacturing Improvement	UNOPS	GEF	63400	Learning- Training on the improvement of SWES manufacturing		24,754.07						24,754.07
	UNOPS	GEF	71200	International consultant								
	UNOPS	GEF	72100	Contractual Services-Companies		9,035.18						9,035.18
	UNOPS	GEF	72200	Equipment & Furn		30,086.30						30,086.30

	UNOPS	GEF	74500	Miscellaneous		16,106.57						16,106.57	
	UNOPS	GEF	75100	Facilities & Administration (8%)		6,398.56						6,398.56	
	UNDP	GEF	75700	International Training				25,000.00				25,000.00	
	UNDP	GEF	72200	Equipments for Testing and Measuring					16,000.00			16,000.00	
	UNDP	GEF	74500	Miscellaneous				1,000.00	119.32			1,119.32	
				sub-total		86,380.68		26,000.00	16,119.32			128,500.00	
	UNOPS	UNDP	74500	Miscellaneous		5,968.06						5,968.06	
	UNOPS	UNDP	72200	Equipment & Furn		70,485.12						70,485.12	
	UNDP	UNDP	72200	Equipment & Furn					22,546.82			22,546.82	
	UNDP	UNDP	74500	Miscellaneous					1,000.00			1,000.00	
				sub-total		76,453.18			23,546.82			100,000.00	
OUTCOME 6: SWES Technology Demonstration	UNOPS	GEF	63400	Learning -Training Course on Livelihood/Productivity Projects									
	UNOPS	GEF	71200	International consultant									
	UNOPS	GEF	72200	Equipment & Furn									
	UNOPS	GEF	71600	Travel									
	UNOPS	GEF	74500	Miscellaneous									
	UNOPS	GEF	75100	Facilities & Administration (8%)									
	UNDP	GEF	72200	Equipments for International Exhibition					16,000.00	40,000.00			56,000.00
	UNDP	GEF	75700	In-country training					3,000.00				3,000.00
	UNDP	GEF	74500	Miscellaneous					1,000.00	900.00			1,900.00
					sub-total					20,000.00	40,900.00		60,900.00
		UNOPS	UNDP	72200	Equipment & Furn								
		UNDP	UNDP	72200	Equipment & Furn					20,000.00			20,000.00
					sub-total					20,000.00			20,000.00

OUTCOME 7:Energy Planning and Policy Formulation	UNOPS	GEF	63400	Learning -Training on energy planning and policy making								
	UNOPS	GEF	74500	Miscellaneous		710.54						710.54
	UNOPS	GEF	74100	Professional Services								
	UNOPS	GEF	75100	Facilities & Administration (8%)		56.84						56.84
	UNDP	GEF	75700	International Training (4 components)				30,000.00				30,000.00
	UNDP	GEF	71200	Evaluation							17,032.62	17,032.62
	UNDP	GEF	75700	In-country training					2,000.00	2,000.00	2,000.00	6,000.00
	UNDP	GEF	74500	Miscellaneous				1,000.00	500.00	500.00	500.00	2,500.00
				sub-total		767.38		31,000.00	2,500.00	2,500.00	19,532.62	56,300.00
			TOTAL		340,997.10	529.48	89,000.00	230,675.06	164,919.75	48,878.61	875,000.00	
			GEF		264,543.92	529.48	89,000.00	167,128.24	154,919.75	48,878.61	725,000.00	
			UNDP		76,453.18	0.00	0	63,546.82	10,000.00		150,000	
			GRAND TOTAL								875,000.00	



ANNUAL WORKPLAN AND BUDGET

United Nations Development Programme

DPRK

Year: 2010

Project Number:

Project Title: **Small Wind Energy Development and Promotion in Rural Areas (SWEDPRA)**

Proj. ID	Expected Output	Key Activities	Timeframe				Resp. Partner	Planned Budget					
			Q1	Q2	Q3	Q4		Fund	Donor	Budget Description	Amount US\$		
	The potentials and application of SWES in rural areas in the DPRK are significantly achieved and advanced TOTAL	1. Wind Energy (WE) Resource Assessment				x	UNDP	62000	GEF	75700	International Capacity Building/Training for WRST members	25,000	
						x	UNDP	62000	GEF	74500	Miscellaneous	1,000	
		<i>Sub-total</i>											26,000
		3. Development of Domestic and Overseas Market for Locally-made SWES				x	UNDP	62000	GEF	71300	Market study (local experts)	4,000	
						x	UNDP	62000	GEF	74500	Miscellaneous	2,000	
		<i>Sub-total</i>											6,000
		5. SWES Manufacturing Improvement				x	UNDP	62000	GEF	75700	International training/internship on SWES manufacturing	25,000	
						x	UNDP	62000	GEF	74500	Miscellaneous	1,000	
		<i>Sub-total</i>											26,000
		7. Energy Planning and Policy Formulation				x	UNDP	62000	GEF	75700	International training (4 components)	30,000	
						x	UNDP	62000	GEF	74500	Miscellaneous	1,000	
		<i>Sub-total</i>											31,000
		TOTAL											89,000

V. Management Arrangements

The project will be implemented by UNDP on behalf of the GEF. The UNDP has the largest and longest-standing presence in DPRK among international agencies dating back in 1979.

The National Coordinating Committee for Environment (NCCE) is the National GEF Focal Point in DPRK and it is responsible for GEF projects in the country. It will coordinate the implementation of this project on behalf of the DPRK Government. The NCCE was established in 1995 to act as a governmental coordinating agency directing national direction for international environmental conventions. The State Academy of Science (SAOS) has been designated as the Executing Agency within the DPRK. The SAOS is a full Ministry directed to carry out technical research and disseminate information throughout the State system. There are nine research Branches and 150 Institutes under the SAOS. The newly formed State Commission for Science and Technology (SCST) mentioned in Part 1 will coordinate closely with the SAOS in implementing the Project.

The DPRK Government will appoint a Project Director (PD) who will manage and direct the day-to-day operations of the Project. The Project Director will be supported by the Project Technical Manager (PTM) and the Project Administration Assistant (PAA) who are both also appointed by the Government.

Under the Executing Agency, four Teams or Operation Groups will be established. The four Operation Groups will be:

1) WE Resource Assessment and Monitoring Group (RAMG) – The Center of Wind Energy Research and Development (CWERD) of the SAOS will head this group. The CWERD is a center established under the SAOS and is responsible for research and development work related to wind energy and sets targets and collect, analyze and process results according to Government policy. Other organizations that will be part of the RAMG are the Non-Conventional Energy Development Center (NCEDC), which was formed in 1993 and is now under the SCST. This group will be responsible for carrying out the project activities under Component 1, including the research related activities under Components 2, 3 and 4. It is charged with providing coordination for the exploitation of renewable energy. In Component 1, the RAMG will work also with the Department of Meteorology particularly in the wind monitoring and wind energy potential assessments.

2) WE Technology Development and Application Group (TDAG) – This group will also be headed by CWERD. This group will include the NCEDC and researchers from the universities. More importantly, it will also include selected manufacturers, one of them has been designated as the State enterprise The October 5 Manufacturing Complex. The Complex produces a range of 400 products many of them electrical which include inverters/converters, industrial meters, high and low voltage switches, refrigerators, transmission equipment. Recently, they started prototype manufacturing of mini-hydro and 300W wind turbine systems. The TDAG will implement activities in Components 4, 5 and 6.

3) WE Market Development and Promotions Group (MDPG) – This group will be headed by the NCEDC and include participation from the Ministry of Land and Environment Protection (MLEP), the Ministry of Electric Power Industry (MEPI), the Ministry of Electronics Industry (MEI), the Ministry of Agriculture (MoA) and NGOs active in rural development. Under this group will be formed 2 teams for SWES market development, a Domestic Marketing Team and an Overseas Marketing Team. The NRE Information Center of NCEDC will play an active role in the promotional activities for SWES. The MEPI is responsible for all generation, transmission and distribution of electricity to rural users. The MoA has primary responsibility for all Cooperative and State farms. They interact with these farms through management committees at the Provincial and County levels. The MEI and the Ministry of Foreign

Affairs (MFA) will be actively involved in the planning, design and implementation of the project activities related to the development of overseas markets for locally made SWES products. The MDPG will be responsible for Components 2 and 3.

4) WE Policy and Project Development Group (PPDG) – The NCEDC will also head this group. Under this group will be formed a Project Development Team made up of core NCEDC staff. Under the Project, this team will develop and propose new RE related projects other than wind energy. The PPDG will work together with the MEPI in the formulation of energy policies starting with those related to RE development in DPRK. It will be responsible for the implementation of Component 7.

The UNDP-CO energy cluster of projects comprises of SRED and SWEDPRA with the former being UNDP executed. In view of the symmetry in project logics, the geographical and programmatic focus of the two projects, and in the interest of cost efficiency, one CTA is to be recruited to coordinate the implementation of both the SRED and SWEDPRA projects.

Team members in each group of the project implementation teams will meet regularly, and as needed, to perform their assignments in this Project, under the leadership of the Team Leader and with the guidance of the CTA and Project Director. Furthermore, the four groups together with the Project Director, the CTA and the PTM will comprise the Project Technical Committee (PTC), which will meet every three (3) months for the following functions:

- Provide technical guidance to the Project
- Approve on the quarterly execution plan for the activities of the Project
- Monitor and evaluate the progress of the activities
- Discuss and address technical issues arising during the Project implementation

The PTC will report to the Project Steering Committee (PSC) (cum Tripartite Meeting among UNDP, and DPRK Government), which shall be comprised of the following:

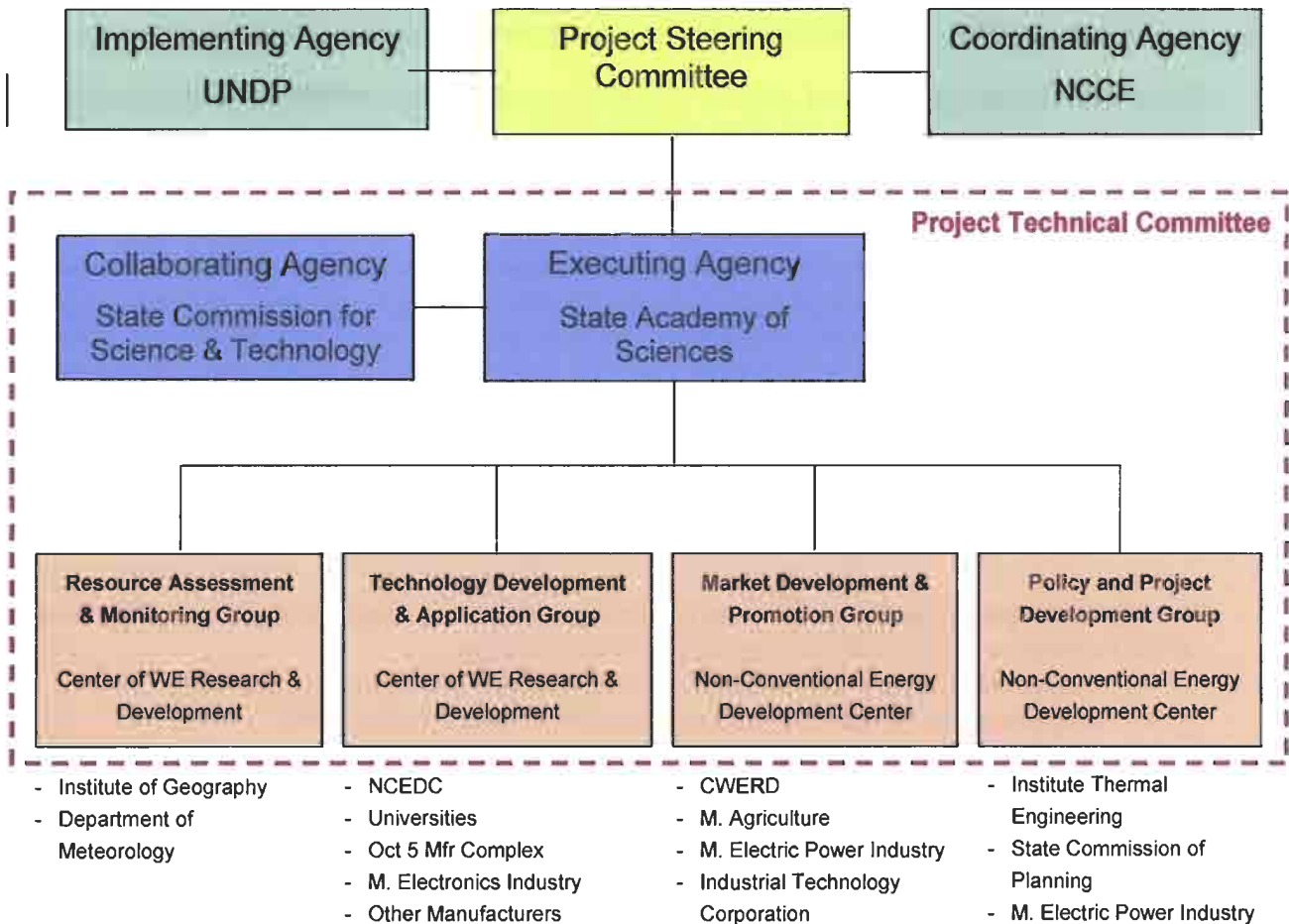
- A representative from UNDP-DPRK who shall be the Co-Chairman of the PSC
- A representative from NCCE who shall be the Co-Chairman of the PSC
- Heads of the four Operating Groups
- The PD (who shall act as the PSC Secretary)
- The CTA
- Representative from the MoA, MEI and MEPI

The PSC, which will convene every six (6) months, will have the following functions:

- Oversee and advise on the execution of the Project
- Monitor and supervise implementation of the Project
- Endorse the work plan
- Approve adaptations to the Project components during the Project execution, if any
- Evaluate the performance and impacts of the Project
- Approve Progress, Midterm and Terminal Reports of the Project

The Project Implementation Arrangement diagram is shown in Figure 1 below.

Figure 1: Project Implementation Arrangement



VI. Monitoring and Evaluation

The review, reporting and evaluation plans will strictly follow the UNDP guidelines as elaborated in the “Programme Operations Policies and Procedures” (POPP).

First of all, the Project’s implementation arrangement has been elaborated to have a clear delineation of roles and responsibilities among the different stakeholders and partners. This included the functions and composition of the PSC and PTC who will have important roles in monitoring and evaluating the progress and activities of the Project.

Regular reports will be produced, which will be submitted to, and approved by, relevant committees. The Project will be monitored through the following:

Within the annual cycle

- Quarterly Progress Reports (QPR), which will detail the accomplishments, lessons learned/problems faced during the execution of the activities and the planned activities for the next quarter. This will be prepared by the PD with the support of the Project personnel and heads of the Operation Groups and approved by the PTC.
- An Issue Log shall be activated in Atlas and updated by the PD to facilitate tracking and resolution of potential problems or requests for change.
- A risk log shall be activated in Atlas and regularly updated by reviewing the external environment that may affect the project implementation.
- Based on the above information recorded in Atlas, Project Progress Reports (PPR) shall be submitted by the PD to the PSC, using the standard report format available in the Executive Snapshot.
- A project Lesson-learned log shall be activated and regularly updated to ensure on-going learning and adaptation within the organization, and to facilitate the preparation of the Lessons-learned Report at the end of the project. The Lessons-learned Report will become part of the Project Terminal Report.
- A Monitoring Schedule Plan based on the PRF shall be activated in Atlas and updated to track key management actions/events.

Annually

- Annual Progress Report/Project Implementation Report (APR/PIR) – This is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). It shall be prepared by the PD and shared with the PSC at a specified period by the GEF. The Annual Progress Report shall highlight risks and challenges, the summary of results achieved, and lessons learnt of the project for that reporting year. The APR/PIR combines both UNDP and GEF reporting requirements. The APR/PIR includes, but is not limited to, reporting on the following:
 - Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
 - Project outputs delivered per project outcome (annual).
 - Lessons learned/good practice
 - AWP and other expenditure reports

- Risk and adaptive management
- ATLAS Quarterly Progress Reports
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Other Reports

- Terminal Report, which will be prepared at the final month of Project implementation. The Terminal Report will present the accomplishments of the Project against targets and key performance indicators, lessons learned and problems faced during the execution of the activities, and recommendations for follow up or future programmes. The Terminal Report will also contain the financial report of the Project. This will be prepared by the PD with the support of the Project personnel and PTC members and approved by the PSC.
- As this is a Global Environment Facility (GEF)-funded project, a Mid-Term Evaluation (MTE) and a Final Evaluation (FE) will also be conducted for the Project. The MTE, which will be done into the 18th Month of the Project's operations, will have as main goal the fine-tuning of work plans for the second half of the project, improving project approaches and optimizing implementation arrangements. It will be conducted using a participative and transparent consultation process with all key stakeholder groups. MTE findings and recommendations will be reviewed and endorsed by the PSC, and will be used as a guide in implementing the activities of the Project during the remaining second half of its implementation. This could be conducted by an independent third party or by an independent section of the Implementing Partner (UNDP). The Final Evaluation, to be conducted by an independent third party, will be initiated at the end of the Project; it will involve consultation with the Project stakeholders at the national and local levels. The FE will detail the achievements, outcomes & impacts of the Project compared to baseline; the issues faced and lessons learned during the Project implementation and will provide recommendations for future actions.
- Other reports and deliverables. During the implementation period, international and local experts will be hired to conduct technical assistance for activities such as feasibility studies, surveys and assessments, capacity building, etc. The reports that will be prepared by the experts in these assignments will be submitted to the PD and approved by the PTC.
- Additionally, certain Project Indicators will be measured and monitored such as: GHG emission reductions, cumulative total installed capacity and electricity production of SWES, etc. The GHG emission reduction will be estimated using the internationally recognized calculation procedure such as the *Intergovernmental Panel on Climate Change*.

The following table shows the M&E plan of the Project.

Table 1: Monitoring and Evaluation Plan

M&E Activities	Frequency /Timing	Aspects to be Monitored & Evaluated/ Description	In-charge of Activity	Approval
Detailed Quarterly Work plan	Every beginning of Quarter	Detailed activities, schedule, milestones, deliverables, manpower inputs for the next quarter	OG, PD	PTC
Annual Work plan and budget	Beginning of each year	Detailed activities, budget, milestones, deliverables, manpower inputs for the next year	OG, PD, PTC	PSC, IP
Quarterly Progress Report	Quarterly	Quarterly accomplishments, lessons learned/problems faced during the execution of the activities and the planned activities for the	OG, PD, PTC	IP

		next quarter		
Annual Progress Report/Progress Implementation Report	Every July 1	Past year's accomplishments; Expenses for the year completed; Update of Project work plan; Lessons learned, recommendations and suggestions for re-orientation of activities (if necessary)	OG, PD, PTC	PSC, IP
Terminal report	End of Project (after 2 years)	Project accomplishments; Project expenses and financial report; Records and evidences of all outputs; Lessons learned and recommendations for future actions	PD, IP	PSC, UNDP-GEF
Mission reports	After each mission	Relevant aspects of the mission (according to defined template). Such mission will include UNDP programme staff field mission.	Individual experts	PD, PTC, UNDP M&E staff
Other reports and deliverables	After each TA or subcontract	Reports and deliverables vis-à-vis the TOR of the TA	Individual experts	PD, PTC
Monitoring of pilot prototypes	After installation of prototypes	Technical feasibility, economic/financial viability and environmental/social impacts of the demonstration projects; Access to equipment installed through site visits; Verifiable delivery of products and services to target beneficiaries	PTC; External service providers	PSC, UNDP-GEF
PSC meetings and minutes	Every 6 months	Minutes of meetings which reflect the discussions and decisions according to the functions of the PSC outlined in this document	PD, PTM	PSC, UNDP-GEF
PTC meetings and minutes	Every 3 months	Minutes of meetings which reflect the discussions and decisions according to the functions of the PTC outlined in this document	PTM, PAA	PSC
Financial recording & reporting	Throughout the Project; continuous	Monitoring and control of project expenditures; financial management & reporting; Project resource data tracking inputted in and regularly accessed from, the Atlas system	PD, UNDP Project Officer	UNDP, IP
Mid-term Evaluation	After 1-1/2 years	Review of progress on execution & achievement of project outcomes as specified in the Project Document; fine-tuning of work plans for the second half of the project; improving project approaches and optimizing implementation arrangements; recommendation on adaptive measures	IP or Independent reviewer	PSC, UNDP-GEF
Final Evaluation	After 3 years	Achievements, outcomes & impacts compared to baseline; lessons learned and recommendations for future actions; evaluation according to GEF Project Review Criteria	Independent evaluators	UNDP, IP

Notes:

GEF = Global Environment Facility

IP = Implementing Partner (UNDP)

OG = Operation Groups

PD = Project Director

PSC = Project Steering Committee

PTC = Project Technical Committee

PTM = Project Technical Manager

TA = Technical Assistance

TOR = Terms of Reference

Table 2: Monitoring and Evaluation Plan and Budget

M&E Activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> ▪ Project Director ▪ UNDP CO, UNDP GEF 	5,000	Within first two months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> ▪ UNDP GEF RTA/Project Director will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. 	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> ▪ Oversight by Project Director ▪ Project team 	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> ▪ Project Director and team ▪ UNDP CO ▪ UNDP RTA 	None	Annually
PSC Meetings	<ul style="list-style-type: none"> ▪ UNDP CO ▪ NCCE ▪ 		Every 6 months
PTC Meetings	<ul style="list-style-type: none"> ▪ Project Director and team 		Every 3 months
Quarterly Progress Reports	<ul style="list-style-type: none"> ▪ Project Director and team 	None	Quarterly
Mid-term Evaluation	<ul style="list-style-type: none"> ▪ Project Director and team ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) 	10,000	At the mid-point of project implementation.
Final Evaluation	<ul style="list-style-type: none"> ▪ Project Director and team, ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team) 	15,000	At least three months before the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> ▪ Project Director and team ▪ UNDP CO ▪ CTA 	None	At least three months before the end of the project
Audit	<ul style="list-style-type: none"> ▪ UNDP CO ▪ Project Director and team 	Cost per year: 3,000	Yearly
Visits to field sites	<ul style="list-style-type: none"> ▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives 	For GEF supported projects, paid from IA fees and operational budget	Yearly
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US\$ 39,000 (+/- 5% of total budget)	

VII. Legal Context

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Agreement between the Government of DPRK and the United Nations Development Programme, signed on 8th November 1979.

The project shall be executed in line with the provisions as set out in respectively the Memorandum of Understanding between the Democratic People's Republic of Korea and the

United Nations Development Programme regarding Financial, Human Resources and Programme Issues relating to the UNDP DPRK Programme of 27th February 2009 and the DPRK CO Internal Control Framework

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the executing agency and its personnel and property, and of UNDP's property in the executing agency's custody, rests with the executing agency.

The executing agency shall:

- a. put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- b. assume all risks and liabilities related to the executing agency's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The executing agency agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

VIII. Annexes

Annex 1	Risk Analysis Log
Annex 2	Terms of Reference
Annex 3	Project Implementation Schedule

Annex 1

Risk Analysis Log

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
1	International political environment	2010	Security/Political	International political environment leading to disruption in UN assistance P=3; I=3	Strict adherence to terms of UNDP/NCC MoU for reopening of UNDP office will support appropriate measures to maintain integrity of programmes	UNDP	UNDP	N/A	N/A
2	Limited donor funding or slow release of funds for scaling-up and follow-up phase	June 2010	Financial	Energy projects replication and expansion is dependent on donor funding; shortfall or delay in release of funds will affect scaling up P=2; I=3	CO working to deliver on target and to maintain close relations with government and donors	UNDP, NCCE	UNDP	N/A	N/A
3.	Monitoring and access to project site	June 2010	Operational	Facilitation is required from national and county government for approvals, travel clearances ; lack of this could delay implementation and results reporting P = 2; I=3	NCCE, and UNDP working with county governments to ensure facilitation. Reliance on international and national staff members for monitoring	UNDP, NCCE	UNDP	N/A	N/A
4	Establishment of design and manufacturing capability	June 2010	Operational	Technical specification of equipment list makes procurement process complex, leading to delay in acquiring and installing equipment P=3; I=4	Adherence to procurement rules and processes; close collaboration with HQ.	UNDP, SAOS, SCST	UNDP	N/A	N/A
5	Extreme environmental phenomenon	June 2010	Environmental	Floods or other natural disaster could hamper implementation. P=3; I=4	UNDP will plan work with Partners to avoid progress or monitoring being affected by extreme weather or natural calamity and contingency planning .	UNDP, NCCE	UNDP	N/A	N/A
6	Equipment usage for non-project applications	June 2010	Technical	Improper, dual usage of equipment could threaten project credibility and viability of future activities P=3;I=3	UNDP will monitor regularly through strict monitoring plan, project visits and regular consultation with national counterpart and the beneficiaries	UNDP, NCCE, SAOS,SCST	UNDP	N/A	N/A

CHIEF TECHNICAL ADVISER (CTA)

For the implementation of the

Sustainable Rural Energy Development (SRED) Programme and**Small Wind Energy Development and Promotion in Rural Areas (SWEDPRA)****Background:**

UNDP's efforts in energy for sustainable development support the Millennium Summit objective of reducing by half the proportion of people living in poverty by 2015. None of the agreed-upon Millennium Development Goals (MDGs) can be achieved without major increases in energy services in developing countries.

The Government of DPRK articulated its national priorities for development assistance at a Prioritisation Workshop for a UN Strategy for DPRK (2007-2009), held in mid January 2006. An outcome of the workshop has been the governments resolve to collaborate with partners in the formulation and implementation of projects for sustainable energy resource management and utilization. Subsequently, the Sustainable Rural Energy Development (SRED) Programme and the Small Wind Energy Development and Promotion in Rural Areas (SWEDPRA) came about and the projects will seek to directly address three of the five priorities identified by the government as follows:

- Improved availability and utilization of energy
- Improved environmental management; and
- Increased food availability at national and household level

The UNDP DPRK Country Office mandate during the current period involves implementation of SRED and SWEDPRA projects. The projects have been revised and approved by the government and Headquarters. Implementation of the projects is expected to start by July/August 2010. A Chief Technical Adviser (CTA) is required to coordinate the management and implementation of the two projects.

Specific Duties and Responsibilities:

The CTA will work under the overall guidance of the UNDP Senior Deputy Resident Representative and under the programmatic co-ordination and supervision of the Senior Programme Advisor. The CTA's main responsibility will be overseeing the successful implementation of both projects. As requested, he/she will also advise the Government on

preparation of a national plan on sustainable rural energy. The CTA will also provide policy advice to UNDP on sustainable rural energy issues.

The CTA can draw upon expertise of senior management/energy and environment practice leaders at UNDP RBAP and BDP, and exchange experiences with advisers in other regions. The CTA, who will be based in DPRK for the duration of project implementation, will also be expected to substantively engage in discussions with external sustainable energy development experts in the region. Such engagements foster learning and generation of new ideas in the area of energy for sustainable development throughout the implementation period.

More specifically, the CTA will carry out the following tasks in close collaboration with the DPRK Government:

Project implementation of both SRED and SWEDPRA

- Coordinate and Manage the implementation of the SRED and SWEDPRA projects and supervise delivery of sub-contracts and services.
- Coordinate with the authorities of the identified/target regions, provinces and cooperative farms for the implementation of SRED and SWEDPRA project activities.
- Where necessary, provide substantive support for partnership and resource mobilization for the SRED programme. This includes collaboration with GEF climate change advisers in the region, as well as with other UN, multilateral and bilateral partners.

Capacity development and training for both SRED and SWEDPRA

- At the beginning of the project implementation, prepare an integrated capacity development plan and implement the capacity building activities to meet the needs of SRED at both the farmers' cooperative and government levels. This should include detailed estimates of the budget for the capacity building activities to be done abroad and in-country.
- For SWEDPRA where the capacity building plan is clearly indicated in the project design, coordinate the capacity building activities and ensure proper training of relevant officials according to the plan.
- Identify barriers, opportunities and constraints to the sustainability of SRED and consequently include them in the capacity development plan.

Support to policy development for both SRED and SWEDPRA

- Provide advice to UNDP DPR Korea country office and DPRK about appropriate responses to sustainable rural energy challenges, with specific attention to increasing access to energy services in rural areas. In particular, support should include integrating energy consideration into other national development strategies including agriculture and other development areas that are interrelated to provision of energy services.
- Keep abreast of alternative policies and strategies that could address the sustainable rural energy development challenges of DPRK, reflecting on UNDP's experiences within and outside the region.
- Recommended policy measures to promote Renewable Energy development and applications in DPRK.

Coordination of specific activities of SRED

- Coordinate the assessment of energy services and resources and assess the feasibility of available technologies at the cooperative farm level.
- Identify and appraise the optimal energy and technology mix to meet the existing and new/potential energy needs and services, including financial appraisal.
- Implement demonstration projects as mutually agreed by the Government and UNDP. This will include implementing institutional and financing arrangements and modalities. This must include developing an operational plan that will take into account options for sustainability, management and maintenance aspects of the pilots.
- After the completion of the pilot demonstration projects, facilitate an evaluation of the various components of the SRED programme so that 'good-practices' can be documented for replication at the national level.
- As part of the implementation of SRED, help the government of DPRK to formulate strategies and plans for scaling-up of sustainable rural energy development programme at the national level based on the lessons learned during the implementation phase.

Coordination of specific activities of SWEDPRA

- Supervise the conduct of Wind Energy (WE) resource assessment and database development.
- Ensure the development of domestic and overseas market for SWES that are locally-made in DPRK using marketing activities, business partnerships and promotional campaigns.

- Initiate and facilitate the programme to improve the design and manufacturing of SWES in DPRK through technical assistance and prototype development.

International Collaboration:

- Survey relevant international conventions to which DPRK is party and propose cooperation mechanisms and schemes for DPR fulfilment of obligations to these conventions and protocols through the projects;
- Assess and make recommendation on fostering international cooperation in sustainable energy management;

Required competency and experience:

- At least 10-15 years of specialized experience in a regional/international context in the field of sustainable energy (in particular, sustainable rural energy and wind energy), economic development, poverty reduction, environment and development. Knowledge and experience on sustainable energy strategies and practices and other macro development strategies with focus on integration of energy issues into core national development priorities will be of particular advantage.
- Advanced university degree in a relevant field.
- Proven experience and demonstrated ability to work with multidisciplinary expertise, in particular, sustainable energy and rural development.
- Candidates must have practical experiences and a sound knowledge of development issues in Asia. A good knowledge of regional and sub-regional energy issues is essential.
- Excellent interpersonal skills and human relationship management.

Fluency in English and good writing skills in English are essential

PROJECT IMPLEMENTATION SCHEDULE

Activities	Oct. '05-Mar '07					Mar '07-Mar '10	Year 1				Year 2				Year 3		
	Q1	Q2	Q3	Q4	Q5		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1. Wind Energy (WE) Resource Assessment																	
1.1. Conduct of WE resource data measurements																	
1.2. WE resource database development																	
1.3. Development of a WE monitoring and simulation methodology																	
1.4. Conduct capacity building program for WRST members																	
1.5. Preparation of initial wind maps																	
2. WE Technology Information and Awareness Enhancement																	
2.1. Establishment of a NRE Information Center in NCEDC																	
2.2. WE Technology Education Program																	
2.3. Integrated WE Information Exchange Service																	
2.4. Information Campaigns on WE technology applications in Rural Areas																	
3. Development of Domestic and Overseas Market for Locally-made SWES																	
3.1. Formation of a domestic Marketing Team																	
3.2. Conduct of a market study in rural areas and a survey of users of SWES																	
3.3. Preparation of promotional materials for locally manufactured SWES																	
3.4. Conduct of regular SWES product demonstrations in Exhibition Hall																	
3.5. Conduct of promotional campaigns to Farms																	
3.6. Regular assessment and upgrading of program on local SWES market dev't																	
3.7. Development of a sustainable local marketing program of locally made SWES																	
3.8. Development of Overseas Market for SWES																	
3.9. Development and dissemination of promotional materials for locally-made SWES in overseas offices of the DPRK																	
3.10. Capacity Building on International Trade and Foreign Investment Promotion																	
3.11. Establishment of business partnerships with other countries in the manufacturing and sales of SWES																	
4. SWES Design Improvement																	
4.1. Assessment of the current performance of installed SWES																	
4.2. Performance evaluation of locally made SWES																	
4.3. Identification of potential improvements & designs for locally made SWES																	
4.4. Technical capacity building to local manufacturers on improved SWES design																	
4.5. Establishment of optimum designs for various SWES components																	
4.6. RE System Equipment Standards Setting																	
4.7. SWES design improvement program results evaluation and dissemination																	
5. SWES Manufacturing Improvement																	
5.1. Assessment of the capabilities of local SWES manufacturers																	
5.2. Identification of potential improvements in the SWES manufacturing process																	
5.3. Technical capacity building to local manufacturers on improved SWES mfg.																	
5.4. Implementation of the optimum designs of SWES components																	
5.5. Provision of technical assistance in the establishment of SWES testing facility																	
6. SWES Technology Demonstration																	
6.1. SWES Demonstration sites are identified and selected																	
6.2. Training Course on Livelihood/Productivity Projects																	
6.3. Identification of Potential Productive Uses and Livelihood Support Activities																	
6.4. Baseline data for each selected demonstration site are established																	
6.5. SWES application schemes in each demonstration site are determined and prepared																	
6.6. SWES demonstration systems are installed in the selected sites																	
6.7. M & E of each demonstration site																	
6.8. Presentation and dissemination of results of SWES technology demonstration																	
7. Energy Planning and Policy Formulation																	
7.1. Assessment of the training needs of NCEDC personnel in energy planning and policy making particularly in the area of RE development and utilization																	
7.2. Conduct of energy planning and policy making training courses																	
7.3. Conduct of training on project management and economic feasibility analysis																	
7.4. Recommended policies and projects on RE development and applications																	

Note: Highlighted activity denotes the activity has been completed or significantly conducted before the suspension



조선민주주의인민공화국 환경민족조정위원회

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA
National Coordinating Committee for Environment

P.O.Box 44 Pyongyang, Tel. 850-2-18111(382 7222), Fax 850-2-381 4660

Baba/Ri

1. Signed document + place to shared drive

Pyongyang, 26 August, Juche 99 (2010)

Dear Mr. Larry Maramis,

Subject: Small Wind Energy Development and Promotion in Rural Areas (SWEDPRA) Project in DPR Korea

With reference to your letter dated 23 August 2010 on the subject, I am pleased to inform you that the DPRK National Coordinating Committee for Environment (NCCE) agrees to the final version of the project document and sends the document with my signature.

Enclosed herewith, please find the signed document.

We look forward to your continued support and cooperation.

Sincerely yours,

Ri Hung Sik
Secretary General

Mr. Larry Maramis
Senior Deputy Resident Representative
UNDP Office
PYONGYANG