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THE ZIMBABWE UNDP-G.E.F.
---------- SOLAR-PV ----------
PROJECT

ZIM/95/G31/B/50/99

CONTENTS

(MAJOR ISSUES)

UNITED NATIONS DEVELOPMENT PROGRAMME
GLOBAL ENVIRONMENT FACILITY

Project of the Government of Zimbabwe

Title:	Photovoltaics for Household and Community Use
Number:	ZIM/95/G31/B/50/99
Duration:	3 years
Project Site:	Zimbabwe
UNDP Sector:	Energy
Subsector:	New and Renewable Sources of Energy
Government Implementing Agency:	Ministry of Transport and Energy (MOTE): Department of Energy (DOE)
Executing Agency:	Government of Zimbabwe
Starting Date:	30 June 1995
Government Inputs:	Z$ 2,120,000
UNDP/GEF Inputs:	US$4,563,820

Brief Description:

This project is intended to strike a balance between development and environmental concerns by using a sustainable model of solar electricity dissemination in Zimbabwe's rural areas, to address the issue of greenhouse gases (GHG) emissions and global warming.

The project started in 1993 as ZIM/92/G31/A/50/99. Following a decision to change the execution modality to national execution, the original PRODOC has been updated to capture the amendments introduced by this change.

The programme will enable the country to:

- Reduce the need for conventional electrical grid extension into areas where the costs are exorbitant, while immediately displacing carbon emissions from kerosene and candles.

- Enhance and upgrade the indigenous solar manufacturing and delivery infrastructure through technical assistance, technician training, and provision of critical inputs to alleviate constraints on manufacturing.

- Develop an expanded commercial market in rural areas for affordable domestic solar electric lighting systems by improving the access of householders to such technology through a low-interest financing scheme.

- Establish specially tailored financing mechanisms at the grassroots level to benefit lower income groups in rural areas.

On behalf of the:	Signature:	Date:	Name and Title
Government:		22/09/95	Dep. Sec. O.M. MTSHALAGA
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A. CONTEXT

1. Description of subsector

Energy consumption in Zimbabwe is six times the average for Sub-Saharan African countries, with the exception of South Africa. The Zimbabwe Electricity Supply Authority (ZESA), a parastatal company formed in 1986, is responsible for supplying and managing the country's utility electrical system.

Zimbabwe's installed electric generation capacity had been 1961 megawatts (1991). Of this amount, 50% comes from coal powered thermal stations at Hwange, 16% from old thermal stations, the remaining 34% comes from Kariba hydropower station. Up to 30% of the total demand is imported from Zambia's share of Kariba.

Eighty-four percent of Zimbabwe's electricity is consumed by industrial and commercial customers in the manufacturing and mining sectors. The remaining 16 percent is used by residential consumers, virtually all of whom live in urban areas or on commercial farms. Transmission and distribution line losses are approximately 9 percent, a relatively low figure on a continent where such losses may run to 60 - 80%.

At present, approximately 20 percent of Zimbabwe's households have access to electricity, and only 16 percent of rural growth centres have grid electricity. With an average rural population density of just nineteen inhabitants per square kilometer, rural electrification is extremely expensive and energy consumptive. The rural population living in areas served by electricity is approximately 155,000, less that 3 percent of the district country/ resettlement population of 5.2 million. Approximately 6 percent of households in electrified centres are actually connected, indicating that the proportion of the district council/resettlement population benefitting from electricity is only about 0.2 percent.

In 1984, the Government launched a programme of rural electrification to improve the standard of living in rural areas and to increase the rate of economic growth and employment generation. However, after investing close to US$10 million, the Government had to put the programme on hold due to a lack of funds.

Rural electrification is aimed at providing electricity to selected rural growth centres through extension of the national electrical grid. Seventy-two such centres were targeted but by 1987, only half of these had been connected. Moreover, arrival of the grid has not made electricity more accessible to the vast majority of rural households in these areas. By mid-1987, an average of only ten households per centre were connected to the grid at an estimated cost (including distribution, line extension and hookup) of $6,000 per household.

Demand for electricity is expected to reach 2,362 MW by the year 2,000, exceeding by far ZESA's capacity, which as mentioned before, is already importing electricity from Zambia's share of Kariba to meet current demand.

2. Host country strategy

"Growth with equity" is the official development strategy of the Government of Zimbabwe. With over 75 percent of the country's population living in rural areas, the Government focuses a proportional amount of attention on the delivery of basic services to rural people. Electricity is seen by the Government as a critical component of rural development.

The Government regards rural electrification as a way to slow rural-urban migration, reduce fertility, increase literacy and improve the overall life of the nearly 8 million people who live in rural areas, virtually all of whom are without access to grid-supplied electricity.

Electrification of households, small businesses and community service facilities is a prime national objective and one of the most pressing challenges facing the Government today. With the publication by the Ministry of Transport and Energy (MOTE) of the Electrification Master Plan in December 1991, the Government is focusing its attention on the problem of electricity for rural Zimbabweans.

3. Prior or ongoing assistance

Under the previous execution modality, the project with the code ZIM/92/G31 provided assistance in the amount of US$2,436,180 for the installation of about 1,500 systems. The main achievements so far have been the establishment of a Programme Management Unit within the Department of Energy; the Revolving Fund (now referred to as Credit Support Facility) at the Agricultural Finance Corporation; as well as the mechanisms and procedures for ensuring access of the solar industry to solar panels and components. Although a number of posts, including that of the National Project Manager are funded by UNDP/GEF, the PMU is staffed mainly by government technicians. The CSF is now fully operational and has provided credits of an average ZIM$7,500 to more than 1,000 end-users. In terms of the local solar industry, the number of installing companies have soared from a handful at the beginning of the project to more than thirty today.

The World Bank had been negotiating the final component of an overall $30 million loan for rehabilitation of the existing electricity transmission and distribution system. This loan did not, nor will it in the future, aid grid extension to most of the rural areas.

The Canadian International Development Agency (CIDA) supported a SADC industrial energy conservation pilot project, operated through an office in Harare.

Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ) is providing assistance towards the development and follow-up of the rural electrification masterplan study. GTZ has also assisted the Department of Energy to establish a database on photovoltaic (PV) installations in Zimbabwe, as well as pilot PV pumping systems, which will be an invaluable aid to the GEF PV project.

4. Institutional framework for subsector

The Zimbabwe Electrical Supply Authority (ZESA) manages Zimbabwe's electrical generating facilities and distribution systems, along with the country's rural electrification programme. ZESA is one of the best managed utilities in Africa.

The Ministry of Transport and Energy sets operational guidelines for ZESA and overall energy policies for the country. The Ministry's Department of Energy (DOE) works closely with ZESA on planning and Development.

The DOE has four sections: (1) Energy, Economics and Planning, (2) Research and Development, (3) Energy Administration, and (4) Energy Conservation. The present project falls under the Energy Conservation section of the DOE.

An in-depth restructuring of DOE's activities is presently under consideration. The changes would include streamlining the activities of DOE to deal with policy formulation, regulatory, and planning issues only. Implementation will be moved out of the Department. Thus, creation of an energy efficiency agency is under consideration as part of this exercise. In the long-term the PMU could be integrated into this structure with an expanded portfolio for renewables or another similar entity.

In addition, the GTZ assists the department with a project called Energy Programme Zimbabwe, for which it has seconded two GTZ personnel. The DOE has contracted a Zimbabwean consulting firm to assist in a study on the dissemination of PV in the rural areas of Zimbabwe.

The Government has officially endorsed the use of PV to provide access to electricity in isolated rural areas, noting in a project proposal (Enhanced Solar Photovoltaics Development in Zimbabwe) that the demand for PV systems in the country is very large. This DOE PV project proposal advocates setting up local quality control and evaluation standards and verification systems, including local PV component standards and testing, as well as the proper rural credit facilities to guarantee the ability of the rural end-user to buy the equipment.

Government agencies actively engaged in rural development include the:

- Ministry of Lands, Agriculture and Water Development through AGRITEX; the Agricultural Development Authority (ADA), and the Agriculture Finance Corporation. These institutions deal directly with the majority of Zimbabwe's population living on small family farms in the rural areas and on communal lands.

- Ministry of National Affairs and Employment Creation, which has extension offices in all eight provinces, and provides advisory and auditing services to local cooperatives and credit institutions.

- Ministry of Local Government, Rural and Urban Development which interacts with people at the grassroots level through the district councils.

- Small Enterprise Development Corporation, which makes grants and loans to small businesses and entrepreneurs.

- Ministry of Environment and Tourism, which address the environmental issues.

Numerous nongovernmental organizations (NGOs) are interested in rural energy development, appropriate technology and energy planning. Currently a number of them including Africare, Plan International and Biomass Users Network, has expressed interest in the project.

B. PROJECT JUSTIFICATION

1. Problem to be addressed and the present situation

Over seventy percent of the people in developing countries have no access to electricity. As this demand is met with conventional sources of energy and continues to increase through population growth and economic development, Greenhouse Gases emissions will also increase. According to current projections, the greatest growth in GHG emissions over the next thirty years is expected to occur in developing countries.

Increased energy efficiency can result in immediate energy savings and offset the need for future capacity expansion in the same market. But this would only address a small part of the real problem which is the future demand for basic electrical service by the vast unelectrified majority in these countries, and the ways in which that demand can eventually be satisfied in a sustainable, environmentally acceptable manner.

Meeting the combined demands of energy conservation, environmental preservation and economic growth and sustainable human development is an especially significant challenge for Zimbabwe. Despite having one of the largest power systems in Sub-Saharan Africa, Zimbabwe has not been able to meet the energy needs of the great majority of its people.

Should Zimbabwe resort to its vast reserves of coal (estimated at 30 billion tons with proven exploitable reserves of 2 billion tons) to meet its unsatisfied energy demand, there would probably be serious environmental consequences. Additional coal power plants such a Hwange I and II, earmarked to satisfy the need for rural household electrification, would do irreversible damage to Zimbabwe's environment while contributing to global warming. For this reason, Zimbabwe should limit the utilization of its coal and hydro energy sources to the current uses: to meet industrial energy needs and to foster economic growth in urban and semi-urban areas.

A non-traditional source of available energy - solar power - can enable Zimbabwe to reduce its reliance on coal, avert atmospheric and other forms of environmental degradation that would result from conventional power sources, and still provide electricity for the majority of its population. With an average of 3,000 hours of sunshine per year falling at the rate of up to 2,200 kilowatt-hours (kWh) per square meter, solar radiation in Zimbabwe is 20 to 25 percent higher than in East or West Africa, and is surpassed only by that in desert regions.

1.1 Current extent of PV use in Zimbabwe

Before the launch of the GEF project, at least 3,000 PV systems had been installed in rural and semi-urban homes, rural health clinics, rural stores, beer parlors and entertainment centres, in schools and for telecommunications purposes. About one-third of home solar systems are purchased by urban area workers for their rural relatives or families. Many others are purchased by rural based civil servants with regular sources of income.

Of an installed capacity of 151 kilowatt-peak in 1991, 41.8 percent is used for lighting, not counting PV used by Post and Telecommunications Corporation (PTC) the National Railways of Zimbabwe and the Zimbabwe National Army. Domestic home lighting constitutes over 23 percent of the PV market.

Through the GEF project an estimated 1,500 systems have been installed in households, clinics and schools in rural areas. This is roughly equivalent to 90 KW. These systems are dedicated exclusively to lighting. The project has also established testing criteria specifications and standards for finished systems; it has mounted a public awareness campaign via mass media, exhibitions and fairs.

Currently, there is only one Zimbabwean solar module manufacturing company, Solarcomm, along with smaller firms specializing in the production and installation of home and community solar electric systems. Until 1991, most installations in the country were in Mashonaland and Manicaland, with only 15 percent of the systems installed in Matabeleland.

Local production capacity, using solar cells imported from Japan, is approximately 150 kW per year, although actual production is only about 80kW. Institutional PV applications are largely the result of donor projects using local design firms to install imported solar panels and components.

A considerable number of solar home systems were purchased with cash or credit arranged by solar dealers or through Scotfin Ltd. (SCOTFIN), the financing arm of the Zimbabwe Banking Corporation Ltd. (ZIMBANK). A huge demand was identified by the installing companies, but they were largely unable to satisfy it, because of such constraints as insufficient foreign exchange allocations, and a lack of affordable and convenient end-user financing.

Evidence suggests that the market would expand, and this technology would be considerably more affordable for the average rural family, since the Government has reduced import duties for the project in the interests of social and rural energy development.

1.2 Official views on the importance of PV

The Southern Africa Development Community (SADC)[1] has recognized solar PV as " one of the most promising technologies" available in the sunshine-abundant Southern African region. However, SADC's Energy Sector has also noted that rural energy needs are not always regarded as an integral part of the rural development process. As a result, up until the beginning of this decade, there were often constraints to expanding the utilization of solar PV and other new and renewable sources of energy. These include:

- Lack of locally produced components and raw materials
- Lack of private sector capacity in manufacturing, distribution, installation and maintenance

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[1]In August 1992, SADC replaced the Southern African Development Coordination Conference (SADCC), a more informal and limited grouping formed in Lusaka in 1980. Current SADC member countries are Angola, Swaziland, Mozambique, Lesotho, Tanzania, Malawi, Zambia, Zimbabwe, Namibia and Botswana.

- Lack of data for the design of PV systems
- Limited availability of foreign exchange
- Cost of PV
- Inadequate financing programmes
- Lack of trained manpower
- Lack of public awareness of the technology
- Lack of institutional framework to ensure quality and sustainability of new and renewable sources of energy (NRSE)
- Restrictive import duties and sales tax regimes
- Lack of appropriate environmental policy.

In its "Study on NRSE Pricing in the SADC Region," SADC recommended eliminating or reducing surcharge and import duties to no more than 10 percent of the cost of PV components and products, eliminating sales taxes for NRSE technologies, eliminating foreign exchange controls, and establishing a set of installation standards determined by national energy ministries. In addition a call was made for "long-term loans for renewable energy investments that include the accounting of the saved costs for conventional energies into the amortization rate of renewable energy investment."

Zimbabwe's long-standing interest in solar energy was expressed by the Permanent Secretary for Energy and Water in Harare in November 1991, while chairing a three-day International Solar Energy Conference on Economic and Political Initiatives for Application of Renewable Energies in Developing Countries. At that session, the Permanent Secretary called for a "solar light revolution to bring civilization to the many dark corners of Zimbabwe." Photovoltaics, he added "can provide this light and fill the gap between no electricity and the national electric grid." He predicted that by the year 2020, every household in rural Zimbabwe could be illuminated with solar electricity.

A DOE-sponsored national PV workshop identified numerous advantages of PV systems relative to present services. Among these were the better quality of light; continuous service; convenience; lack of smoke, fumes and danger of burning; and the reduction of urban-rural disparities.

In October 1991 Zimbabwe's PV manufacturers, design and installation firms, and other interested parties gathered for a one-day workshop sponsored by the DOE. The workshop advocated the formation of a Zimbabwe Solar Energy Industries Association, which has now been established, and which is playing a key role in this project. Noting that PV is a viable option to bring about decentralized rural electrification with the kind of power requirements most commonly needed by small-scale rural users like homes and shops, the workshop recommended that:

- PV equipment should be put on the Open General Import License and special consideration should be given to the

reduction of duties, tariffs and taxes. There have since been positive changes resulting in the relaxation of duties on selected solar imports.

- Local technology and systems components should be improved to provide greater reliability

- Zimbabwe's PV business should be more decentralized to provide better marketing and service

- Credit facilities must be provided, preferably through existing institutions with collateral guarantees from a supporting agency.

2. Expected end-of-project situation

By the completion of this five-year project, a number of significant advances should have been made:

- At least 9,000 45 Watt or equivalent[2] systems should have been directly installed. An equal number of PV systems should also have been indirectly sold as a result of the programme.

  Available funds from the programme are sufficient to install up to 9,000 home solar systems of equivalent 45 watts (W) each at current prices. The Credit Support Facility, which is partially replenished by consumer down payments, instalment fees and component purchases, is unable to support installation systems without periodic seeding. Furthermore, should half of the 9,000 initial systems be of low wattage (including battery-charging operations), another 5,000 or more households could receive electric lighting and power for radios under the programme.

- through this pilot project, a sufficiently large number of households and community institutions will have received solar electric systems, allowing a valid assessment and demonstration of the technology and the various approaches to its promotion and dissemination.

- Capacity will have been built through the existing solar manufacturing industry, commercial financial institutions, Government ministries and agencies, district councils, NGOs and ZESA, to demonstrate that solar PV can play a key role in Zimbabwe's energy future

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[2] Should the systems be of lower wattage, the number of systems installed will increase proportionally.

expanded use of solar PV will be a model for sustainable rural energy development throughout the region and the world.

- It will have been demonstrated that this appropriately scaled down renewable energy technology can effectively meet most rural household needs for electricity in a way that does not harm the environment.

- Operating under an Economic Structural Adjustment Programme, liberalized trade laws, a market economy, and available credit through ongoing revolving credit funds, the commercial solar industry would be able to offer home solar systems to rural people at affordable rates.

- Open competition and an expanded market will have a positive impact on consumer prices, at least in real terms, down from approximately US$ 600 for a 45 W system including four 20 W fluorescent lights, wiring, switches and installation.

- The project should have been instrumental in creating a more favourable climate for investment in the solar energy sector. The Zimbabwe-based solar industry should become able not only to serve its local market, but also to export to other countries in the region.

- The Credit Support Facility fund will have become a permanent-self sustained scheme, established and managed by a local institution. At the termination of the pilot project, the residual funds will be managed by the Government.

3. Target beneficiaries

The target beneficiaries will be the people living in unelectrified rural areas, especially those who, with the assistance of concessional financing mechanisms, can afford to purchase their own 20 to 50 W solar electric lighting systems. As already noted, 0.2 percent of the 5.2 million people living in communal and resettlement areas are connected to grid power. Another 155,000 people have access to the grid power supply, but remain unconnected.

The programme will also attempt to target the "true" rural poor - the 80 percent without enough purchasing power for a 45 Watt system- by helping to develop and produce small 5,10 and 15 W lighting systems along with affordable hire/purchase financing. These small systems, over 500 of which have already been sold in Zimbabwe, provide the basic light needs for the poor rural families. Other options to be considered to facilitate the access

to the systems include, renting\leasing arrangements, partial payment in kind (labour) and the use of communal battery charging stations.

Distance from the electrical grid will be the main criterion for establishing target areas/markets. Beneficiaries should live at least 5 kilometers beyond the nearest main power line. Other criteria such as employment rates, commercial farming activities and the existence of NGO- or Government-sponsored community development activities could also be utilized to select target areas. On the other hand, it is expected that the commercial cash-led marketplace will self-select scattered beneficiaries throughout the country.

Provincial Development Councils will assist in determining the local market for PV systems in the selected areas. In addition, they could be instrumental in marketing the systems and in facilitating the development of installation capacity locally.

Within a selected target area, individual income levels will largely determine the applicability of a given delivery system and eligibility for accessing the financing scheme. Homes that are clustered in communal areas near district and rural service centres will be ideal targets. At least three communities of 100 to 500 houses each will be identified, and the goal will be to electrify virtually every house.

After the formalization of the project document, the PMU, after consultation with the provincial Development Councils will produce a list of specific geographic target areas. This list will be approved by the Steering Committee and will be updated regularly according to changes in the qualifying conditions in the eight provinces. A vigorous awareness campaign will be undertaken so that all provinces may receive a share of the PV systems.

Up to two thousand systems will be allocated for community institutions in the selected target areas, including clinics, hospitals, schools and community centres. By allowing the technology to be demonstrated and observed, schools and clinics are often catalysts for further solar development in a given area.

Traditionally, such institutions have been the beneficiaries of donor aid projects which provide complete solar systems gratis. This project, however, will require each community institution to pay for the system, thus permitting them the same access to the revolving fund at the same concessional rates as individual consumers. These systems are likely to have a higher cost than a typical home solar system. Hence specific requirements will be determined on a case-by-case basis and funds will be loaned to qualified community associations accordingly.

3.1 Cost and ability to pay

The fee (1991) for being connected to the electrical grid is US $125 plus ongoing monthly bills of US$ 10 to US$ 15. This is more than many people can afford. In addition, because most grid-connected rural families have very low consumption rates - less than one kWh per day - the cost of being hooked up to the grid cannot be justified.

By contrast, a 45 W photovoltaic system, purchased with a US$ 100 down payment and paid for over thirty-six months at US$ 15 per month, will provide sufficient power for twenty years with only minor maintenance and occasional battery replacement.

A 1991 DOE PV workshop analyzed three sizes of domestic lighting systems - 20, 50, and 100 Watt-peak (Wp) - and their costs to the consumer compared to their present energy expenditures for kerosene, dry cells, candles and car batteries (carried to and from garages for charging). The study found that 70,000 households would be ready cash customers for 50 Wp systems. Twenty percent of the population of rural areas was found to have sufficient purchasing power to acquire home solar systems through hire purchase.

The study recommended that the remainder of the rural population without sufficient purchasing power - nearly 80 percent - be serviced through solar-powered battery charging stations. These stations could use six 45 Wp panels to charge fifty small deep-discharge solar batteries. The batteries would be leased to clusters of fifty families; every ten or fifteen days the batteries would be returned for recharge or exchange, with a cost per family of US$ 2 to US$ 3 per month. The batteries for this programme would be manufactured in Zimbabwe.

In addition to this modality, the ZESA and NGO delivery modes could also introduce rent and lease mechanisms to appeal to the needs of the lower income segment.

The Electrification Master Plan identified a clear ability-to-pay and a willingness-to-pay for electricity (either grid extension or PV). The document points out that non-electrified households average higher monthly energy bills than electrified households. Batteries for powering radios and televisions (both dry cell and automotive) account for an average of 48 percent of monthly energy expenditures, while candles and paraffin account for 30 percent. Except for those relying on firewood, non-electrified families have higher energy costs than do ZESA's customers. The average lighting cost for a non-electrified family living in a rural centre is US$ 3 per month.

In addition to consumer savings, considerable foreign exchange savings could be realized in the long run, as the one-time outlay for imported PV equipment is much less than the cost of a family's twenty-year supply of imported paraffin.

Numerous United Nations and World Bank studies have concluded that PV village electrification is more viable using individual (stand-alone) unconnected PV systems than a mini grid powered by a single large PV system or mini-utility. Only in exceptional circumstances (e.g. closely clustered shelters), will mini or micro-grids be considered.

4. Project strategy and institutional arrangements

The programme will use a proven, innovative and renewable technology to demonstrate new approaches to PV applications. Although PV as a technology has been applied in a variety of settings and under a variety of conditions, the approach which this project describes differs from all existing or previous efforts directed at using PV for rural electrification. It will thus serve to demonstrate an innovative and still unproven technical approach.

In order to achieve results in the most cost-effective manner, and to ensure the sustainability of PV rural electrification in the long-run, this project will utilize Zimbabwe's existing commercial sector delivery infrastructure. As the Secretary for Transport and Energy has stated, "It will be the private commercial sector who will be instrumental in delivering photovoltaics to the people." This is Government policy as well as the intention of this project.

4.1 Procurement of equipment:

In the past, the economic policy environment was not favourable to the development of the local solar industry. To the contrary, severe foreign exchange restrictions and import license requirements inhibited the capacity of the industry to meet the local demand because the imported component of the average system represents 60 to 70 percent of the cost. Import license restrictions, limiting the number of systems available were a second inhibitor.

Taking advantage of the fact that foreign exchange constraints have been eased and monetary regulations relaxed, the project will establish procurement mechanisms and credit facility to make available critical inputs to local suppliers.

The project's equipment procurement capacity to maximum advantage to provide the necessary imported hardware, components and commodities required for the production of solar electric systems. Expected savings arising from the realization of economies of scale (volume purchasing) will be passed on to consumers.

On their request, equipment will be imported duty-free by the project for the solar companies. The installing solar companies will then "purchase" modules from the project's warehouse by making payments to a revolving fund established at the financing institutions. In addition, the project will support the local production of balance of systems which include controllers, lights, voltage droppers, etc.

The GOZ will be responsible for procurement of equipment under UNDP procurement rules, regulations and procedures. Based on an assessment of the projected requirements of equipment for a three month period, the National Project Manager will conduct the tender process and submit its recommendation to the Executive Committee together with all the supporting documentation for approval. Procurement of locally manufactured equipment and components will follow the same procedure, but will not be subject to the quarterly requisitions requirement.

Based on the appropriate quality, capacity, availability criteria, the optimal procurement mix will be chosen between :

- Balance of systems components such as batteries, charge regulators, wiring and switches
- Solar cells, aluminum, low iron glass and tedlar plastic sheet for manufacturing
- Finished modules and complete systems for independent suppliers.

Similarly, although customs duty and surcharge have been removed, the National Project Manager (NPM) and the industry will continue with their efforts to negotiate a further reduction or elimination of selective import duties and sales taxes on all solar hardware. This is the policy of the Ministry of Transport and Energy, which has stated: "Given the essential role that PV can play in the social and economic development of rural areas, and in the interest of equity, every effort should be made to reduce the restriction that tax and duty place on the access lower income rural people have to this technology."

4.2 Target Areas

As mentioned before, access to the project will be established primarily based on geographic and economic considerations. Target areas will be identified and approved by the Executive Committee on the basis of distance from the electrical grid, relative development, ability to pay, infrastructure, etc. Specific criteria for selecting beneficiaries may include:

- Located more than 25 kilometers from an urban centre or more than 5 kilometers from the electrical grid
- Income levels (a ceiling will be established for eligibility)
- Source of income (civil service, farming, business, and so on), to determine period and method of payment.

The distribution of the systems by type of end-users will be as follows:

* 900-1500 systems for semi-urban houses clustered in communal areas near district and rural service centres
* 1500-2000 systems for community institutions in unelectrified rural areas
* 5,500-6,500 systems for households in unelectrified rural areas

4.3 Delivery Modes

THree basic delivery modes will be implemented in each area, namely: (a) commercial,(b) ZESA, and (c) NGOs/CBOs). Individuals/households and community institutions will be eligible to either mode according to income levels and other criteria.

For both modalities the terms and conditions for end users (warranty requirements, interest rate, period) will be established by the Executive Committee based on the recommendation of the project manager. Conditions within each category will be the same for all qualifying clients.

4.3.1 Need to Address the Very Low Income People.

There is need to address the specific needs of the potentially large market for small lighting systems (5-20W), since the target population does not have the purchasing power and cannot access commercial lending, not even at a concessional rate. Specially tailored approaches are therefore necessary to reach this low income group.

To this end, after a careful assessment, an effective outreach programme to the low income peasant population will be conducted by the PMU. This exercise will define the desired services, specifications, prices for the required PV products and will provide the information on the basis of which conditions for payment will be established.

The Zimbabwe Electricity Supply Authority (ZESA) together with Non-Governmental and Community Based organizations (CBO's) will be instrumental in delivering systems to the very low income target groups.

4.3.1.1 Zimbabwe Electricity Supply Authority (ZESA), will have access up to 700 45 W-equivalent systems to be installed in target areas lying beyond its grid under its own solar energy programme. Solar electric systems will be provided to ZESA by the project and will either be installed by the private companies or by ZESA's trained technicians.
ZESA, as the national utility company has comparative advantages over other delivery participants, in as much as it is able to cater for long-term financing schemes. This will facilitate coverage of the poorest segment of the market by offering the possibility of amortizing the cost of household systems over ten or twenty years, thereby requiring only a small monthly payment by householders.

Options available under this delivery mode will include but may not be limited to: (i) rental/leasing and purchase of systems on long-term basis, (ii) Utilization of battery charging stations owned and operated by ZESA, and accessible to users through a small monthly fee, and (iii) payment in kind.

The share of systems allocated to the ZESA will be delivered through the utility's own Credit Support Scheme and marketing strategy to be established with the assistance of the PMU, and approved by the Executive Committee. Financial mechanisms for the utility delivery mode, including those related to the location and operation of the credit support fund, interest rates, etc. will also be developed in collaboration with the PMU and will be approved by the EC.

4.3.1.2 Non-Governmental (NGO) and Community Based Organizations (CBO's) [3]

District councils, local solar energy credit associations, and NGOs, will have access to up to 1000 45 W or equivalent[3], pursuant to approval of marketing plans by the Executive Committee. The specific modalities of this approach will be worked out with each participating organization, in order to encourage innovative methodologies. However, the bottom-line of this approach will be to make more affordable the systems to the poorest segment through cost-cutting measures. PMU, through the on-going installer training programme will train NGOs/CBOs and assist them in training their own members at grass-roots level on installation and maintenance of solar systems. The savings realized from the reduction in

[3] Under this delivery systems, designed to serve the poorest segment of the rural population, it is highly desirable that the systems be of a lower wattage. However this will depend on the capacity of the local industry to provide such systems.

installation and maintenance costs are expected to result in lower costs for end users, with only a small incentive going to the organization itself. The PMU will provide technical support to participating NGOs/CBOs in terms of setting up their programmes and defining the details of their marketing strategies.

It is anticipated that NGOs/CBOs will have access to the Credit Support Facility at AFC and will act as intermediaries between the end users and the AFC, distributing credit application forms, collecting down payments and installments for the group of beneficiaries. However, each individual enduser will remain financially responsible to the AFC and his/her system will be the collateral for the loan.

4.3.2 The Commercial delivery mode

Under this modality, individuals/households as well as community institutions with a higher purchase power will be served. Although credit applications will be available from a variety of sources (AFC, Provincial Councils and installers), the main marketing effort will be undertaken by the qualified installing companies. This does not preclude ZESA, the NGOs or any other organization from conducting marketing efforts of their own through this facility. Based on the eligibility criteria set by the Advisory Board, AFC will process applications. Conditions for this modality, will largely be determined by those prevailing in the marketplace, which represents -on its own- a strong sustainability Fund (CSF) since the bulk of the systems (between 5,500 and 7,000) are expected to be delivered through this mode.

Considering that the conditions may differ from one delivery mode to another and that, as a result installation of systems may take place at different stages, it is necessary to allow some degree of flexibility in the allocation of solar systems among delivery modes. To provide this flexibility, the number of systems reserved for the different delivery modes can be modified upwards and downwards by the Executive Committee based on the delivery rate of each scheme or on financial grounds, provided that project objectives are met and that the viability of the credit scheme are not jeopardized.

4.4 Financing Scheme

There will be three basic financing modalities for end users of solar systems:

- Dealer financing for aggregate loans through block discounts involving multiple consumers handled by PV suppliers/installers, NGOs and CBOs.

- Individual consumer financing for solar systems using the solar panel as collateral

- Loans to institutions (such as schools, churches and clinics) and community associations (grassroots revolving credit funds) backed by a loan guarantee from the programme fund.

The Agricultural Finance Corporation is the first organization to provide credit for the nationwide dissemination of PV systems. AFC has already established a Credit Support Fund with project funds for the commercial delivery mode. This facility will be expanded to cater for the NGO/CBO delivery mode also.

On the recommendation of the PMU the Executive Committee will approve the establishment of similar arrangements with other financial institutions if it is deemed necessary. Appropriate legal instruments will be entered into with each institution participating in the management of the Credit Support Facility.

Although AFC will be managing the CSF through its main Office in Harare, authority for loan review and approval will be decentralized to the AFC branches throughout the country.

4.5 The Credit Support Fund (CSF) **(see Annexe V).**

By the end of the project, the expansion of the use of solar energy systems will largely depend on the establishment of locally supported and funded, financing schemes for PV system supply and installation companies as well as for end users. The CSF, established with initial seeding from the project is expected to aid the consolidation of this scheme.

An appropriate legal framework has already been established for the operation of the CSF at the AFC, similar arrangements will be made with ZESA and with any other participating organization. In addition, PMU developed appropriate management procedures and financial regulations. Suitable financial provisions have been made to workout the details of the withdrawals of funds for the CSF.

To a large extent, the overall success of the project will depend on the sound operation and management of the CSF. Jump-started by an initial seeding, the facility will allow for payments to installing companies on behalf of end users. Cash purchases of solar components by installing companies and regular payments by end users are the main CSF replenishment channels. In addition, the facility should also provide a buffer for payment defaults and for the long-term delivery modes. It is clear that for it to remain viable, the combined financial flows on the CSF should keep it within a strictly controlled ceiling.

Due to the fact that financing from the facility only covers those cost components requiring foreign exchange, (approximately 60% to 70% of the total cost of the system), a comprehensive procedure for monitoring the fund, including capital erosion will

be established. Especially needed is a procedure to cover treasury gaps. Mechanisms could include: a) an advance by AFC, the term of which could be negotiated, b) establishing alternative procurement processes - on local basis for the complete systems.

Furthermore, the time lag between the procurement of solar panels by the PMU and selling them to the installers could become another source of revolving fund erosion, as adverse exchange rates may occur during this period. The main provision to prevent fund erosion, is to reduce or eliminate this time lag to a minimum set by the Executive Committee. In addition, PMU will provide a price list in Zim dollars updated on the first of every month, thus following exchange rate fluctuations.

Another source of progressive fund depletion is of structural nature, since the CSF line of credit only covers 85% of the total cost of the system. Professional financial assistance in the form of consultancies are envisaged to assist in the development of a functional mechanism to stabilize the CSF. In addition, a monthly report on the running of the CSF should be prepared and submitted to the Executive Committee.

The long term sustainablility of the financial scheme depends on the effectiveness and financial soundness of the CSF. Therefore, in order to prevent an artificial boost of the market any in-built subsidy mechanism should be carefully targeted and phased-out gradually. Nonetheless, at the beginning of the project subsidized interest rates and concessional terms of financing may be necessary to lift the project off the ground.

4.6 Cash Sales

Just as credit users, cash purchasers will contribute to the CSF, since they will also derive benefits from the project. To this end, appropriate mechanisms will be devised to retrieve from cash sales, the contribution to the capital base which is built into the interest rate of the financial scheme.

4.7 Private Sector Participation

To meet the goal of the programme, the participation of most of the existing companies is required. The commercial sector is expected to install at least 90% of the systems, through the different delivery modes. Between fifteen and twenty installations a day, for at least 200 days a year, will be necessary during the first three years of the implementation phase to achieve a target of 10,000 installations. The actual installation rate is currently 6 to 10 installations per day.

As mentioned before, key to long-term sustainability of the project is the establishment of a local private sector capacity for installation, operation, maintenance and repair of PV systems. The

creation of mechanisms for financing PV system supply and installation for end users are elements of the project's strategy aiming at this purpose.

4.7.1 Coordination with Industry

Explicit plans have been drawn up for PMU/Industry coordination. The strategy calls for a closer linkage between project management and participating companies, promotion of local components manufacture, establishment of joint committees and holding of regular sessions, as well as hosting of decentralized workshops and training programmes.

A two-tier approach will be followed in order to enable the local industry to take full advantage of the project for strengthening its technological, managerial and financial soundness. On one hand, appropriate training and high level technical assistance will be made available at all levels, whilst rigorous quality standards and control mechanisms will be adhered to and enforced.

4.8 Training and technical assistance

An articulate strategy for strengthening the local know-how on solar technology will be developed. The strategy will be operationalized through a detailed medium-term capacity building workplan prepared by the PMU. A deliberate effort will be made to exploit technology transfer possibilities, with the project becoming a major catalyst of technology transfer by facilitating the links between the Zimbabwean companies and international solar energy experts. In addition there are provisions for short-term consultancies by experts of the highest caliber and for study trips to other countries with more advanced PV technology.

In conjunction with the relevant institutions, PMU will establish training courses for qualified installation applicants. Conducted by professional PV systems trainers, these courses will be a pre-requisite for certification and licensing of installers and technicians. Other forms of training for installers and end users will be undertaken on a systematic basis and included in the work-plan.

4.9 Quality control

4.9.1 Qualifying Criteria and Standards

Building-up the local industry capacity of the industry to improve technical capabilities and reduce system failure is key to project success. By the same token, monitoring mechanisms are a *sine qua non* condition for long-term quality and sustainability of the market.

To this end PMU, with support from the solar industry, has developed a set of criteria and procedures for certification and licensing of installers and technicians. To ensure transparency in the qualification of installers, clear technical, professional, and financial criteria to be met by all firms before they can participate in the GEF project have been established.

Uniform and transparent guidelines for evaluation and qualification, ex-ante agreed upon with the industry will be applied. In order to facilitate free-entry, qualifying criteria will be perceived not as a set of pre-conditions but as capacity areas to be assessed and supported if found wanting. The PMU will make every effort to accommodate requests for technical assistance and training from firms/institutions which require such support in order to meet the criteria.

4.9.2 Testing of equipment

Although the equipment purchased will be of the highest international quality standard, suitable technical facilities will be provided to the PMU for performing basic testing to ensure that out-of the box equipment is in working order, thus eliminating from the installers the risk of any manufacture caused fault.

4.9.3 Inspections

A system of inspections will be the backbone of the quality control strategy. Based on a random sampling approach, regular inspections will aim at ensuring a high level of quality in installations and service and full adherence to the standards by installers. Relying on existing national institutions for its operation, PMU will devise a sustainable system of inspections which, will take into consideration the company's experience in the field and past performance. The inspection costs, which are essentially transport and per-diem, are included in the project budget under the travel costs line. However, in the case of re-inspection due to faulty installation, the responsible company will be asked to cover in full the additional costs involved.

4.9.4 Warranty and maintenance

Since in most instances the PV systems will require service and repair within three years of installation, installers will be required to offer at least a three year-warranty. Companies can either be allowed to include the projected cost of warranty-based service in their initial price or alternatively, they could offer an extended service contract to the consumers.

Special arrangements will be made for the NGO/CBO delivery mode in which, as a cost saving measure, trained beneficiaries will be responsible for installation and maintenance.

Upon satisfactory completion of the installation, both installer and end users must certify that the latter has been trained on the use and simple maintenance of the equipment, before the certificate of completion is issued by the PMU.

4.10 Code of Ethics

A clear set of standards for ethical and professional behavior developed by the PMU and approved by the Executive Committee, has been established for industry. This includes appropriate guidelines for resolution of conflicts of interest and penalties for these. Provisions should include for example, ensuring that employees of Government/UNDP should not misuse their positions or communicate to anyone external to the project, any privileged information, except as authorized by Government/UNDP; further they should not establish their own solar installation and/or service companies. Companies benefitting from the UNDP/GEF project should meet basic standards of professional competence, financial responsibility and good ethics.

4.11 Publicity

A newsletter will be prepared and published by the PMU in close collaboration with the industry, NGOs and interested institutions. This publication should depict project progress and lessons learned as well as provide continuous information on the dissemination of photovoltaic technology in the country, thus expanding the outreach of the project.

In addition the production of a documentary video will be undertaken during the course of the programme to be used to document the solar electrification process and to disseminate the achievements of the project.The video should be released to coincide with the 1995 World Solar Congress of the International Solar Energy Society will be held in Harare, providing a timely opportunity for Zimbabwe to showcase its GEF programme of solar rural electrification.

Provisions are also made for the PMU to participate in trade-fairs, expositions, exhibitions and shows to promote the use of PV systems and disseminate the results of the programme.

4.12 Implementation arrangements

The Government will adopt internal arrangements for the execution of the project. The role of the GOZ, UNDP and UN cooperating agencies as well as the procedures to be followed for project implementation will be specified in a Memorandum of Understanding which, upon signature shall become an integral part of the project document.

4.12.1 Project Management Unit (PMU)

Implementation arrangements for the programme include setting up under the executing/implementing agency at the Ministry of Transport and Energy, at arms-length, a separate project management unit (PMU).

With the assistance of a professional project management consultancy a practical-goal oriented work plan will be developed and a clear and effective functional structure will be established for the PMU. This exercise will also address PMU procedures, staff profiles and training needs as well as financial reporting and accountability. The consultancy should also lead to the development of an appropriate management information system with adequate procedures, computer equipment and qualified human resources.

Coordinating this unit is a National Project Manager (NPM), paid from the project budget who is responsible and accountable for the overall programme, including financial, administrative and technical matters. The NPM must liaise closely with the Executive Committee on managerial issues, with the Advisory Board on policy issues, and with the relevant Government institutions and the UNDP Country Office on operational issues.

In addition, there will also be at the PMU a technical operations officer with strong technical background and proven managerial experience. This person will assist the NPM in his executive duties, being responsible for the day to day operation of the project. Also within the PMU there will be a rural PV Expert, preferably from the region, this PV expert will provide the high level technical input to the programme, overseeing technical assistance to the industry, organizing and conducting training activities and preparing the relevant material.

Attached to the PMU is an Outreach Advisor responsible for outreach activities in the field. The outreach advisor will prepare and put in operation an effective outreach programme for low income peasant population. This exercise will include an assessment of the desired services, specifications, prices for the required PV products and will provide the information on the basis of which conditions for payment will be established. A secretary and 2 drivers for the PMU are also included in the budget.

Seconded to the unit are professional staff from the DOE, as the ministry's in-kind contribution to the programme. These professional officers will assist in the financial and administrative duties and will also have other important roles in project monitoring, inspection of installations and the enforcement of standards.

A number of short-term consultants will be required in support of the training and technical activities of the capacity building work-plan. Consultants and firms will also be engaged under the sub-contract modality to conduct specific tasks related to public awareness, video production and publication of a newsletter and other materials.

Provisions are made in the form of study tour and fellowships, for intensive training of the PMU personnel in order to enhance their capacity and capability to implement the project and for the project to become a nucleus of qualified and highly trained photovoltaic experts. This will thus allow the PMU to perform efficiently and implement effectively its extensive technical backstopping functions under the project.

4.12.2 The Executive Committee (EC)

The Executive committee will be the highest executive body of the project, responsible for overall project guidance on operational and managerial issues. In that capacity the EC will provide directives, oversee the functioning of the PMU and approve the projects implementation strategy as well as the annual PMU workplan. The Committee will also approve the allocation of tenders for procurement of equipment, terms and conditions of credit for the CSF. The eight member committee will be chaired jointly by the Permanent Secretary for Transport and Energy and the UNDP Resident Representative, and will include representatives from the National Economic Planning Commission, the Agricultural Finance Corporation, the Ministry of Environment and Tourism. Two representatives from the industry/business sector and one from the academic community, appointed by the Ministry of Transport and Energy will also be included. Committee members are appointed as individuals, hence their participation cannot be delegated.

4.12.3 The National Steering Committee (NSC)

An NSC will be set-up to advise the Government on decisions related to policy issues including target areas, allocation of systems amongst delivery modes, participation of additional financial entities in the Credit Support Facility and others. The group could also play an important role arbitrating conflicting issues between public and private domains. The group will be a forum of discussion and analysis for all interested parties, supporting the Ministry of Transport and Energy, as the responsible Government institution, on all matters related to project implementation and progress. The group will be chaired by the Director of Energy, and will include also the NPM, representatives from the Ministry of Environment and Tourism, Ministry of Industry, two representatives from NGOs dealing with renewable energy/environment issues, the Consumer's Union (representing end-users), two representatives from the solar industry and one from UNDP.

4.12.4 Scientific and Technical Advisory Panel (STAP)

An international scientific and technical advisory committee of five international experts, to provide technical backstopping and oversight has been established. Its activities will be supported by the project budget.

Draft Terms of Reference for the panel involve meetings in Zimbabwe at least once a year, including participation in the Tripartite Reviews. The panel will monitor the implementation of the project and provide advice as required. Its members will provide support to the project in developing strategies and approaches to institution and capacity building, and advise Government and the PMU of opportunities for study tours and international workshops/conferences. Details of the panel and its Terms of Reference are herewith annexed.

4.13 Sustainability/Capacity Building Strategy

The project follows an explicit capacity building approach, conceived as a deliberate effort to develop the national capability to perform those particular functions required for the diffusion of solar energy within the country. The capacity building strategy will be delineated in a medium-term workplan with specific targets for technical assistance to be prepared by the PMU and approved by the EC. The main elements of the strategy are: (a) development of human resources; (b) building and strengthening of institutions and (c) facilitating the adoption of an appropriate policy environment. The PV expert will be responsible for implementing the workplan, involving consultants on specific activities.

4.13.1 Human resources development

With the aim of enhancing its project implementation capabilities and to transform the PMU into a nucleus of qualified photovoltaic experts, provisions are made for the training of PMU staff in relevant areas through study trips and workshops by experts. In addition, staff will be trained in the management of the Credit Support Facility.

Experts from companies abroad may be brought in for entrepreneurship and management training, as well technical assistance to the renewable energy industry. Technicians from installing companies will systematically be trained by professional PV systems trainers. End users will be trained in the operation and basic maintenance of PV systems.

Negotiations with the appropriate institutions will be undertaken in terms of including solar energy as a subject in the formal education curricula. Already formal consultations have taken place with the University of Zimbabwe and the Harare Polytechnic.

4.13.2 Institutional building/strengthening

A highly qualified local professional management consultancy will be engaged to work with the PMU to develop and implement a program of restructuring and expansion of its capabilities. This exercise will address the areas of process and procedures, staff profiles and training needs, information and data management, technical and financial reporting, accounting and management information systems among others.

In addition, PMU will be provided with suitable technical facilities and skills to conduct basic testing of equipment. In the long-term, the project will seek the integration of the PMU into the DOE, either under its present structure or within any renewed institutional arrangement with an expanded portfolio.

Efforts are also directed throughout the project at consolidating a local private sector capability for installation, operation, maintenance and repair of PV systems.

Critical to the sustainable diffusion of PV systems in the country, is the creation of mechanisms for financing PV systems supply and installation companies and of end users. The groundwork for such mechanisms should be laid-down by the project's Credit Support Facility. Institutional continuity will be required for key functions of Government, including development of standards for performance; testing and certification of components and systems and technical assistance.

It is anticipated that the comprehensive quality-control systems which the project will put in place, including inspections, monitoring and evaluation mechanisms, will contribute to the long-term quality and sustainability of the market.

4.13.3 Creating an appropriate policy environment

Expanded collaboration with ZESA will include input from PMU on the development, financing and implementation of the Rural Electrification Master Plan and assistance to the utility in terms of setting-up their renewable energy programme.

Every effort will be made to integrate outreach activities with Government-sponsored social and economic programmes, coordination with multilateral development assistance (including the World Bank anticipated renewable energy-based, decentralized electric rural power delivery programme).

Removal of tariff duties on G.E.F. imported components has increased demand for solar systems under the project. Further, the PMU is currently negotiating with Government for removal of sales tax which affects endusers.

All the elements described above, some of which are already incorporated into different sections of the project, will be compiled by the PMU into the capacity building strategy.

5. Reasons for assistance from UNDP

Zimbabwe's energy sector reflects the imbalance and inequalities of the country's economy. While much planning and investment has gone into the provision of energy for the commercial, industrial sector and for urban households, little has been devoted to the bulk of the population. As a result, 85% of Zimbabwe's electricity is consumed by industrial and commercial users. The remaining 15% utilized by residential consumers, is utilized almost exclusively by urban households in the higher income bracket.

A policy analysis study made by the Kennedy School of Government at Harvard University for the United Nations Centre for Science and Technology for Development (1990) concluded that :

> "Photovoltaics can play an important role in providing electricity to rural areas of Zimbabwe. Under certain conditions of low population density and low electricity demand, PV is a much more cost-effective technology than grid extension; [The] addition of PV to the current electrification strategy could thus provide substantial savings to the government. Further, photovoltaics, if provided to the rural poor at subsidized rates, is financially feasible and will permit users to be owners and managers of their own electricity resources."

Environmental concerns and the need to address the issues of development and environment together prompted the Government of Zimbabwe to request special development assistance under the guidelines of the GEF.

Long-standing interest in PV technology within the government and the private sector led to the specific project request. Many senior officials within the Government have expressed support for PV energy as a viable alternative to conventional energy sources.

Through the offices of the then Ministry of Environment and Tourism, a proposal for a PV project for Zimbabwe was tendered to the GEF early in 1991. The then Ministry of Energy and Water developed the initial project concept, planned as a five-year programme, with special attention to ongoing infrastructure and sustainability.

The GEF Coordinator for Africa proceeded, with the assistance of the Solar Electric Light Fund, and support from the then United Nations Department of Technical Cooperation for Development, to develop a project brief for GEF consideration. The GEF

Implementation Committee approved the project in October 1991 for U.S.$7 million. The project began in 1993 under the execution of DDSMS. Following a decision to move to national execution, the project was reformulated and re-launched in mid-1995.

6. Special considerations

6.1 Women

Women, who outnumber men by 10 to 7 in the rural areas, will play a key role in the adoption of solar electricity in rural areas as they are likely to benefit most from it. While men tend to migrate to the city seeking employment, it is the woman who usually stays in the villages conducting domestic and productive tasks. Subject to workloads of up to 18 hours a day, after sunset (approximately 6:30 p.m. around the year) they are confined to dark workplaces and unable to enjoy good time with their families. For this reason they are often the first to show interest in solar lighting.

Because the project could be instrumental in enhancing the living conditions of rural women, women's organizations at the national, provincial and district levels will be encouraged to become involved in the programme.

6.2 The environment

The environmental implications of this project are enormous. If, as a result of this project 10,000 households begin using solar electricity, the amount of kerosene burned per year per household will decrease significantly. This will annually prevent about 400 tons of carbon dioxide from being released into the atmosphere. Also, at a household usage rate of ninety-six dry cell batteries per year, the project will have prevented the disposal of nearly 5 million of these dry cells in ditches and garbage dumps where they could have had harmful environmental effects. In addition, hydrocarbon emissions from the use of as many as 15 million candles will also be displaced.

As part of the on-going efforts to comply with the provisions of the United Nations Framework Convention on Climate Change, regular assessments of emissions are expected during the project lifetime. These will provide a reliable indication of the degree to which Green House Gases have been offset by grid displacement and other abatement measures.

A technical review of ZESA's emissions will be conducted during the programme to indicate the degree to which GHGs have been offset by attendant grid displacement.

6.3 Economic development

This programme focuses on developing a solar energy delivery infrastructure, including technical training and support for small enterprises at community level. The programme will therefore be instrumental in creating a demand for solar PV systems and in enhancing the local installing capacity through industry, utilities and NGOs. Where appropriate, the project will make use of the local manufacturing capacity. In either case, an indirect result of the effort will be to rapidly commercialize an already existing small PV industry.

7. Coordination arrangements

7.1 Government agencies

Several Ministries will actively participate in the project implementation through the advisory group and executive committee. Close coordination and extensive consultations with ZESA, district councils, NGOs, Government agencies and community development associations will take place at the policy level within the advisory group. At the operational level, the project will link up with relevant Ministries which have extension services in all provinces.

The Ministry of Information, Posts and Telecommunications, a strong supporter of solar energy development, may prove helpful in providing educational materials and liaising with Government media.

The Ministry of Local Government, Rural and Urban Development. should be approached to assist with development efforts focused at the district council level.

7.2 SADC

Liaison with SADC will be important as member states will be watching the programme closely. At a workshop held in Swaziland, on Renewable Energy and the Utilities in the SADC Region, the GEF PV programme was discussed at length, with much interest exhibited by representatives of SADC utilities and energy ministries.

7.3 Donor Community

The Danish International Development Agency (DANIDA),the European Community, the German Technical Cooperation Agency (GTZ), the Canadian International Development Agency (CIDA) and the Swedish International Development Agency (SIDA), are all sponsoring small renewable energy programmes in Zimbabwe which are in different development stages. Every effort will be made to liaise closely with them, identify common areas of interest and explore avenues for joint activities.

7.4 Other coordination efforts

The programme will sponsor a workshop for NGOs and the donor community to familiarize Zimbabwe's numerous aid and development organizations with the use of PV technology in rural electrification. It is hoped that this event will motivate participants to support further efforts for consolidating the introduction of PV in communities where they already have projects.

Agricultural institutions, shows, fairs and credit bureaux will be approached in terms of supporting the dissemination of the technology.

8. Counterpart support capacity

The government will provide in-kind support equivalent to Zim Z$2,120,000.00 during the life of the project. This contribution includes the salaries of the DOE professionals which are seconded to the programme as well as that of the support personnel and senior officials involved in its implementation, office space, vehicles, communication costs and other inputs.

9. Possible follow-up

The World Bank has expressed its willingness to explore the possibility of additional financing of up to $15 million in concessional loans or GEF grants, provided that a successful investment model - either commercial, Government-sponsored or parastatal-has been identified within the first two years of the project.

C. DEVELOPMENT OBJECTIVE

To supply basic electrical service to rural populations lacking access to grid extension utilizing an environmentally benign and affordable solar technology, thus reducing emissions of GHGs by at least 3000 tons over the 5 year period as the use of conventional-coal powered electrical generation is deferred and the domestic consumption of paraffin is significantly reduced. The programme will serve as a demonstration of an innovative and still unproven technical approach as an alternative to planned grid extension.

D. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

IMMEDIATE OBJECTIVES

- Upon completion of the project, to have developed and proven feasible, a sustainable solar rural electrification strategy with appropriate institutional mechanisms.

- Over a three year period, to have facilitated the installation of a minimum of 9,000 45 Watt or equivalent solar electric systems in households and community institutions in rural areas, through a revolving fund mechanism which will continue to operate after the project end.

- By the end of the project, to have established standards and upgraded local installation and manufacturing capacity. Improved technological capacity within the local solar industry should be imparted for manufacture of charge controllers, batteries, lights, low cost (5-10W) systems, battery charging stations and assembly of PV modules.

- To have created a lasting public awareness regarding the appropriate utilization of solar electric technology and the benefits associated with it.

- To have established a self-sustained financial mechanism for funding of solar PV usage and expansion using three delivery modes (1) commercial/private sector; (2) ZESA utility; and (3) NGOs and community based organizations.

OUTPUTS AND ACTIVITIES

Output 1

Availability of and immediate access to critical PV technology equipment and components for utilization by Zimbabwe's solar industry to assemble and install 9 000 equivalent 45w solar systems in households and community institutions in rural areas, according to the requirements and needs of the end-users.

Activities for Output 1

1.1 PMU to establish appropriate procurement/storage facilities for solar panels and components, utilizing Government and UN established capacity.

1.2 In coordination with the solar industry and the Zimbabwe Standards Association, the PMU will develop mechanisms, a set of qualifying criteria, and procedures for certification and licensing of installers and technicians as a pre-requisite to access the PV equipment purchased by the project.

1.3. PMU to establish suitable technical facilities for performing basic testing for out-of-the box equipment

1.4 A code of ethics for participating companies to be developed by the PMU and approved by the Executive Committee

Output 2

Availability of commercial credit funds for end users to purchase up to 9,000 45 Watt (or equivalent) solar electric lighting systems over a period of three years.

Activities for Output 2

2.1 Identification and selection of target areas according to the specified criteria and in consultations with the provincial District Councils

2.2 Establish a three-tiered, self-sustained Credit Support Facility at participating financial entities to provide credit to dealers, individuals and community institutions for the purchase of solar systems

2.3 Develop and put in place criteria for the selection and qualification of solar electric dealers, NGOs, CBOs and installers as participants in the credit scheme.

Output 3

Institutional capacity at ZESA for dissemination, installation, and maintenance of an initial 700 solar lighting systems of 45 W equivalent as an alternative electrical system.

Activities for Output 3

3.1 PMU to assist ZESA in the preparation of a marketing plan and implementation of a dissemination strategy for the delivery of solar electric systems in selected rural areas.

3.2 Institute appropriate mechanisms to expedite the access of ZESA to the equipment and components necessary for the delivery of 700 45 Watt equivalent solar systems to At least three communities of 100 to 500 houses.

3.3 Make the appropriate provisions including procedures and regulations for a subsidiary Credit Support Facility at ZESA, to finance the ZESA-delivered systems.

3.4 Support to ZESA in the establishment of a solar programme including training to appropriate officials and staff.

3.5 Conduct a terminal technical review of ZESA's emissions to indicate the degree to which GHGs have been offset by attendant grid displacement.

Output 4

A sustainable mechanism for the financing, delivery and maintenance of solar electric systems for poor households and villages through Non-governmental and Community based organizations (e.g. Rural Councils, cooperatives) is in place.

Activities for Output 4

4.1 Define a set of qualifying criteria for participating organizations select a group of NGOs/CBOs to deliver the systems in the target areas.

4.2 Prepare and put in operation an effective outreach programme for low income peasant population will be conducted by the PMU. This exercise will include an assessment of the desired services, specifications, prices for the required PV products and will provide the information on the basis of which conditions for payment will be established.

4.3 With the assistance of the PMU, participating NGOs, CBOs will design and implement a delivery strategy aimed at the poorest segment of the rural population, including cost-cutting provisions such as the development, with the assistance of the PMU, of their own capacity (at the local level) for installation and maintenance of PV systems.

4.4 Make the appropriate provisions including procedures and regulations for a NGO/CBO "sub-revolving fund", possibly within the main RF, for the financing of at least 1000 45Watt equivalent PV electrical systems.

Output 5

Development of a self-sustained local PV technological capacity in terms of number of trained and qualified PV technicians and installers.

Activities for Output 5

5.1 Assist the local industry in devising and implementing a plan for enhancing their in-house technician training facilities/programmes.

5.2 Develop and conduct an intensive training programme for technicians and installers to create a critical mass of qualified personnel in the private sector, utilities, NGOs, CBOs, Government institutions and other social organizations.

5.3 Advocate and effectively support the establishment of formal solar PV education programmes offering technical level certificates in PV technology in at least one of the vocational education institutions.

5.4 Support the local institutions in the establishment of certification or licensing procedures and requirements for installers and technicians.

5.5 Arrange for Zimbabwe publication and/or distribution of PV technical handbook e.g. Small Solar Lighting Systems for Africa (by Mark Hankins).

5.6 Produce PV technology training materials in English and vernacular languages specially adapted to the local conditions and needs.

Output 6

Increased national public awareness of benefits of solar electricity and on the PV project.

Activities for Output 6

6.1 Conduct a national public awareness media campaign for the GEF project, highlighting its goals, benefits and financial scheme.

6.2 Develop and coordinate the distribution of PV information materials through ZESA, participating community organizations, district councils, NGOs, Government agencies and the Ministry of Information. Posts and Telecommunications.

6.3 Participate in expositions, trade fairs, exhibitions and shows around the country to introduce and demonstrate solar PV technology, and report on progress of GEF project.

6.4 Production of video on the use of the Solar PV electrical technology in Zimbabwe and the achievements of the project. This documentary is to be released at the 1995 World Solar Congress in Harare.

6.7 Publication of a monthly newsletter on the project progress and on the dissemination of PV technology in the country.

6.6 Hold end-of-programme three-day workshop including all involved parties to analyze, critique experience and draft final report (1996).

Output 7

Improved technological capacity, within the local industry, for the manufacturing of charge controllers, batteries, lights, small-low cost (5-10W) systems, battery charging systems and for the assembly of solar PV modules.

Activities for Output 7

7.1 Prepare and put in operation of a medium-term capacity building workplan for strengthening local know-how on P.V. technology

7.2 PMU to organize and conduct, in conjunction with the relevant institutions, quarterly training courses for qualified installation applicants by professional PV systems trainers, as pre-requisite for certification and licensing of installers and technicians.

7.3 PMU to organize refresher training courses for installers and end users systematic basis

7.4 PMU to devise a sustainable random-sampling inspections strategy which, will take into consideration the company's experience in the field and past performance. Inspection to be built-in as a cost component of the system but re-inspections due to faulty installation, to be borne by the installer

7.5 Design and support a research and development programme for the local manufacturing of small (5-10 Watt) PV systems.

7.6 Develop a technology transfer and technical assistance plan to the local industry to be implemented with the PMU's own experts, short-term consultants and other technical specialists as required.

7.7 Organize study tours for technical personnel of PMU and DOE to observe the experiences of PV technology in other countries.

Output 8

To have established standards for PV equipment and components, both locally produced and imported, including licensing programme for installers and standards for installation and design. Ongoing testing programme for PV components and systems.

Activities for Output 8

8.1 Establish systems qualifications for components suppliers, and set design and balance-of-systems specifications for two or three systems of sizes agreed upon in consultation with SAZ, industry and the Solar Energy Society.

8.2 Establish, in coordination with industry and the Zimbabwe Standards Association, national standards for PV systems components, modules, installations and maintenance.

8.3 Prepare and establish testing procedures and programme in association with the Standards Association of Zimbabwe.

8.4 PMU to establish testing facilities to perform basic testing of imported and locally manufactured equipment and components

8.6 PMU to devise and institute an inspections strategy, based on random sampling methodologies to ensure that all installations are done in compliance with standards and regulations.

E. INPUTS

1. Government of Zimbabwe

	M/Months	Zim $
Personnel		
3 Project Officers	108	684 000
2 Project Technicians	72	144 000
4 Part-Time senior proffessionals	36	450 000
Secretarial and Administrative support (see Job Descriptions)	60	140 000
Sub - total	276	1 418 000
Operational expenses		
Transport		72 000
Office Space		300 000
Office Equipment		12 000
Sanitation/Cleaning Services		36 000
Utilities		72 000
Communications		210 000
Sub - total		702 000
PROJECT TOTAL Z$ 2 120 000		

2. UNDP

	M/Months	US $
Personnel		
Rural PV Expert (DDSMS)	18	180 000
National Project Manager	30	100 000
Technical Operations Officer	30	45 000
Outreach Coordinator	30	37 200
Admin/Finance Officer	30	30 000
Admin/Finance Assistant	30	18 000
Secretary	30	15 000
Drivers	60	20 000
Sub - total	258	445 200
Operational Costs		
Short Term Consultancy (DDSMS)	3	50 000
Short Term Consultancy (National)	12	36 000
Management Consultancy	6	25 000
Mission Costs (Advisory Panel)		60 000
UNDP/RBA/GEF Mission Costs		15 000
In - Country Travel		40 000
Sample Inspections		20 000
Evaluation		50 000
Sub - total	21	296 000

Sub - Contracts		
Newsletter		25 000
Publicity		20 000
Sub - total		45 000
Training		
Fellowship		30 000
Study Tours		20 000
International Workshops/Conferences		25 000
In-country Training		160 000
Sub - total		235 000
Equipment		
Office Supplies		35 000
PV Components		3 240 393
Sub - total		3 275 393
Miscellaneous		
Operation and Maintanance		65 000
Reporting		7 000
Sundry (Local)		40 000
Sundry (DDSMS)		2 300
UNDP support costs		132 927
Overheads (sub - contracting)		20 000
Sub - total		267 227
PROJECT TOTAL	279	US $4 563 820

F. RISKS

Risks associated with the project include:

- High inflation rapidly eroding value of revolving funds
- Devalued currency increasing end-user cost of PV units
- Lack of effective local participation
- Failure to establish market incentives
- Surcharges and taxes that increase cost of technology beyond ability of rural people to afford it.
- high default rates
- droughts (poor harvests)

G. PRIOR OBLIGATIONS AND PREREQUISITES

1. Prior Obligations: None

2. Prerequisites: The Government and UNDP will agree on the role of each partner on the execution of the project. The distribution of roles/areas of responsibility will be identified in a separate document to be formalized between the two parties.

H. PROJECT REVIEW, REPORTING AND EVALUATION

The project will be subject to tripartite review (joint review by representatives of the government and UNDP) at least once every twelve months. The programme manager shall prepare and submit to each tripartite review meeting a Project Performance Evaluation Report. Substantive project reports to teh UNDP/GEF Executive Coordinator and to UNDP/RBA will be prepared at least once a year(with the first two reports due 6 and 12 months after the initiation of the project). Additional reports may be requested, if necessary, during the project.

A project terminal report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft sufficiently in advance to allow review and technical clearance by the executing agency at least four months prior to the terminal tripartite review.

The project shall be subject to review four months after the start of full implementation. The organization, terms of reference and timing will be decided after consultation between the parties to the project document. There will be evaluation missions at the middle and at the end of the project.

I. LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Initial Standard Basic Assistance Agreement between the Government of Zimbabwe and the UNDP, signed by the parties on 27 May, 1980. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the Government Cooperating Agency described in that agreement.

J. BUDGET

A project budget, covering both Government and UNDP/GEF inputs, is attached.

1 GOVERNMENT of ZIMBABWE

PROJECT BUDGET COVERING GOVERNMENT
CONTRIBUTION (in Zim Dollars) 1995 - 1997

	M/M	Z$ Total	1995	1996	1997
Personnel					
3 Project Officers	108	684 000	228 000	228 000	228 000
2 Project Technicians (Solar)	72	144 000	48 000	48 000	48 000
4 Part - time Senior/Professionals	36	450 000	150 000	150 000	150 000
Secretarial/Administrative Support	60	140 000	47 000	47 000	47 000
Sub - total	276	1 418 000	473 000	473 000	472 000
Operational Costs					
Transport		72 000	24 000	24 000	24 000
Office Space		300 000	100 000	100 000	100 000
Office Equipment/Furniture		12 000	4 000	4 000	4 000
Sanitation/Cleaning Service		36 000	12 000	12 000	12 000
Utilities (water, electricity, etc.)		72 000	24 000	24 000	24 000
Telecommunications (Phone, Fax)		210 000	70 000	70 000	70 000
Sub - total		702 000	234 000	234 000	234 000
PROJECT TOTAL	276	2 120 000	707 000	707 000	706 000

COUNTRY ZIMBABWE

PROJECT NUMBER ZIM/95/G31/B/50/99
PROJECT TITLE PHOTOVOLTAICS FOR COMMUNITY AND HOUSEHOLD USE IN ZIMBABWE

PROJECT BUDGET COVERING UNDP CONTRIBUTION (in U.S. dollars)

PROJECT COMPONENT		TOTAL AMT M/M	1995 AMT M/M	1996 AMT M/M	1997 AMT M/M
*010 PROJECT PERSONNEL					
* 11 Experts					
011-001 PV Expert		180 000	30 000	120 000	30 000
		18	3	12	3
011-097 Short-Term Consultants		50 000	9 000	25 000	16 000
		3	0.5	1.5	1
11-99 Sub-total	(*)	230 000	39 000	145 000	46 000
		21	3.5	13.5	3
* 13 Admin. Support Personnel					
013-001 Secretary		15 000	3 000	6 000	6 000
		30	6	12	12
013-002 Drivers		20 000	4 000	8 000	8 000
		60	12	24	24
013-003 Admin/Finance Officer		30 000	6 000	12 000	12 000
		30	6	12	12
013-004 Admin/Finance Assistant		18 000	3 600	7 200	7 200
		30	6	12	12
13-99 Sub-total	(*)	83 000	16 600	33 200	33 200
		150	30	60	60
*15 Official Travel					
015-000 In - Country Travel		40 000	10 000	15 000	15 000
015-001 Sample Inspections		20 000	4 000	8 000	8 000
15-99 Sub-total	(*)	60 000	14 000	23 000	23 000
* 16 Mission Costs					
016-001 Mission Costs (Adv. Panel)		60 000		30 000	30 000
016-002 UNDP/ RBA/GEF Costs		15 000		15 000	
016-030 Evaluation		50 000			50 000
16-99 Sub-total	(*)	125 000		45 000	80 000

COUNTRY ZIMBABWE

PROJECT NUMBER ZIM/95/G31/B/50/99
PROJECT TITLE PHOTOVOLTAICS FOR COMMUNITY AND HOUSEHOLD USE IN ZIMBABWE

PROJECT BUDGET COVERING UNDP CONTRIBUTION (in U.S. dollars)

PROJECT COMPONENT		TOTAL AMT M/M	1995 AMT M/M	1996 AMT M/M	1997 AMT M/M
*17 National Professionals					
017-001 National Project Manager		100 000	20 000	40 000	40 000
		30	6	12	12
017-002 Technical Operations Officer		45 000	9 000	18 000	18 000
		30	6	12	12
017-003 Outreach Coordinator		37 200	7 200	15 000	15 000
		30	6	12	12
017-004 Short Term Consultants (Natl)		36 000	6 000	7 200	7 200
		12	2	5	5
017-005 Management Consultants		25 000	15 000	10 000	
		6	4	2	
17-99 Sub-total	(*)	243 200	57 200	98 000	88 000
		108	24	43	41
019 COMPONENT TOTAL	(**)	741 200	126 800	344 200	270 200
		279	57.5	116.5	105
*020 Subcontracts					
023 001 Newsletter		25 000	5 000	10 000	10 000
023 002 Publicity		20 000	7 500	7 500	5 000
029 COMPONENT TOTAL	(**)	45 000	12 500	17 500	15 000
*030 Training					
031 001 Fellowships		30 000	5 000	15 000	10 000
032 001 Study Tours		20 000	5 000	10 000	5 000
032 002 Int. Workshops/Conferences		25 000	10 000	15 000	
033 001 In-Country Training		160 000	60 000	80 000	20 000
039 COMPONENT TOTAL	(**)	235 000	80 000	120 000	35 000

COUNTRY ZIMBABWE

PROJECT NUMBER ZIM/95/G31/B/50/99
PROJECT TITLE PHOTOVOLTAICS FOR COMMUNITY AND HOUSEHOLD USE IN ZIMBABWE

PROJECT BUDGET COVERING UNDP CONTRIBUTION (in U.S. dollars)

PROJECT COMPONENT		TOTAL AMT M/M	1995 AMT M/M	1996 AMT M/M	1997 AMT M/M
*040 Equipment					
041 001 Office Supplies		35 000	5 000	15 000	15 000
042 005 PV Components		3 240 393	497 825	1 634 550	1 108 018
049 COMPONENT TOTAL	(**)	3 275 393	502 825	1 649 550	1 123 018
*050 Miscellaneous					
051 000 Operation & Maintenance of Eq.		65 000	13 000	26 000	26 000
052 000 Reporting		7 000			7 000
053 000 Sundries (Local)		40 000	8 000	16 000	16 000
053 001 Sundries (DDSMS)		2 300	384	1 450	466
054 000 UNDP Support Costs		132 927	22 415	65 508	45 004
054 001 Overheads (Subcontracting)		20 000	5 000	7 500	7 500
059 COMPONENT TOTAL	(**)	267 227	48 799	116 458	101 970
099 BUDGET TYPE TOTAL	(***)	4 563 820	769 572	2 249 114	1 545 134
		279	57.5	116.5	105
999 UNDP TOTAL	(***)	4 563 820	769 572	2 249 114	1 545 134
		279	57.5	116.5	105

ANNEX I

DESCRIPTION OF FIELD OFFICE PROJECT SUPPORT SERVICES.

Field office support services are provided for GEF PROJECTS throughout the PROJECT CYCLE, i.e identification, formulation, appraisal, processing for approval, implementation, monitoring. and evaluation.

1. FIELD OFFICE MANAGEMENT FUNCTION.

1.1 PROJECT IDENTIFICATION AND FORMULATION.

-Negotiations on project document preparation with Govt as Partner i.e. Ministry of Finance and other participating Ministries of, Transport and Energy, (as implementing ministry (Environment and Tourism GEF Focal Point for Zimbabwe) Local Government , Industry and Commerce, National Planning Commission National Affairs and Employment Creation.

-Participating with the Govt in consultative discussions involving project delivery participants i.e Financial Institutions, The Power Utility ZESA, The Solar Industry, NGOs', District Councils and Communities on project formulation.

-Assisting with project document preparation , appraisal establishing F O PAC reviews, and liaising with Govt and other parties on prodoc finalisation and signature.

1.2 IMPLEMENTATION AND MONITORING FUNCTION

-Participating in the project Executive Committee

-Setting up of project structures, the Project Management Unit, and recruitment of project personnel.

-Assist in setting up of the Steering Committee, (the policy and regulatory body to monitor and review project progress) and participate in its periodic meetings.

- Facilitate negotiations with project participants in setting up project operational structures namely:- The Credit Support Facility, PV Clients credit lines, as well as financial institutions.

The UNDP will be the major negotiating partner with a comparative advantage to set up mechanisms for the Revolving Fund and Credit lines for clients groups.

The Project Manager and the Implementing Ministry have no authority to vet and be party to contracts agreements with respect to financial arrangements.

- Negotiations with Govt on import duties and sales tax on equipment purchased through the project.

- Oversee, assist in project strategy and establishing operational structures with respect to the four main Project Delivery modes i.e. Commercial Sector , ZESA , NGOS' Co -operatives, and Community Groups.

-Initiate and Facilitate Tripartite Review process.

- Programme staff full time will participate on a full time basis in backstopping project implementation.

2. FO PROJECT EVALUATION FUNCTION

As this is a pilot project under the GEF Global Warming Category, a substantive continuous Field Office evaluation function will be critical in project performance.

- The office will provide periodic feedback to UNDP HQ on performance of various aspects of the project.

3. FO ADMINISTRATIVE FUNCTION

3.1 PROCUREMENT

Procurement of equipment & supplies (local)

-Drawing up a short list of suppliers

-Participating in the procurement decision and approval through the Executive Committee.

- Inventory and Distribution of supplies and equipment.

- Reporting and disposal of equipment.

3.2 FINANCIAL

- Processing and payment of local staff salaries and benefits.

- Processing and payment of DSA, tickets for local and international travel.

- Processing and payment of DSA and workshop facilities costs in country training workshops.

- Processing payments for external project equipment, raising of letters of credits, bank drafts, etc.

- Establishing and replenishment of Imprest Account.

- Monitoring and accounting for project Imprest Accounts funds.

- Preparation of financial reports.

3.3 SHIPPING

- Clearance of PV equipment. (There will be approximately US$4 500 000 worth of PV systems and components imported and channelled through the Field Office over a three-year period).

- Clearance, Registration and Insurance of project vehicles.

- Preparation of declaration and undertaking Forms (C152) for Diplomatic clearance with customs of PV components, vehicles and other project equipment.

- Preparation of documentation for re-exportation of defective PV equipment.

3.4 PERSONNEL

- Recruitment and classification of posts for local recruited staff, short term consultants, and local subcontracts.

- Accreditation and administration of local and international staff i.e. contract preparations, increment processing, monitoring of leave records, medical insurance and dependency benefits and performance evaluation where applicable.

ANNEX II
ARRANGEMENTS FOR THE IMPLEMENTATION OF NATIONAL EXECUTION

1- BACKGROUND .

The successor arrangements for agency support costs were introduced in July 1992, inter alia, to support "governments in better assuming the management of UNDP programmes" while national execution was reconfirmed to be the norm for programmes and projects.

This decision was based on the realization that Government execution, as the prime capacity building instrument, promotes long-term sustainability and self-reliance by enhancing the capabilities of local institutions and expertise. At the same time, this decision seeks to enhance the involvement of the specialized agencies in the upstream stages of the programme/project cycle. Today, National Execution (NEX), has become UNDP preferred project execution modality.

During the Tripartite Review Meeting (TPRM) for the project "Photovoltaics for Community and Household Use in Zimbabwe" in February 1994, consultations were held by the Government of Zimbabwe (GOZ), the UN Department for Development Support and Management Services (DDSMS) and the United Nations Development Programme (UNDP) and a decision was taken by all parties to adopt the national execution modality for this project in order to foster the ground-work for post-project sustainability.

The rationale behind the recommendation was largely based on two main considerations: a) that the basic local managerial and technical capacity existed to execute the project and that, b) systematic training for local institutions is paramount for the dissemination of the solar technology, therefore NEX was perceived as reinforcing the GOZ policy of national capacity building to strengthen indigenous skills. The need for streamlining the decision making process and facilitate speedy consultation in this unique project, were among other factors prompting the adoption of national execution.

The TPRM decision was endorsed by the Independent Evaluation Mission (IEM) conducted in July 1994, which recommended that " the process for change of execution modality be specified by UNDP Headquarters and...implemented by the concerned parties". The mission further recommended that as part of this exercise "a careful and full identification of the technical, financial, and institutional resources required by both the Government and UNDP Country Office to carry out national execution" be conducted.

Following the report of the IEM, the GEF coordinator, submitted to the UNDP Country Office a plan for implementing the recommendations including the change of execution modality. The plan called upon the CO to submit a proposal for effecting the change. The proposal delineated below was prepared to respond to that request.

II- ROLES AND RESPONSIBILITIES OF THE PARTNERS UNDER NEX

The following document, in the format of a Memorandum of Understanding to be signed (in addition to the Standard Letter of Agreement) by the parties involved, spells out the role that each partner will play in the execution of the project. A summary of this document can be found in Annex I.

A. Government of Zimbabwe:

1. Administration/Financial Management

The Government undertakes to put in place and maintain an accounting and recordkeeping system that reflects all financial transactions of the project, using UNDP and Government formats as applicable. These responsibilities include but are not limited to:

-maintenance of an accounting system including books, records and controls
-budget control mechanisms
-non expendable property ledger
-project accounting files (purchases, payments, vouchers)

UNDP will make available the project funds to the Government in any of the modalities available: (a) Advances of Funds, (b) Direct payments by the UNDP country office, in accordance with the specific provisions and the relevant section (s) of the Programme and Projects Manual.

The Government will report regularly and timely on the receipt and disbursement of UNDP funds. To this end the GOZ will furnish financial statements within 15 days following 30 April and 31 August and within 45 days following 31 December.

Periodical statements on status of funds advanced and on expenditures will be prepared according to UNDP instructions and formats:

In addition, the GOZ will provide UNDP with certified and audited annual financial statements within 120 days after the end of the calendar year. These statements should include:

-Annual status of funds advanced
-Annual statement of expenditure
-Annual report of non-expendable equipment

2. Training

The Government will be responsible for the selection of candidates for UNDP-financed training and will make all the arrangements for the payment of stipends and allowances. However, the GOZ will inform the Resident Representative of actions regarding the selection of candidates for UNDP-financed training, the proposed award of fellowships and the selection of training facilities.

3. Subcontracts

According to the provisions of the project document, the GOZ will subcontract public or private institutions or firms outside or within the Country to implement a part of the project. In such case, the Government will employ international competitive bidding, wherever such bidding would have been called for in UNDP financial rules and regulations. The Government should normally apply its own procedures and practices in international competitive bidding. Alternatively, they may apply those of UNDP.

The Government should inform the RR of any arrangements to be made for the procurement of services through subcontract.

4. Domestic Procurement of Equipment

The Government will be responsible for all domestic procurement of expendable and non-expendable equipment, excluding PV solar panels and components not available locally. The GOZ must employ competitive bidding as a normal rule and should apply its own procedures. Under this project, the PMU will get the required quotations, select the best supplier and request the payment either from the Ministry of Finance or from UNDP.

UNDP-financed project equipment becomes the property of the Government upon delivery. The Government, therefore will be responsible for the operation and maintenance of project equipment, including office equipment, data processing equipment and vehicles, ensuring that they are used exclusively for their intended purpose within the project. To this end appropriate records should be kept.

5. Terminal Report

The GOZ in conjunction with the project management are responsible for the preparation of the terminal report at the appropriate time and in accordance with the prescribed format.

B- UNITED NATIONS DEVELOPMENT PROGRAMME

1. Project Monitoring and Evaluation

UNDP's policies with regard to project monitoring and evaluation apply in the case of Government execution of UNDP-supported projects. The FO will be responsible for the day-to-day monitoring of the project and for the application of the UNDP M&E instruments. Provisions are made in the project to secure the services of additional expertise for evaluations purposes, particularly in the area of solar technology and financial management of the credit support facility.

As the focal point for financial monitoring of the project, the UNDP Resident Representative will be responsible for ensuring timely submission of financial reports by the Government and for ensuring that advances of UNDP funds to the Government are made in accordance with the project, within the limits of the project budget and on the basis of a written request and certification from the Government.

2. Locally Recruited Project Personnel

UNDP-financed project personnel will be engaged by the Government in accordance with its own procedures and conditions of service. The remuneration and other entitlements of UNDP-financed personnel should not exceed those applicable within the United Nation systems for comparable functions in Zimbabwe. The Government will inform the Resident Representative of all recruitment actions and the proposed compensation for UNDP-financed project personnel.

3. Procurement

UNDP will assist the Government of Zimbabwe in the procurement of PV components as identified in the project document, in accordance with the existing instructions for procurement and contracting, UNDP Financial Rules and Regulations and the Programmes and Projects Manual. The Government should submit a written request to the UNDP signed by the authorized officials and providing all the specifications of the equipment.

C - UNITED NATIONS DEPARTMENT FOR DEVELOPMENT SUPPORT AND MANAGEMENT SERVICES (DDSMS)

1. Technical Backstopping

DDSMS will provide technical support for project implementation through technical monitoring and backstopping. DDSMS will participate in the project's capacity building strategy by providing international expertise for training and technical assistance services for the solar industry.

2. Recruitment of International Personnel

DDSMS will recruit, based on requests from the GOZ, the international personnel to be attached to the project following its own rules and procedures. However, the Government will have to approve any candidate before an actual contract is issued.

III- ACTION PLAN

A. Reformulation of the Project Document

A multi-disciplinary working group comprising Government (Department of Energy), the PMU and UNDP personnel has been appointed to conduct the in-depth reformulation of the project document.

The scope of work for the reformulation exercise is guided by three main objectives:

i-) Updating the information contained in the background section of the project document, particularly with regards to the macro-economic environment in which the project is operating; the state of the solar industry in the country; and the level of dissemination of the photovoltaic technology within the country;

ii-)Modifying specific elements of the project: strategy, activities, inputs and outputs according to the experience gathered over a year of execution

iii-) Incorporating the relevant recommendations of the Independent Evaluation Mission

iv-) Adjusting UNDP/GEF inputs and funding actual level of available resources and accommodate the budgetary implications of the changes described above.

2. Identification of Appropriate Financial/Administrative Mechanisms and Procedures

Although under the Government Execution modality, the GOZ will assume full responsibility for the management of the resources allocated to the project, a clear definition of procedures for payments, accounting, reporting and financial control are necessary.

To this end, a MOU specifying the roles of each one of the partners in the execution of the project has been established. In addition, the GOZ must identify the preferred modality for disbursement of funds and select those administrative/ financial functions it will entrust to UNDP.

Specific issues to be addressed include: i) the appointment of the authorized Government officials for requesting disbursement of funds from UNDP and for certifying expenditures against the project budget; ii) opening of a separate bank account and establishing the appropriate mechanisms for its utilization; iii) developing rules and procedures for the utilization, maintenance and control of project equipment, and iv) the UNDP financial accounting, reporting and audit requirements.

Credit Support Facility (CSF):

A comprehensive set of guidelines for the operation of the CSF has been developed and established, with the assistance of a professional financial consultancy and with the participation of the financial institutions participating in the scheme.

The current financial mechanism established at the Agricultural Finance Corporation will be subject of an intensive review consultancy in the near future (see attached Terms of Reference for Management Consultant Services in Annex III). The need for periodic "seeding" of the CSF arises from its structural undercapitalization due to the coverage of only the foreign exchange component of the cost of a system (40 - 60% of the total). Fund erosion is also due to exchange rate fluctuations as a result of the time lag between procurement of solar components by PMU and their sale to installers.

It is envisaged that the CSF will take the form of a Main and a Mini CSF. The former represents the current finance scheme geared to endusers, and underpinned by a Memorandum of Understanding. The Mini CSF would be run by the AFC specifically for the ZESA, NGO or CBO delivery modes. However, it is expedient that some capable NGO's or CBO's run their own Mini CSF's independently.

Accountability for managing the CSFs will equally lie on the fund sponsors.

Other options which could appeal to the rural poor, with respect to the Credit Support Facility, and to be considered during implementation under national execution include:

(i) 15% deposit fee at 35% annual interest rate for 5 years, yielding a higher return on capital. The monthly instalment burden would be equivalent to that of the current CSF.

(ii) Leasing option, whereby a homeowner pays a very low monthly fee in perpetuity, but in return has a guarantee that as long as he makes the lease payments the system will be fully maintained by the leasing company.

(iii) Amortization option, whereby an interest bearing debt is "amortized" when all liabilities (principal plus interest) are discharged by a sequence of instalments over a sufficiently long period.

(iv) Sinking Funds method, in which the creditor receives the interest when due and the face of the debt at the end of the term. To make the latter payment the borrower creates a separate fund into which he makes periodic instalments over a long period, so that just after the last deposit the fund amounts to the original debt.

3. Preparation of the Appropriate Legal Instruments

The establishment of the legal framework for the implementation of the project under Government execution, is a critical element inasmuch as -with the innovative approach adopted- the project implementation involves a variety of partners GOZ: the Solar Industry, NGOs, the Zimbabwe Electric Supply Authority (ZESA) and the Agricultural Finance Corporation (AFC).

A number of legal documents in the form of memoranda of understanding will be prepared and formalized amongst the partners in addition to the standard letter of agreement to be signed between UNDP and the GOZ. Such documents include the following:

-Roles of the Partners in Government Execution (GOZ & UNDP)
-Legal framework for the establishment and operation of the PV finance scheme at the AFC (GOZ & AFC)
-Terms and conditions for the participation of private companies in the delivery of UNDP funded PV systems (GOZ & individual commercial firms)
-Terms and Conditions for the participation of ZESA in the

delivery of PV systems (GOZ & ZESA)
-Terms and conditions for the participation of NGOs in the delivery of PV Systems (GOZ & individual NGOs)

4. Technical Backstopping Plan for Acquisition of Expertise

In accordance with the recommendations of the IEM, a highly qualified local professional management consultancy (strategic management consultants) will be engaged to work with the PMU to develop and implement a programme of restructuring and augmentation of PMU's capabilities. This exercise will also address PMU procedures, staff profiles as well as financial reporting and accountability. Specific areas to be covered include:

-training PMU staff in project management
-development and operation of a computer-based management information system
-streamlining of procedures for certification and licensing of installers and technicians
-strengthening outreach activities

With the assistance of the consultants a practical-goal oriented work-plan will be developed for the PMU, which will become the main project management instrument (see attached Terms of Reference for Management Consultants Annex III).

In addition, provisions will be made for intensive training of the PMU personnel to enhance their technical capacity and capability as a nucleus of qualified and highly trained photovoltaic experts, and to enable it to assume effectively its extensive technical backstopping functions. An international P.V. expert, preferably from the region, recruited through DDSMS will conduct most of the training. Specific consultancies are also envisaged for other areas such as management of the credit support facility.

5. Procurement of equipment

As it was specified in the section on "Role of the Partners", the GOZ will conduct the procurement of the PV components with support of the UNDP country office according to UNDP procedures, rules and regulations.

6. Country Office Support Services

The main areas of CO involvement in providing support services are: i) Managerial function, in terms of assistance to the project, implementation and monitoring; ii) Evaluation function re performance and impact; iii) Administrative support, including procurement, financial management, recruitment of local personnel. A thorough description of the

support services provided by the CO throughout the project cycle is attached in Annex I.

Office support costs are computed as 3% of the total allocation (US$132 927).

ANNEX III

MEMORANDUM OF UNDERSTANDING FOR THE EXECUTION OF THE PROJECT

1. GENERAL PROVISIONS

The Government is responsible for the management of all UNDP resources allocated to the project. In this capacity it is accountable to the Administrator for the entirety of UNDP resources under its control.

The Government is responsible for maintaining an accounting and recordkeeping system that reflects all financial transactions of the project. In addition, the Government is required to report on the receipt and disbursement of UNDP funds. Government should not include unliquidated obligations in reports issued to UNDP.

The UNDP Resident Representative (RR) has the responsibility for ensuring timely submission of financial reports by the Government and for ensuring that advances of UNDP funds to the Government and UNDP direct payments are made in accordance with the project document, within the limits of the project budget, and on the basis of a written request and certification from the Government.

The RR is the focal point within UNDP for financial monitoring of the project, and will ensure that Government meets its financial obligations.

Advances to the Government of funds in excess of $10,000 to meet expenditures arising from advance authorizations require the prior approval of the Director of UNDP's Department of Finance.

UNDP will make available the project funds to the Government in any of the modalities available: Advances of Funds, or Direct payments by the UNDP field office according to the specific provisions of the relevant section of the programme and projects manual. The Cooperating Agency and UNDP Headquarters can also make funds available.

The certified and audited annual financial statement of the status of funds advanced by UNDP, should be processed according to the procedures set out in the PPM.

If there is an unspent balance of UNDP funds held by the Government, that balance should be refunded to UNDP by the Government in the currency of the advance no later than 30 days after the date of financial completion of UNDP assistance.

Upon financial completion of the project, the Government should issue final financial statements to cover the period 1 January to the date of either financial completion or refund of the unspent balance of UNDP funds.

All accounts maintained by the Government for UNDP resources may be audited by UNDP internal auditors and or/United Nations Board of Auditors or by public accountants designated by the UN Board of Auditors. Standard Government and UNDP accounting formats will be used as applicable. Fluctuations in exchange rates will be accounted for.

Government financial responsibilities will include:

- maintenance of an accounting system containing books, records and controls.
- budget control mechanisms
- non expendable property ledger.
- project accounting files (purchases, payments, vouchers).

- **Training**

The Government should inform the Resident Representative of actions regarding \the selection of candidates for UNDP- financed training, the proposed award of fellowships and the selection of training facilities.

Stipends and other allowances financed by UNDP should not exceed the maximum monthly fellowship stipend rate applicable within the United Nations System. The Government should ensure the continued payment of the salaries of fellows in order to provide for the continued support of their dependants.

- **Subcontracts**

The Government may decide to sub-contract the implementation of a part or all of the project to a public institution or firm outside or within the country. In such case, the Government should employ international competitive bidding, wherever such bidding would have been called for in UNDP financial rules and regulations. The Government should normally apply its own procedures and practices in international competitive bidding. Alternatively, they may apply those of UNDP.

Domestic procurement of services, based upon competitive bidding by domestic suppliers, as an alternative to international competitive bidding, may be authorized by UNDP headquarters as long as such procurement is compatible with UNDP financial Regulations and Rules.

UNDP Headquarters may waive altogether the requirement for competitive bidding if the procedure would not be most economic of efficient methods for obtaining the required services.

The Government should inform the RR of any arrangements to be made for the procurement of services through subcontract. Requests for domestic procurement or for the waiver of the requirement of competitive bidding should be made by the appropriate authorities to the RR.

- Equipment

UNDP-financed project equipment becomes the property of the Government upon delivery, except in those cases where the title of ownership has been reserved by UNDP. The UNDP and Government shall specify which equipment remains the property of UNDP upon completion of the project.

The Government is responsible for the operation and maintenance of project equipment, including office equipment, data processing equipment and vehicles, ensuring that they are used exclusively for their intended purpose within the project. To this end appropriate records should be kept.

The Government should furnish the RR with an annual report of non-expendable equipment, for the year to 31 December, within 60 days following that date. The report should include all UNDP financed non-expendable equipment furnished to the project during the year. The report should describe each item in detail, list the identification number given by the Government and the serial or registration number assigned by the maker, and reflect the cost in US Dollars at the time of purchase calculated at the UN operational rate of exchange.

- Terminal Report

Project management is responsible for the preparation of the terminal report at the appropriate time and in accordance with the prescribed format.

II. FINANCIAL AND ACCOUNTING ARRANGEMENTS

(a) General

1. The government authority named on cover page of project document, hereinafter referred to as "the Government", is responsible to the Administrator of UNDP for the custody and proper use of funds advanced to it by UNDP.

2. The Government will maintain separate accounts (including a separate bank account) for UNDP resources. It will use the funds provided to it only for inputs financed by UNDP, in accordance with

the project budget covering UNDP's contribution. (See section 30305, subsection 3.0.)

3. Advances of funds to and payments by UNDP on behalf of Governments are governed by the applicable UNDP Financial Regulations and Rules and directives regarding the utilization of currencies.

4. The Government will provide UNDP with financial statements of UNDP funds received and spent, prepared in accordance with the UNDP financial year (1 January to 31 December) in English. The periodicity and content of such statements are set out below. Annual financial statements will be audited by the legally recognized auditors of the Government's own accounts. To the extent feasible, the audit principles and procedures prescribed for the United Nations will be applied by the auditors, who will provide audit reports annually together with the reports set out below.

5. For the purpose of reporting to UNDP, US dollar equivalents will be calculated at the United Nations operational rates of exchange. The resident representative of UNDP will inform the Government of such United Nations rates of exchange and of changes thereto when they occur.

(b) **Advance of funds**

6. Advances will be made by the Resident Representative at the request of the Government in accordance with the project document and in the required currencies subject to the conditions set out below.

7. The Government will indicate its cash requirements from UNDP funds for each period of the schedule of advances included in the project document at least two weeks before payment is due (attachment 1 of this annex, Request for advance of funds). Advances will be made by UNDP at the time indicated in the schedule of advances, in the amounts and currencies requested by the Government. (See also paragraph 9, below for requests for cash advances in currencies not available to the UNDP field office.)

8 If the schedule of advances included in the project document no longer reflects actual requirements for funds, a new schedule will be prepared by the Government in consultation with the Resident Representative, in accordance with the format indicated in attachment 5 of this annex, Schedule of advances. Advances should normally be sufficient to cover anticipated cash requirements for a maximum of three months.

9. Local currency advances to the Government will normally be made by the Resident Representative.

10. Advances to the Government in US dollars will be made by the Resident Representative if this currency is available to him or her. The Resident Representative will arrange for advances in currencies not available to him or her to be made by UNDP headquarters or other field offices, as deemed appropriate.

(c) Direct payments by UNDP

11. At the request of the Government, UNDP will, after verification of the supporting documentation, make payments directly to individuals or firms providing UNDP - financed services or goods. The requests will be addressed to the Resident Representative who will either arrange for the payments to be made by his or her office or by UNDP headquarters. The requests will indicate payee, amounts and currencies required, justification for the request and payment instructions reflecting payee's bank, its address and the account number.

12. The Resident Representative will provide the Government with statements of direct payments made by UNDP within 15 days following 30 April, 31 August and 31 December, for incorporation in the project delivery report in accordance with paragraph 13 (b), below.

(d) Periodic financial statements

13. The Government will furnish the Resident Representative with certified financial statements within 30 days following 30 April and 31 August and within 60 days following 31 December. The statements will include the following:

(a) Status of funds advanced by UNDP (attachment 2 of this annex). The statement will be submitted for each period indicated above and will be prepared in the currency of the advance. Separate statements will be issued where different currencies have been advanced. Each statement will reflect cumulatively for the year the amount of funds available at the beginning of the year, funds advanced by UNDP, funds expended by the Government during the reporting period and the resulting balance at the end of that period. The statement will also detail expenditure incurred by month in local currency and the US dollar equivalent calculated at the applicable United Nations operational rate of exchange;

(b) Project delivery report (attachment 3 of this annex). The report will be submitted for each period indicated above and will reflect cumulative current-year expenditure classified according to the items listed in the approved project budget. It will incorporate the expenditure incurred by the Government and, where appropriate, the expenditure statement of the co-operating agency, if any, and the statement of direct payments made by UNDP;

(c) Annual report of UNDP-financed non-expendable equipment (attachment 4 of this annex). The Government will furnish the Resident Representative, for the year to 31 December, within 60 days following that date and together with other financial statements due at that date, with an annual report of non-expendable equipment. The report will include all UNDP-financed non-expendable equipment furnished to the project during the year. Non-expendable equipment purchased by the co-operating agency, if any, and furnished to the project will also be included. The report will describe each item in detail, list the identification number given by the Government and the serial or registration number assigned by the maker and reflect the cost at the US dollar equivalent at the time of purchase calculated at the United Nations operational rate of exchange.

(d) Expenditure statement for jointly financed projects. In the case of joint financing of project activities by the Government and UNDP and, as the case may be, other sources of assistance, the certified financial statements referred to above shall be accompanied by a separate statement reflecting expenditure for the full project covering the same period as the certified financial statements. To this expenditure statement should be added an indication of the apportionment by the Government of the reported expenditure to UNDP's contribution and other available funds.

14. If the Government cannot submit the financial statements on the date on which they are due, it will inform the resident representative of the reasons and indicate the planned submission date.

(e) Government's annual audited financial statements

15. A certified and audited annual financial statement of the status of funds advanced by UNDP, as described in paragraph 13(a), above, will be made available by the Government to the resident representative within 120 days after the end of the calendar year.

16. The financial statement will be audited and attested to by the entity specified in paragraph 4, above.

(f) Government final financial statements

17. Upon financial completion of UNDP assistance to a project, the Government will provide final financial statements to cover the period 1 January to the date of either financial completion or refund of the unspent balance of UNDP funds, if any (see paragraph 18, below). The financial statements will be audited so as to conform to the requirements set out in section E above. The format given in attachments 2 and 3 of this annex should be used. The statements will be provided within 120 days from the date of financial completion to the Director, DOE, with copies to the UNDP Resident Representative.

Attachment 1

GOVERNMENT OF _____

REQUEST FOR ADVANCE OF FUNDS FROM UNDP

FOR PROJECT _____NO: /

For the period from _____19____ to _____ 19____

Currency	Cash in hand at beginning of period	Estimated disbursements to end of period	Net advance required	Payment details		
				Bank Name and address	Account title	Number

Certified by:

_____
Name (typed)
Title
Government agency (department)

Attachment 2

GOVERNMENT OF _____

STATUS OF FUNDS ADVANCED BY UNDP a/

FOR PROJECT _____NO._____/____/____

For the period 1 January to _____19___
(In [currency])

A. Summary of funds received and expended	Amount (In currency of advance)
Balance at 1 January 19___	XXX XXX
Add: Advances received from UNDP	XXX XXX
Total funds available for project purpose	XXX XXX
Deduct: Total expenditure for year-to-date	YYY YYY b/
Balance at .....19___	========
Represented by:	
Cash in bank	XXX XXX
Cash on hand	XXX XXX
Balance at .....19_____	XXX XXX

a/ A separate statement is required for each currency advanced by UNDP.
b/ This amount should be the same as the total expenditure (in currency of advance) in table B.

B. Summary of expenditure by month

	Expenditure (In currency of advance)	UN operational rate of exchange	Expenditure (In US$ equivalent
January	XX XXX	X.XX	XX XXX
February	XX XXX	X.XX	XX XXX
March	XX XXX	X.XX	XX XXX
April	XX XXX	X.XX	XX XXX
May	XX XXX	X.XX.	XX XXX
June	XX XXX	X.XX	XX XXX
July	XX XXX	X.XX	XX XXX
August	XX XXX	X.XX	XX XXX
September	XX XXX	X.XX	XX XXX
October	XX XXX	X.XX	XX XXX
November	XX XXX	X.XX	XX XXX
December	XX XXX	X.XX	XX XXX
Total	YYY YYY a/		XXX XXX

Certified correct by:

Name (typed)
Chief Accountant
Government agency (department)

Approved by:

Name (typed)
Title
Government agency department)

AUDIT CERTIFICATE
(As issued and signed by the Auditors)
REQUIRED ONLY FOR ANNUAL AUDITED
AND FINAL AUDITED FINANCIAL STATEMENTS

a/ This amount should be the same as the total expemditure for year-to-date in table A.

Attachment 1

GOVERNMENT OF _____

PROJECT TITLE _____ UNDP Project no. ___/___/___)

Project delivery report
for funds provided by United Nations Development Programme (UNDP)
for the period 1 January to _____ 19__
(Prepared in US dollars)

Budget line	Description	Budget for year	EXPENDITURE			
			Government	UNDP direct payments	Co-operating agency	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
99.00	TOTAL		a/			

Certified correct by:

_____
Name (typed)
Chief Accountant
Government agency (department)

Approved by:

_____
Name (typed)
Title
Government agency (department)

AUDIT CERTIFICATE
(As issued and signed by the Auditors)
REQUIRED ONLY FOR ANNUAL AUDITED
AND FINAL AUDITED FINANCIAL STATEMENTS

a/ Total of US dollars equivalent shown in each attachment 2.

Attachment 4

GOVERNMENT OF _____

Annual report of UNDP-financed non-expendable equipment a/

For project no: _____

For the year ended 31 December 19__

Description	Government identification number	Maker's serial or registration number	Cost in US dollars b/
Total			

Certified by:

_____

Name (typed)
Title
Government agency (department)

a/ Includes those items of equipment valued at $400 or more, and with a serviceable life of at least five years, and those items of equipment although valued at less than $400, which are office furniture, filing cabinets, office machines, attractive items (such as cameras, projectors, stop watches, briefcases) or other similar items as determined by the Government.

b/ US dollar equivalent at time of purchase calculated at the United Nations operational rate of exchange.

18. If there is an unspent cash balance of UNDP funds held by the Government, that balance will be refunded by the Government in the currency of the advance not later than 30 days after the date of financial completion.

G. Audit by UNDP

19. All accounts maintained by the Government for UNDP resources may be audited by the UNDP internal auditors and/or the United Nations Board of Auditors.

ANNEX IV

DESCRIPTION OF OFFICE SUPPORT SERVICES

Under national execution the UNDP is expected to provide support services for the implementation of the project according to the roles assigned to it under the "Arrangements for the Implementation for National Execution" included in Annex II of the project document.

UNDP Country Office will assist the Government of Zimbabwe to perform its project management and implementation function. In addition, the office will be responsible for the continuous monitoring and evaluation of project progress throughout the duration of the project and will verify the compliance with UNDP rules and procedures for National Execution.

The detailed breakdown of the resources that the office will mobilize in support of the project implementation under NEX is the following:

Resident Representative/Deputy Resident Representative:

Policy Advice: Overall policy guidance. Liaison with high level Government Officials, Solar Industry representatives and NGOs on policy issues related to project implementation. Ensuring that GEF and UNDP concerns are upheld throughout the project.

Advocacy: Advocating the fulfillment of Government commitments under the project document, specifically with regards to the creation of an enabling policy environment for the development of the renewable energy sector, promoting the growth and consolidation of the Solar Industry and the timely provision of the Government counterpart contributions to the project.

Managerial role: Participating in the project's Executive Committee the highest level managerial body of the project. Overseeing Country Office technical and administrative backstopping for project implementation.

Liaison with UNDP Headquarters: Providing feedback on a regular

basis and maintaining the UNDP/GEF Executive Coordinator's office in Headquarters abreast of major project issues, progress and implementation.

Monitoring: Provides overall guidance to the country office's financial and substantive monitoring function and participates in tripartite meetings.

Sustainable Development Advisor (SDA)

Technical Backstopping: Coordinates and supervises the delivery of CO technical backstopping services to the project. Provides technical advice to the UNDP Programme Officer for the project and to the National Project Manager. Represents UNDP in the project's Steering Committee.

Monitoring: Oversees project implementation and monitors regular project progress reports. Monitors progress towards the accomplishment of project immediate objectives. Analyzes annual project reports and participates in Tripartite Meetings.

Financial support: Approval of advances/payments to the project and ensures that requests for funds are consistent with project activities and based on the workplan.

Programme Officer

Technical Backstopping: Provides technical backstopping to the project on a day to day basis. Liaises closely with the project's National Manager, technical personnel and participates in the regular meetings of the Project Management Unit. Participates in the project's Steering Committee meetings.

Follow-up and Monitoring: Follow-up on the fulfillment of the workplan and on the execution of project activities as established in the project workplan. Monitors the progress towards the achievement of project objectives, the completion of activities and the utilization of GEF/UNDP inputs. Provides regular feedback to CO management on project progress and major issues. Reviews and analyzes progress reports and briefs RR/DRR/ARR regularly on project matters.

Financial support: Reviews, analyses, and gives clearance to requests for payments and advances to ensure consistency with project document and workplan. Supports the monitoring of the project's credit support facility.

Assistant Resident Representative (Administration)

Administrative support: Coordinates and supervises the provision of administrative support services to the project including the

recruitment of personnel, the processing of requests for payment; purchase orders; travel advances and claims, clearance of imported project equipment and PV panels and components for an estimated 9,000 systems, etc.

Accounting/financial monitoring: Oversees compliance with UNDP's guidelines for National Execution and the Financial Rules and Regulations in particular.

Senior Finance Officer

Accounting/Financial monitoring: Responsible for the maintenance of the project's Operating Fund Account and for the application of UNDP financial monitoring mechanisms. Monitors the status of the Credit Support Facility.

Administrative/financial support: Supervises and coordinates the processing of all requests for payments, travel advances and claims originating from the project.

Finance Clerks

Processing of payments: Processing and payment of local staff salaries and benefits; DSA and tickets for international and local travel and training activities; external procurement of equipment; etc.

Shipping clerk

Clearance and preparation of "Undertaking Forms" (C152) for the importation of PV equipment (approximately US$3 million worth of PV panels and components will be imported over a three year period).

Personnel Assistant

Classification of posts for locally recruited staff, short-term consultants and local subcontracts. Accreditation of international staff and administration of local and international staff i.e. contract preparations, increment processing, monitoring of leave records.

	"PHOTOVOLTAICS FOR COMMUNITY AND HOUSEHOLD USE"						
	(ZIM/95/G31)						
	COUNTRY OFFICE SUPPORT COSTS						
STAFF	FUNCTION					ANNUAL	
MEMBER						COSTS	
	Advocacy-	Managerial-	Technical	Monitoring &	Financial &		
	Policy guidance	Liason UNDP/HQ	Backstoping	Evaluation	Administrative support		
						p/m	US$
RR	X	X				0.5	5000
DRR	X	X		X		0.5	3000
SDA			X	X		1.5	3000
ARR/A				X	X	1	4000
PO			X	X	X	6	15000
SFO				X	X	2	3000
FCs					X	12	6000
SC					X	1.5	750
PA					X	0.5	250
					TOTAL		40000

ANNEX V

SUSTAINABILITY OF THE CREDIT SUPPORT FUND (CSF)[5]

1.The overall success of the G.E.F. PV-Solar Project greatly depends on the successful operation of the AFC-finance scheme.

Inputs (I) into the CSF consist of:
- initial seeding to "jump start" the fund.
- down-payment deposits by end-users
- monthly instalment payments by end-users
- solar component purchases by installing companies
- interest from money invested.

The Outputs (O) from the CSF are:

- payouts to installing companies
- low-interest loans to end-users.
- payment defaults..

2. From the above: I-O > 0, for at least 3 successive months; Or else the fund is unstable.

3. The CSF stabilizes in a favourable environment when:

- defaults in end-user payments are non-existent or minimal.
  This requires strict screening of loan applications.

- an increasing number of installing companies (who install) is involved.

- spot cash systems are encouraged.

- group end-user participation (clinics, schools, etc.) is encouraged (donors).

- turn-around time in loans applications processing is minimized.

- ensure physical existence of supposedly installed systems.

- installation defects are minimized (intensify training of installers).

- system inspection times are minimized, and becomes eventually industry's responsibility.

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[5] Previously called Revolving Fund.

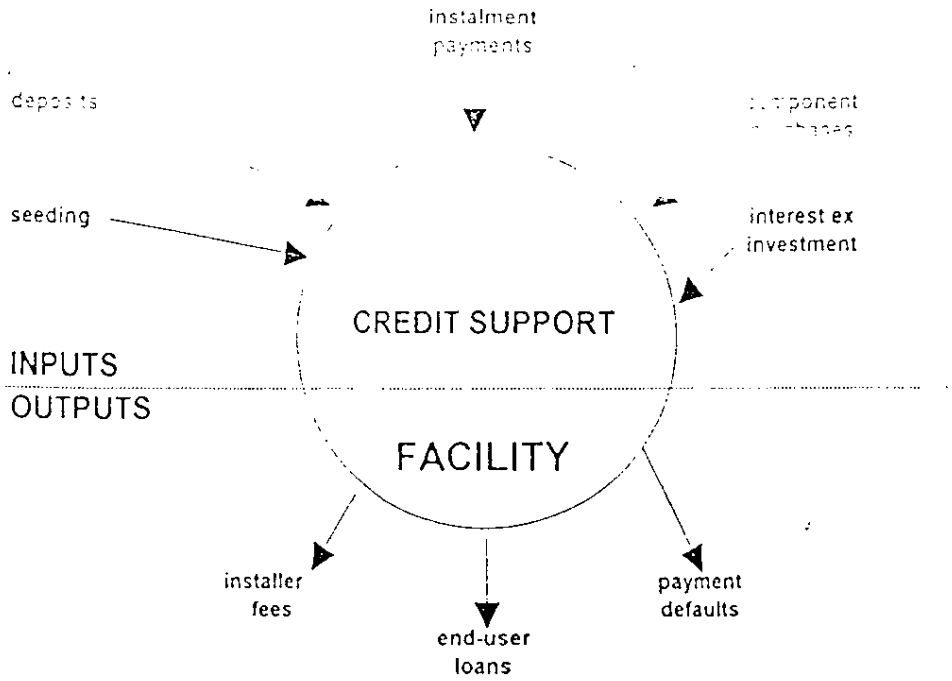
- industry takes an increasing role in direct purchase and warehouse stocking of solar components.

4. Aside of the AFC finance scheme, which is extended to end-users only, it has been noted that installers and manufacturers also need a low-interest loan scheme to sustain their respective activities. The PMU has informally arranged for such a scheme, and will continue to identify a much more affordable scheme.

5. **Factors to watch for Sustainable Credit Support Fund**

- determine inflows into the fund via equipment purchase.
- determine outflows through payouts to companies.
- determine monthly repayments by endusers.
- project monthly interest rates from investments.
- project defaults by clients.
- determine time frame for which the variation of the above five parameters are relatively constant and stable.
- ensure physical existence of systems declared as installed.
- closely and regularly monitor the balances of the CSF account.

CREDIT SUPPORT FACILITY



ANNEX VI

COORDINATION BETWEEN INDUSTRY AND PMU

1. BACKGROUND

1.1 Solar industry capacity building takes a variety of forms:

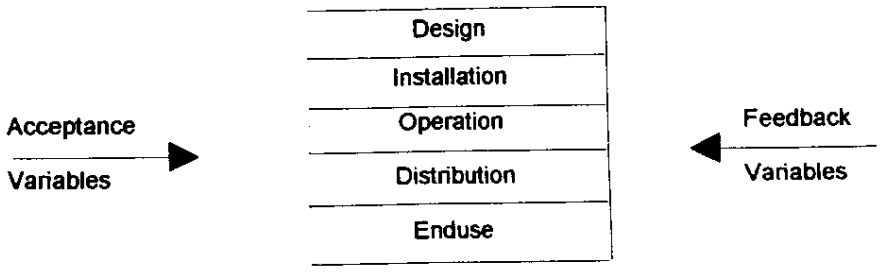
- growth in productivity and quanta of solar energy use.
- promotion of expertise in installation and manufacturing of solar systems.
- transfer of technology for repair and maintenance personnel.
- on-site training and development of quality assurance standards and specifications.
- popularization and marketing of the solar technology.

1.2 Popularization of solar energy applications will naturally lead to strengthening of industrial expertise. Hence, new and novel applications of solar energy need to be explored and exploited: lighting, radio/TV, fans, videos, poultry/livestock incubation, telecommunications, refrigeration, irrigation, sewing machines and small DC motors.

In the field of industry build-up, there is need to identify energy needs of end-users, evaluate economic and financial constraints to solar energy dissemination, and train/orient endusers and the public in its efficient utilization.

1.3 There are, however, inhibiting factors to the efficient dissemination of solar technologies. Some of these are: lack of long-term support commitment from national/international agencies; lack of incentives for endusers and industry to invest in solar energy, and to promote market development; and finally absence of baseline data on available resources and options.

In strengthening industry capacity one notices five closely linked parameter areas; viz, design, installation, operation, distribution and enduse.



1.4. The Role of Solar Energy Industry Association of Zimbabwe (SEIAZ) in the Project

Industry (SEIAZ) has been and will be involved in the development and upholding of system components, installation standards and inspection procedures, in conjunction with the PMU and the Standards Association of Zimbabwe.

- Industry participants need to speak with "one voice", and hence need to be encouraged to be members of SEIAZ. The PMU is also in the process of organizing discount concessions for component purchases by SEIAZ members so as to boost its membership.

- PMU and SEIAZ will jointly formulate and enforce a Code of Ethics for the project. Further, PMU will seek industry's counsel when qualifying new companies to the project.

- Industry is expected to play a crucial role in the procurement and warehousing of the solar system components.

- The PMU will facilitate the access of low interest loans by industry, from viable finance houses. This has already happened with respect to SCOTFIN and AFC.

- PMU and Industry are holding joint consultative meetings regularly, at PMU's offices and alternately at Industry's offices, for engagement in meaningful project dialogue; to review and comment on plans of action in implementation.

- The project is to provide financial and material support for the joint establishment with SEIAZ, of a newsletter on a cost-shared basis.

1.5 **Market Development of Solar Products**

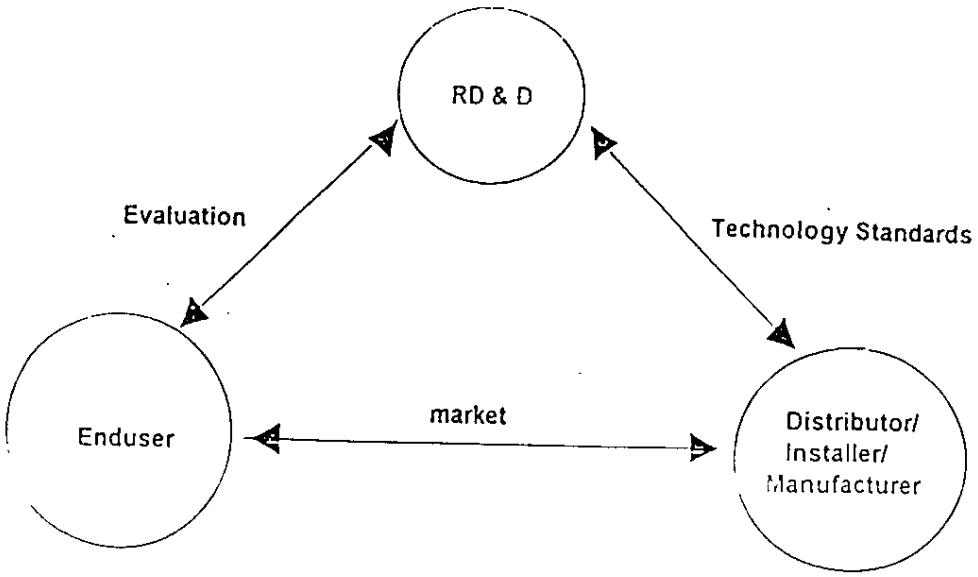
Endusers acquire solar systems only when they have the money, or someone else elects to finance the scheme. Hence, the idea of initiating income generating schemes to finance solar installations, should be exploited. Other methods of raising finance for solar energy projects are: donor funding,direct investment by the utilities, commercial finance, private direct investment or blends of all these.

To extend the marketing scenario for solar usage, diversify rural electrification activities to include water pumping, street lighting, security alarms and rural school science labs. Resource mobilization in the rural areas inevitably includes; creation of repair and maintenance facilities, intensifying acceptance of solar technologies (demand analysis, demonstrations, financial instrument).

Strategies for solar energy dissemination will be spearheaded by NGO's, private/informal sector and community based organizations.

An expanding marketing strategy should rely less and less on imported components in preference to locally produced equipment. Hence, Research, Development and Demonstration (RD & D) will in future closely focus on the production of solar cells and local assembly of PV panels.

The interaction of RD & D, endusers and industry is schematized as follows:



In the promotion of the solar market development, some catalysing agents are community-sponsored credit associations, special solar cooperatives and market facilitators.

2. INDUSTRY CAPACITY BUILDING PLAN

Given the nature of the participating companies in the GEF solar project, there is need to formulate and implement a comprehensive capacity building plan. It should be noted that capacity building training needs of the companies are of two forms: viz; general, and specific to manufacturers and suppliers of equipment.

2.1 General training needs

Planning and Management
Accounting and administration
Stock control
Project Cycle
Technical training
Marketing/salesmanship for solar products.

2.2 Specific Requirements for manufacturers and distributors

R & D for system components
Quality control practice
Development of sustainable market.

3. INDUSTRY TRAINING WORKSHOPS PROGRAMME

Informal training of industry personnel takes place during installation inspections (corrections), and also at G.E.F. installations where private sector personnel are invited to participate. In addition the Project Management Unit plans to hold a number of formal training workshops in different parts of the country. These workshops are justified as follows:

3.1 A number of solar systems have been installed at schools, clinics and business centres. The systems have been handed over to the respective Rural District Councils. It is essential that council officials and other pertinent personnel are trained in maintenance of these systems.

3.2 Ministry of National Housing and Public Construction is involved in a programme of installing solar systems at their offices. Training is desired for its officials to maintain the systems, and also to act as inspectors on behalf of the PMU.

3.3 A number of NGOs will be involved in financing and maintenance of solar systems for their groups. These will need training in maintenance and after-sale service.

3.4 A number of companies have been qualified to install systems under the project. As such, the companies will need hands-on training on installation of quality solar systems.

3.5 It is envisaged that we hold four (4) workshops for officials from Rural District Councils; Government Departments and NGOs, and one workshop for new companies. The duration of the courses would be 4 days.

The venues of the 4 workshops are planned as follows:-

Elangeni Training Centre:	Mabateleland(North and South)
Senga Training Centre:	Midlands and Masvingo
Rowa Training Centre:	Manicaland and Mashonaland East
Chinhoyi Training Centre:	Mashonaland Central and West

The number of participants are expected to be 30 and 4 from PMU.

3.6 The hands-on workshop for new companies will be held at Domboshawa Training Centre. The number of participants are expected to be 30 and 4 from PMU.

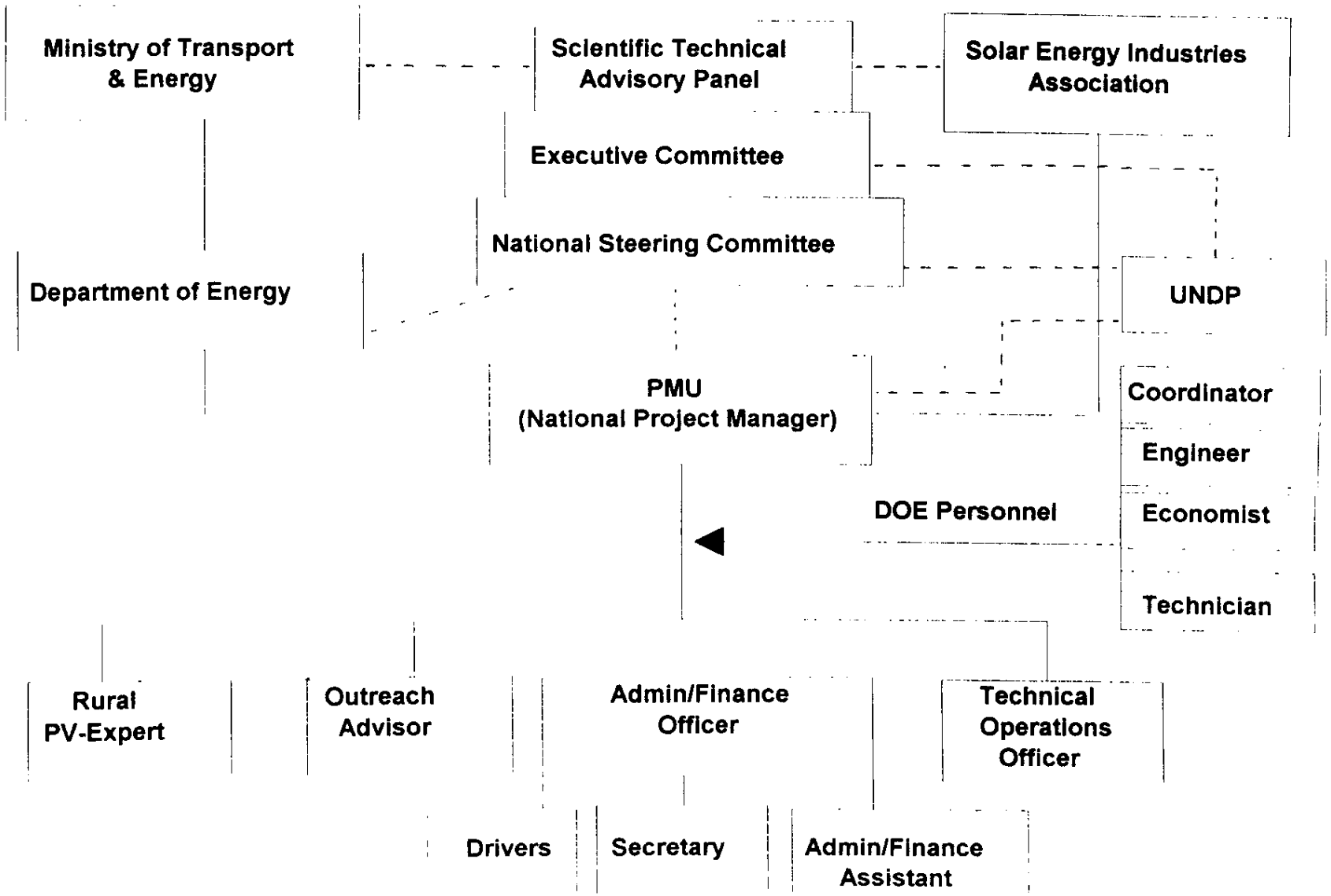
3.7. After each workshop successful participants will be issued with a Certificate of Attendance.

3.8 Using last year's figures, the cost of each workshop would be about Z$30 000. Participants would be expected to contribute towards the total cost for each specific workshop.

3.9 Over and above the afore-mentioned, the Outreach Adviser, Technical Operations Officer and the Rural pv Expert will be conducting a rotational upgrading training scheme for manufacturers, system installers, maintenance personnel and endusers.

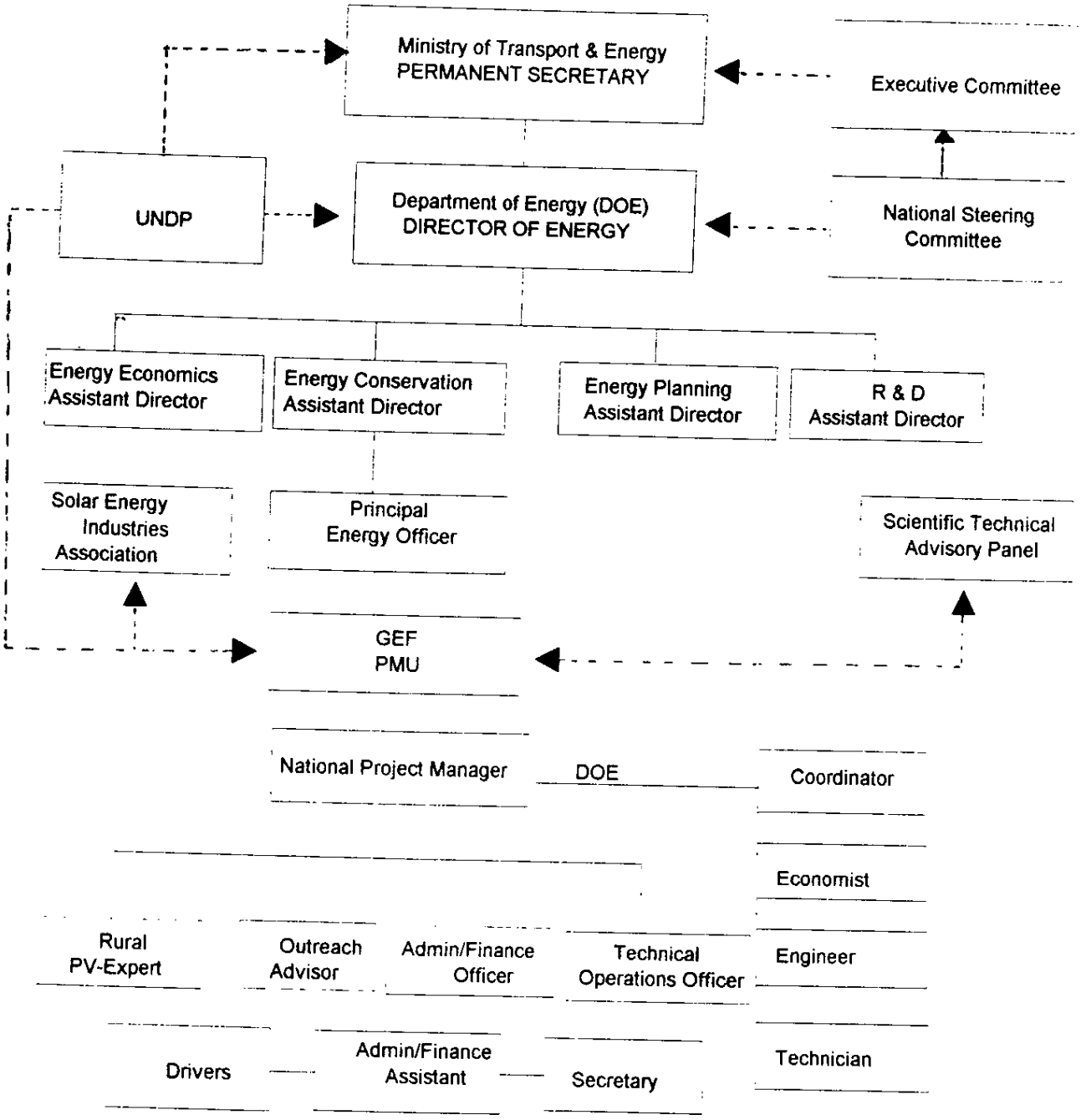
ANNEX VII

MANAGEMENT ORGANOGRAM



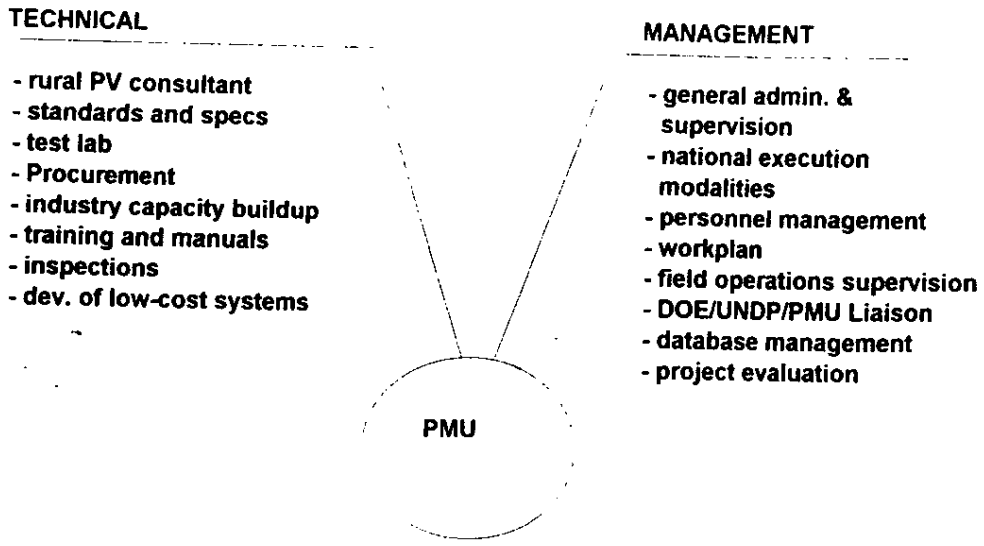
ANNEX VIII

UNDP-GOVERNMENT OF ZIMBABWE G.E.F. SOLAR PROJECT
REPORTING SCHEDULE



ANNEX IX

Functional Organs



FINANCIAL

- purchases
- payments
- vouchers
- prices evaluation
- Impresit account
- Banking
- Procurement
- Finance Schemes and loans
- Stocks and inventories
- implement audit recomendations

OUTREACH

- SEIAZ & SAZ. liaison
- field coordination
- installers & endusers
- training programmes
- publicity and market development
- Government/donor/NGO's
- installation inspectorate
- group participation soliciting.

JOB DESCRIPTIONS OF UN FINANCED PMU STAFF

A: National Project Manager (NPM)

1. GENERAL DESCRIPTION.

Provision of overall general management, administration and project supervision as advised by DOE/UNDP

2. SPECIFIC DUTIES

2.1 Responsible and accounting to DOE/UNDP for overall programme , financial, administrative and technical activities.
2.2 Coordination and liaison of Government, UNDP, PMU and international agencies
2.3 Coordination and liaison of Government, donor, NGO and Industry activities.
2.4 Responsible for accountability of project funds and equipment
2.5 Responsible for work plan management and field operations supervision.
2.6 Coordinate all project sectional activities.
2.7 Report to DOE and UNDP on project implementation progress.
2.8 Perform any other duties assigned by DOE/UNDP.

B: TECHNICAL OPERATIONS OFFICER

1. GENERAL DESCRIPTION.

Provision of technical managerial support services to the National Project Manager and PMU.

2. SPECIFIC DUTIES

2.1 Reports to the National Project Manager.
2.3 Understudy the PV expert and liaise with the international scientific advisory panel.
2.4 Supervise project technical and research activities.
2.5 Document progress of field activities
2.6 Coordinate the development of relevant training programmes for PMU, Industry and users.
2.7 Act as ZESA's main PV technical adviser for its operation and credit facility .
2.8 Assist in the preparation of monthly and quarterly technical reports for Government and UNDP.
2.9 Assist in the development of interim system quality standards and specifications.
2.10 Coordinate international technical assistance for the project.
2.11 Participate in research and development for solar applications
2.12 Participate in the monitoring of field reference systems, inspection of installed systems and in solar PV industry association deliberations.
2.13 Perform any other duties as assigned by the NPM.

C: RURAL PV EXPERT

1. GENERAL DESCRIPTION.

Provide expert , professional and international technical perspective on the dissemination of the PV technology for rural application.

2. SPECIFIC DUTIES

2.1 Reports to the National Project Manager.

2.3 Provide international perspective and reference on PV system components, standards, installations, code of practice, marketing methods, local assembly and training.

2.4 Participate in the development of component qualification test methods and provide test technical assistance to Zimbabwe test agencies.

2.5 Provide technical assistance in development and evolution of cost effective systems for the rural low income households.

2.6 Coordinate the refinement of interim system quality standards and specifications

2.7 Provide technical assistance in module and balance of system manufacture and in system installation methods and codes.

2.8 Participate in the development of the test laboratory and testing systems for refrigerators, batteries, lights, charge controllers and balance of systems.

2.9 Assist in the development of training programmes and materials for installers, inspectors and maintenance personnel.

2.10 Perform any other duty as assigned by the NPM.

D: OUTREACH ADVISOR

1. GENERAL DESCRIPTION.

Providing primary outreach in the dissemination of solar PV systems for rural areas.

2. SPECIFIC DUTIES

2.1 Reports to the National Project Manager.
2.2 Work closely with the National Project Manager in mobilising project activities among the public, local leadership and target consumers.
2.3 Provide main point-of-contact with PV system end-users including rural household, district councils, small businesses, farmers, schools, churches, clinics, etc.
2.4 Co-ordinate in designing and implementation of training programmes for installers and maintenance personnel in collaboration with the Technical Operations Officer and the PV Expert.
2.5 Co-ordinate publicity and public relations for project activities.
2.6 Participate at rural agricultural shows by setting up demonstration systems.
2.7 Assist manufacturers to produce solar instruction manuals in both Shona and Ndebele.
2.8 Co-ordinate co-operation and contacts with other related development programmes.
2.9 Assist in establishing rural users network that monitors the performance of installed systems and problem areas and offer quick solutions.
2.10 Perform any other duties as assigned by the National Project Manager.

E: ADMINISTRATION / FINANCE OFFICER

1.GENERAL DESCRIPTION.

Providing expert and professional, administrative accounting and financial support and reports to the National Project Manager.

2.SPECIFIC DUTIES

2.1 Provide administrative and accounting services to the project.
2.2 Ensure financial monitoring and accounting for all aspects of the project.
2.3 Prepare monthly financial status reports.
2.4 Prepare requests for authorisation.
2.5 Monitor local spending authorisations and advise on availability of funds to NPM.
2.6 Prepare quarterly financial reports.
2.7 Manage project imprest account
2.8 Maintain petty cash account
2.9 Monitor inventory levels and initiate procurement orders.
2.10 Provide personnel management support to the National Project Manager for Government and UN financed project personnel
2.11 Supervise the administrative staff (secretary, drivers).
2.12 Liaise with industry on requirements and provide industry professional business, management and accounting practice.
2.13 Perform any other duty as assigned by the NPM

F: ADMINISTRATION / FINANCE ASSISTANT OFFICER

2.GENERAL DESCRIPTION.

Provide assistance to the administration/finance officer and support services to the PMU. Reports to Admin/Finance Officer.

2.SPECIFIC DUTIES

2.1 Develop and manage information storage and retrieval systems.
2.2 Maintain inventories and manage project office equipment.
2.3 Responsible for imported project equipment clearance.
2.4 Responsible for issuing out PV components and modules to installers.
2.5 Responsible for the development and printing of project literature.
2.6 Act on behalf of the finance /administrator officer in his absence.
2.7 Responsible for logistics of workshops, seminars and training programmes.
2.8 Responsible for local purchases.
2.9 Supervise secretary, drivers and ensure effective utilisation of project equipment and vehicles.
2.10 Perform any other duties as assigned by the NPM.

G: PROJECT SECRETARY

1. GENERAL DESCRIPTION

Provide secretarial support to the National Project Manager and PMU.

2. SPECIFIC DUTIES

2.1 Receiving and distributing correspondence for the project (faxes and letters).
2.2 Sending outgoing mail for the project (faxes and letters).
2.3 Receiving incoming calls and making outgoing calls for the project staff.
2.4 Receiving visitors and directing them to appropriate PMU staff.
2.5 Maintain project files and documented database.
2.6 Word processing : letters and project documents.
2.7 Perform any other duties assigned by the NPM and PMU staff.

JOB DESCRIPTIONS OF PMU GOVERNMENT FINANCED PERSONNEL:

A: Government Programme Officer (coordinator)

1. GENERAL DESCRIPTION

Liaise with the relevant government department officials , AFC Branch Managers and its Technical Service Manager, Solar Energy Industry Association representatives, NGOs, ZESA and Endusers on a day-to-day basis, on issues related to project implementation.

2. SPECIFIC DUTIES

2.1 Provide technical and administrative backstopping to the project on a day-to-day basis.
2.2 Liaise closely with the project National Manager , PMU technical personnel and with DOE assistant director on the project.
2.3 Review , analyse , and recommend PMU expenditures to DOE assistant director on the project.
2.4 Work closely with AFC technical service manager to ensure effectiveness of the credit support facility.
2.5 Provide PV technical and administrative support in setting up NGOs and ZESA delivery modes with options for alternative credit support facilities.
2.6 Ensure that sustainable factors are in-built in the projects for Solar electric system dissemination beyond the pilot GEF Solar project.
2.7 Assist in the preparation of monthly, quarterly and annual progress reports of the project for DOE, UNDP and other pertinent authorities.
2.8 Assist in the development of terms of reference of project consultants.
2.9 Identify training needs and assist in the development of the appropriate training programmes
2.10 Set up the appropriate project database and ensure their up-keeping during implementation
2.11 Perform any other duties as assigned by the NPM.

B: Government Economist

1. GENERAL DESCRIPTION

Providing financial / accounting and administration support to PMU on a day-to-day basis on behalf of Government.

2 SPECIFIC DUTIES

2.1 Responsible for financial accounting as Government representative.
2.3 Liaise with financial institutions.
2.4 Responsible for project equipment procurement
2.5 Responsible for project impact analysis
2.6 Report on the financial status of the project's credit support facility.
2.7 Set up and organize the logistics for seminars, workshops, exhibitions and publicity.
2.8 Upkeeping a project database and project inventory records.
2.9 Supervise and coordinate the processing of all requests for travel advances for PMU personnel.
2.10 Perform any other duties as assigned by the NPM.

X (x)

C: GOVERNMENT PROGRAMME ENGINEER

1. GENERAL DESCRIPTION

Provision of expert and professional Pv technology/technical backstopping to the project on a day-to-day basis.

2. SPECIFIC DUTIES

2.1 Prepare and develop component qualification test methods and standards.
2.2 Carry out field inspection and monitor performance of installed solar (PV) systems.
2.3 Participate in the deliberations of the PV industry association (Solar Energy Industries' Association of Zimbabwe).
2.4 Provide technical assistance in developing training programmes and training of installers and endusers.
2.5 Identify areas which require international Technical Assistance for the project.
2.6 Liaise closely with the Rural PV specialist, Technical Operations Officer and other technical staff on the project.
2.7 Supervise project Technician.
2.8 Assist in the technical development of the ZESA delivery mode.
2.9 system database
2.10 Responsible for installation and maintenance of project equipment in the field and in offices e.g. computers.
2.11 Perform any other duties as assigned by the NPM.

D: Government Programme Technician

1. GENERAL DESCRIPTION

Providing technical inputs in the upkeeping of project laboratory, test equipment and reference solar systems.

2. SPECIFIC DUTIES

2.1 Responsible for the day-to-day upkeeping of the GEF Solar laboratory and test equipment.
2.2 Assist with PV system qualification exercises.
2.3 Assist with the clearing of imported project equipment and up-keeping of relevant inventory.
2.4 Responsible for monitoring of on-going tests in the laboratory.
2.5 Responsible of the updating of laboratory equipment inventory.
2.6 Assist in field system inspections.
2.7 Assist in field training of installers and endusers.
2.8 Perform any other duties as assigned by the NPM.

ANNEX XI

PROCUREMENT, PRICING AND INVENTORY PROCEDURES:

There will be need to adhere to current Government tender procedures. The following procedures will also be established:

1. **Identification of Need:**

   The need to procure equipment is established by the installing or manufacturing companies. This is based on their projected requirements over a period of time. At other times the need is based on the level of inventories in the warehouse. In such cases the Procurement Committee of the PMU determines what is to be procured.

2. **Obtaining Bids:**

   After the need has been determined, competitive bids in the form of pro-forma invoices are obtained from vendors. In the case of companies who are agents of only one company the need to obtain competitive bids is dispensed of and pro-forma invoices only obtained from the sole source. Companies in this category include Ecological Designs who are the Solarex dealers and Sollatek (Zimbabwe) who obtain their requirements from Sollatek (UK).

3. **Evaluating Bids:**

   After bids have been received, the Procurement Committee of the PMU sits to consider the bids. In evaluating the bids, consideration is taken of the price, technical specifications as well as delivery times. The Committee then recommends a vendor based on the above factors.

4. **Placing Orders:**

   Under the previous execution modality, orders were placed through DDSMS. A written request accompanied by the pro-forma invoice was sent to DDSMS who vetted the order before sending it to Contracts & Procurement Service (CPS). CPS then issued Purchase Order to the vendor.

   Alternatively, if the order was urgent and cost under US $ 20 000.00, a field Purchase Order was raised directly to the vendor by the National Project Manager through the local UNDP Office.

   Under national execution Government and UNDP Country Office have selected Government procurement with support from the UNDP Country Office. The IRC has approved this mode of procurement.

5. **Receipt of Goods:**

When goods are received they are checked and entered into inventory. Previously goods that were purchased for direct onward forwarding to the ordering company have not been entered into inventory but invoiced out directly. This practice has been discontinued and all goods will now be entered into inventory first.

6. **Pricing of Equipment:**

The PMU prices goods at the landed cost of the Purchase Order. The exchange rate to convert the foreign currency cost to Zimbabwe dollar equivalent is based on the bank ruling rate at the date of the Purchase Order. However, to encourage companies to buy in bulk, and thus reduce the administrative paperwork, solar modules are marked up by 10% for quantities between 10 and 19 for any one order from companies and 15% for orders less than 10. Orders of over 20 modules are at CIF price.

7. **Inventory Control:**

Inventories are kept by category and model and controlled by a running balance system maintained on computer. Periodic physical counts are held. The responsibility for inventory control lies with the Administrative / Finance Officer and the Project Economist.

8. **Procedure for Purchase of Equipment from the Warehouse:**

The following procedure for purchase of equipment by companies from the GEF Warehouse has been established:

a) **Companies supply written purchase orders for equipment that they wish to buy.**

b) **The project issues an invoice for the equipment to be procured.**

c) **Companies take the invoice to AFC and make payment as per invoiced amount.**

d) **Companies bring back AFC receipt and goods are issued on production of the AFC receipt.**

	ZIMBABWE UNDP / GEF SOLAR PV PROJECT							
	ZIM /95 /G31 / B / 50 / 99							
	PRELIMINARY INVENTORY OF MATERIALS AND EQUIPMENT							
	AS AT 16 AUGUST 1995							
	PV EQUIPMENT							
			RECEIVED			ISSUED		
DESCRIPTON	DATE	PO No.	QTY	AMT	QTY	AMT	BAL	BAL$
SOLAREX MSX18	8/4/94	31662	100	13600.00	70	9520.00	30	4080.00
SOLAREX MSX40	12/1/95	40976	400	90376.00	177	39991.38	223	50384.62
SOLAREX MSX50	12/1/95	40976	400	111296.00	122	33945.28	278	77350.72
SOLAREX MSX53	12/1/95	40976	100	24477.95	50	12238.98	50	12238.98
PHOTOWATT 35W	14/10/94	A20339	50	12737.00	0	0.00	50	12737.00
KYOCERA 24W	31/10/94	A20338	76	17172.00	0	0.00	76	17172.00
DARENTEK GS1235	14/10/94	40586	50	11956.00	30	7173.60	20	4782.40
DARENTEK GS1224	14/10/94	40586	50	9040.00	14	2531.20	36	6508.80
SOLARCOMM SP25	15/7/93	30994	50	12587.50	47	11832.25	3	755.25
SOLARCOMM SP47	15/7/93	30994	101	45410.00	20	8992.08	81	36417.92
SEC 12-100G BATTERII	24/2/94	31662	216	27985.00	146	18915.79	70	9069.21
SEC 12-65G BATTERIE	24/2/94	31662	360	38052.00	159	16806.30	201	21245.70
DIG. VOLTMETER	24/3/94	A20331	50	1437.50	29	833.75	21	603.75
INCLINOMETER	24/3/94	A20331	50	1092.50	12	262.20	38	830.30
TUBES								
PHILIPS 9W TUBES	9/5/94	40221	2500	6896.20	2480	6841.03	20	55.17
PHILIPS 11W TUBES	22/12/94	A20329	1000	2961.00	840	2487.24	160	473.76
OSRAM 5W TUBES	22/12/94	31502	1000	2760.74	780	2153.38	220	607.36
OSRAM 11W TUBES	8/11/93	31432	1000	2914.11	530	1544.48	470	1369.63
OSRAM 8W TUBES	8/11/93	31432	100	150.31	75	112.73	25	37.58
CHARGE CONTROLLERS								
SOLAPAK MX120	4/10/94	A20335	400	15800.00	359	14180.50	41	1619.50
R & S BAS1012i	29/9/93	31378	100	10049.00	31	3115.19	69	6933.81
R & S BAS1412	29/9/93	31378	10	2204.00	5	1102.00	5	1102.00
IOTA INVERTERS	5/10/93	31433	200	4520.00	0	0.00	200	4520.00
VOLTAGE REGULATOF	30/12/93	31818	1000	479.63	0	0.00	1000	479.63
ALUMINUM CAPACITOI	30/12/93	31818	2000	483.79	0	0.00	2000	483.79
POLYPROPLYNE CAPA	30/12/93	31818	4000	361.82	0	0.00	4000	361.82
				TOTAL				272220.70

Compiled by:		G. Mandishona National Project Manager						
Date:	18/9/95							
Signed by:	15/9/95	C. T. Mzezewa Director of Energy						
Date:								

VEHICLES AND EQUIPMENT INVENTORY					
DESCRIPTION	COMPAN	ORDER DATE	PO#	AMOUNT	DOMICILE	SERIAL NO
TOYOTA LAND 135	TOYOTA	14/4/93	22445	33783.36	GEN	200TCE135
TOYOTA LAND 122	TOYOTA	14/4/93	22445	33783.36	GEN	200TCE122
TOYOTA LAND 200	TOYOTA	3/6/93	30808	26000.00	OA	200TCE200
NISSAN PATR 230	NISSAN	3/6/93	30809	21216.36	NPM	200 CD 230
TOYOTA MOTOR SPARES		14/4/93	22445	3715.51	GEN	200TCE 122/135
JACKY'S ORDER?						
TYPEWRITER PANASONIC			30723		RM.23 MAG/	3AM37B02940
FAX MACINE -PANASONIC			30723		RM.23 MAG/	1930200201
COPY MACHINE -DESK TOP-CANNON			30723		RM.22 MANI	DXV12197
COPY MACHINE MEDIUM DUTY-CANNO			30723		RM. 21 DRIV	PJT02381
OVERHEAD PROJECTOR 3M			30723		STRM	948066
SLIDE PROJECTOR KODAK			30723		STRM	O260763000
VIDEO CAMERA PANASONIC			30723		RM.22 MANI	B3HB02243
CAMERA TRIPOD			30723		RM.22 MANI	-
TELEVISION -SONY			30723		RM.22 MANI	1021080
VCR-JVC			30723		RM.22 MANI	O9880965
VCR-JVC			30723		RM.22 MANI	O9881000
PO TOTAL				11889.00		
FAX MACHINE-SAMSUNG (LOCAL PURCH.)				1380.37	RM22 MAND	BIXB900466
NETCONNECT ORDER						
COMPAQUE CONTURA LAPT		2/6/93	30724	1651.00	RM22 MAND	7322HCG52842
COMPAQUE CONTURA LAPT		2/6/93	30724	1651.00	STRM	7322HCG51433
HP LASERJET PRINTER		2/6/93	30724	2109.00	RM29 KALIV	USBB163139
HP LASERJET PRINTER		2/6/93	30724	2109.00	RM20 MUPA	USBB163137
HP DESKJET 500 PRINTER		2/6/93	30724	461.00	RM.17 PFAI	US135S1109X
HP DESKJET 500 PRINTER		2/6/93	30724	461.00	RM.23 MAG/	US35S1109K
HP DESKJET 500 PRINTER		2/6/93	30724	461.00	RM.22 MANI	US35S1109S
EPSOM LQ 1170 PRINTER		2/6/93	30724	685.00	RM.24 MUK(	4161057407
EPSOM LQ 1170 PRINTER		2/6/93	30724	685.00	STRM	4161057402
HP DESKJET 500 PRINTER		16/11/93	31528	385.10	RM20 MUPA	3333S46046
HP DESKJET 500 PRINTER		16/11/93	31528	385.10	RM27 MUCH	3325S33136
HP DESKJET 500 PRINTER		16/11/93	31528	385.10	DOE	?
HP DESKJET 500 PRINTER		16/11/93	31528	385.10	RM30 MARA	3333S46032
NISCAR PAGE SCANNER		2/6/93	30724	559.00	STRM	ISXIR3005A
TRANSFOMER FOR ABOVE		2/6/93	30724	120.00	STRM	

MS BUS MOUSE 5PAK	2/6/93	30724	348.00	VAR	
MS BUS MOUSE 5PAK	2/6/93	30724	348.00	VAR	
10 TRIPPLITE SURGE PROTE	2/6/93	30724	460.00	VAR	
APC BACH UPS	2/6/93	30724	447.00	RM23 MAGAVA	
APC BACH UPS	2/6/93	30724	447.00	STRM	
8 15 FT PRINTER CABLES	2/6/93	30724	152.00	VAR	
7 ANTI GLARE SCREENS	2/6/93	30724	301.00	STRM	
FAX/MODEM COMMUNICATC	2/6/93	30724	218.00	STRM	
FAX/MODEM COMMUNICATC	2/6/93	30724	218.00	STRM	
CODATEC ORDER					
GATEWAY 4SX-25 COMPUTE	2/6/93	30725	1510.00	DOE MZEZE	1436190
GATEWAY 4SX-25 COMPUTE	2/6/93	30725	1510.00	RM23 MAGA	1692707
GATEWAY 4SX-25 COMPUTE	2/6/93	30725	1510.00	RM.24 MUK(	1436191
GATEWAY 4SX-25 COMPUTE	2/6/93	30725	1510.00	RM.27 MUCI	1436188
GATEWAY 4SX-25 COMPUTE	2/6/93	30725	1510.00	RM.29 KALI	1436192
GATEWAY 4SX-25 COMPUTE	2/6/93	30725	1510.00	RM17 PFAIF	1436198
GATEWAY 4DX-33V COMPUT	2/6/93	30725	2395.00	RM.20 MUPA	1435846
GATEWAY 4DX-33V COMPUT	2/6/93	30725	2395.00	RM.20 MUPA	1435847
GATEWAY 4SX-25 COMPUTE	21/10/93	31530	1625.00	DOE MUROY	?
GATEWAY 4SX-25 COMPUTE	21/10/93	31530	1625.00	RM22 MAND	1692710
GATEWAY 4SX-25 COMPUTE	21/10/93	31530	1625.00	RM22 MAND	1436193
GATEWAY 4SX-25 COMPUTE	21/10/93	31530	1625.00	RM.30 MARA	1692708
A.L.S. COMPUTER SYSTEMS ORDER					
10 LONG LIFE INK CARTRIDGES		31528	272.00		
4 ANTIGLARE SCREENS		31528	121.92		
4 INTERNAL FAX MODEM		31528	360.00		
DATA 2400 FAX S+R 9600	16/11/93	31528	360.00		
PORTABLE PRINTER	14/7/93	30986	583.00	STRM	AZDK10060
TELEVEYES VGA TO TV CON	22/11/93	31529	307.00	STRM	
COMPUTER-EYES/RT-PAL	22/11/93	31529	407.00	STRM	
COMPUTER SOFTWARE					
EDGE-BUY ORDER					
WINDOWS 3.1 SOFTWARE	3/6/93	30722	88.50	STRM	
DOS SOFTWARE	3/6/93	30722	48.50	STRM	
MS EXCEL	3/6/93	30722	294.00	STRM	
LOTUS 1-2-3 1.1 WINDOWS	3/6/93	30722	373.00	STRM	
MS WORD WINDOWS	3/6/93	30722	294.50	STRM	
WORDPERFECT 5.2 WINDOW	3/6/93	30722	267.50	STRM	
QUATTROPRO WINDOWS	3/6/93	30722	93.75	STRM	

ALDUS PAGE MARKER	3/6/93	30722	544.75	STRM	
HAVARD GRAPHICS	3/6/93	30722	352.00	STRM	
CALENDAR CREATOR	3/6/93	30722	39.50	STRM	
CA - PBI ACCTG II	3/6/93	30722	150.00	STRM	
OMNIPAGE PROF	3/6/93	30722	985.00	STRM	
DBASE IV	3/6/93	30722	519.00	STRM	
PARADOX	3/6/93	30722	119.50	STRM	
NORTON ANTIVIRUS	3/6/93	30722	81.50	STRM	
NORTON UTILITIES	3/6/93	30722	112.50	STRM	
NORTON DESK TOP	3/6/93	30722	112.50	STRM	
QUICKEN	3/6/93	30722	39.00	STRM	
RAPID FAX	3/6/93	30722	99.00	STRM	
WINFAX	3/6/93	30722	80.00	STRM	
NORTON TUTORIALS	3/6/93	30722	132.00	STRM	
PROJECT SCHEDULER	3/6/93	30722	457.00	STRM	
EASY CAD	3/6/93	30722	95.00	STRM	
NO SQUINT	3/6/93	30722	86.00	STRM	
PVCAD	3/6/93	30722	485.00	STRM	
LONDON 32 PABX	23/3/94	A 20327	5870.00	RM23	
OFFICE CURTAINS	16/6/94		253.19	VAR	
SECRETARIAL DESK			352.50	RM23	
TYPIST CHAIR			72.33	RM23	
4 GLASS FRONT BOOKCASE			625.03	RM24,22,20,30	
3 LETTER TRAYS			49.36	RM24,23,17	
2 STATIONERY CUPBOARDS			445.83	RM24,14	
3 BEADED PANEL BOX FILE STORAGE			842.05	2RM23,1RM22	
5 X 4DRAWER FILING CABINET			1134.91	2RM23,1RM24,25,30	
	TOTAL		185554.48		
Compiled by:	G. Mandishona			Date:	18-9-95
	National Project Manager				
Signed by:	C. T. Mzezewa			Date:	13-9-95
	Director of Energy				

Test Equipment Inventory

[EQUIPC17]

NO.	QTY REC'D	QTY STOCK	NOT FOUND	ITEM	MANF	MODEL NO	UNIT (US$)	TOTAL (US$)
FROM PO NO. 30727								
1	2	1GMAR, 1JP	0	Digital Multimeter	Fluke	12	80.75	161.50
2	2	1NK, 1GM	0	Digital Multimeter	Davis/389451	Rangemaster II	132.00	264.00
3	2	1GMUP	1	Digital Multimeter		383487	151.00	151.00
4	2	2STR	0	Data Acquisition Sof	Davis	383495/895	47.50	95.00
5	2	2STR	0	Current Clamp	Fluke	Y8100	206.00	412.00
6	4	3STR	1	Current Shunt	Fluke	80J-10	43.25	129.75
7	2	2STR	0	Light Meter	Davis	L179672/734	113.00	226.00
8	2	2STR	0	Scopemeter	Fluke	97	1755.00	3510.00
9	2	2STR	0	Line Voltage Charge	Davis	PM8907/003	142.50	285.00
10	2	2STR	0	Hard Carrying Case	Davis	C97	52.25	104.50
11	2			Service Manual	Davis	931605	0.00	0.00
12	2	2STR	0	DSOCOM Software	Davis	PM2270/003	133.00	266.00
13	2	2STR	0	Digital Thermometer	Davis	DT10	43.00	86.00
14	2	2 CLAIM	2	Dig. Temp/Hum. Me	Davis	UTL880	38.00	0.00
15	2	2STR	0	Vane Air Velocity Me	Davis	DS105101	156.75	313.50
16	2	TR, 1SOLD -SOLLAT	0	Power Supply	Kenwood	PR36-3	279.50	279.50
17	2	1GMUP, 1CLAIM	1	Power Supply	Kenwood	PD35-20	1340.00	1340.00
18	2	2STRM	0	Audio Generator	Kenwood	LAG1208	379.00	758.00
FROM PO 31564								
ALTERNATIVE ENGINEERING ORDER								
1	20	20	0	Alternative En Eng'ing Catalogs			N/C	N/C
2	10	10	0	Battery Post & Terminal Cleaner		51-879	3.76	37.62
3	2	2	0	Pump w/ Pressure Switch		75-332	136.95	273.90
4	1	1	0	Portable Sun Oven		95-190	244.20	244.20
5	1	1	0	Zomeworks Solar Oven		95-210	309.38	309.38
6	2	2	0	Hair Curler (12 VDC)		85-898	29.70	59.40
7	1	1	0	Solar Fence Charger		88-205	244.20	244.20
8	1	1	0	Portable Lantern		88-012	92.81	92.81
9	25	25	0	NiCd Battery (D - 4 Ah)		87-400	7.76	193.88
10	2	2	0	NiCd Battery Charger (12 VDC)		87-121	23.76	47.52
11	1	1	0	Electric Vehicle Directory		90-110	14.52	14.52
12	1	1	0	Living on 12 Volts With Ample Pow		90-117	38.30	38.30
13	1	1	0	Battery Book for Your Home		90-135	18.56	18.56
FROM PO NO. 30988								
C & H SALES ORDER								
1	10	3STR	7	Resistor 0.1 Ohm 1%	C & H Sales Co	RS9159	0.45	1.35

2	20	14STR	6	Resistor 0.05 Ohm 1	C & H Sales Co	RS9254	1.05	14.70
3	10	3 LOAN SOLLATEK	7	Resistor 2.0 Ohm 1%	C & H Sales Co	RS9250	1.50	4.50
4	20	20STR	0	Resistor 0.5 Ohm 1%	C & H Sales Co	RS9002	1.00	20.00
5	4	4STRM	0	Protective Goggles	C & H Sales Co.		4.00	16.00
6	1	1DOZ STRM	0	Latex Gloves (1Doz)	C & H Sales Co.		10.00	10.00
7	2	2STR	0	4-Pole Contactor	C & H Sales Co.		25.00	50.00
FROM PO NO. 30990								
	2	2WH	0	Solstice MX 120 Cor	Solapak		87.47	174.93
FROM PO NO.30987								
IOTEC								
1	1	1STRM	0	Data Acquisition Sy	IO Tech, Inc	DacBook/100	1295.00	1295.00
2	1	1STRM	0	Screw-Terminal Car	IO Tech. Inc	DBK11	95.00	95.00
3	1	1STRM	0	Rechargeable Batte	IO Tech. Inc.	DBK30	395.00	395.00
4	1	1STRM	0	HT Basic(Rocky Mo	IO Tech. Inc	HTBASIC	625.00	625.00
FROM PO NO. 30991								
NESTE ORDER								
	2	2STRM		Charge Controller	NAPS NORWAY	NCC1	75.00	150.00
FROM PO NO. 30989								
EDMUND SCIENTIFIC ORDER								
	4	1EA. GMUP, NK, JP	1	Inclinometer	Edmund Scient	D33,417	19.00	57.00
	4	1EA. GMUP, NK, JP	1	Compass	Edmund Scient	D35,269	15.00	45.00
FROM PO NO. 31563								
MOUSER ORDER								
NO	QTY			ITEM		MOUSER NUMBER	EACH	TOTAL (US$)
1	100	100 Sold - Sollatek	0	Heatsink (32 deg C/Watt)		567-7-192-BA	0.21	0.00
2	10	10 Sold - Sollatek	0	Heatsink (41 deg C/Watt)		567-7-340-1PP	0.69	0.00
3	1	1 Sold - Sollatek	0	Lacing Filament (500Yd)		501-56NOF17W	15.84	0.00
4	5	4 Sold - Sollatek, 1S	0	Hook-up Wire (100',20AWG,BK)		515-2040-12-01	4.31	0.00
5	5	4 Sold - Sollatek, 1S	0	Hook-up Wire (100',20AWG,RD)		515-2040-12-03	4.31	0.00
6	5	4 Sold - Sollatek, 1S	0	Hook-up Wire (100',20AWG,YL)		515-2040-12-05	4.31	0.00
7	5	1 STRM	4	Control Cable (4 x 22AWG x 100')		515-4063-12	13.94	13.94
8	20	20 Sold - Sollatek	0	Banana Jack - Red		164-6216	0.49	0.00
9	20	20 Sold - Sollatek	0	Banana Jack - Black		164-6217	0.49	0.00

10	10		10	Binding Post - Red	164-11102	1.15	0.00
11	10	10 STRM		Binding Post - Black	164-11103	1.15	11.50
12	20	20 STRM	0	Alligator Clip - Red	13AC151	0.13	2.60
13	20	20 STRM	0	Alligator Clip - Black	13AC152	0.13	2.60
14	20	20 Sold - Sollatek	0	Banana Plug (Solderless) - Red	530-108-0302-1	0.84	0.00
15	20	20 Sold - Sollatek	0	Banana Plug (Solderless) - Black	530-108-0303-1	0.84	0.00
16	5	3 Sold - Sollatek,5 S	0	Standard Test Leads (10 w/ 5 colou	13AC012	6.89	34.45
17	5	4 Sold - Sollatek,	1	Heavy Duty Test Leads (4 w/ 4 colo	13TC900	4.07	0.00
18	100	100 Sold - Sollatek	0	Metal Oxide Varistor (130 v, 38 J)	570-V130LA10A	0.55	0.00
19	10	10 Sold - Sollatek	0	Capacitor, Metalized Polypropylene	1429-1104	0.39	0.00
				105 deg, 0.1 mfd, 100 V			0.00
20	10	10 Sold - Sollatek	0	Capacitor, Metalized Polypropylene	1429-1474	0.83	0.00
				105 deg, 0.47 mfd, 100 V			0.00
21	1	1 Sold - Sollatek	0	Capacitor Kit - Polyester Film	370-140PFK-1	23.95	0.00
				175 Pieces, 10 %			0.00
22	10	10 Sold - Sollatek	0	Push Button Switch (1 A - Red)	18PA220	1.05	0.00
23	8	5 Sold - Sollatek	3	Battery Holder (4 - D)	12BH145	3.07	9.21
24	10	10 Sold - Sollatek	0	Knob (1/4 " ID)	45KN024	0.81	0.00
25	1000	800 Sold - Sollatek,2	0	Cable Tie (6")	491-0106W	0.026	5.20
26	4	1 EA.NK,JP,GM,JP.H	4	Screwdriver Set (5 Std, 5 Philips,	57SPS68	20.33	81.32
				1 Torque Handle)			
FROM PO 30726							
Data Logger Equipment Order							
	QTY						
	4	2 STRM,2 Alt. Techn	0	Data Logger 2832/33/34/35			
				Licor LI-1000-32		1370.00	5480.00
	2	1 STRM, 1 Alt. Techr	0	RS-232 Cable (1000-09)		56.00	112.00
	1	1Alt. Technology	0	Communication Software		63.00	63.00
	4	2 STRM, 2 Alt. Techr	0	AC Adapter (1000-02)		120.00	480.00
	4	2 STRM, 2 Alt. Techr	0	Carrying Case (1000-07)		45.00	180.00
	4	2 Alt. Technology	2	37 Pin D Connector (1000-12)		15.00	60.00
	4	3 STRM, 1 Alt. Techr	1	Terminal Block (1000-05)		120.00	360.00
	4	2 STRM, 2 Alt. Techr	2	Photometric Sensor (LI-210SA) PH5064/6		365.00	730.00
	4	4 STRM	0	Pyranometer Sensor (LI-200SA) PY18482-5		200.00	800.00
	4	1 STRM, 3 Alt. Techr	0	Temperature Sensor (1000-18)		70.00	280.00
	8	5 STR	1	Mounting and Leveling Fixture (2003S)		44.00	220.00
Test System Components							
				PO# 31582			
GEF Solar Project (ZIM/92/G31)				[OR1013.XLS]			
				C & H			
1	5		5	Bridge Rectifier (25 A, 200 V)	FD6901	0.00	0.00
2	12	12 WH		Thermal Circuit Breaker (10 A)	TCB9101	0.83	10.00
3	5		5	Circuit Breaker (15 A, 28 VDC)	CB9251	0.00	0.00
4	10	10 WH		Capacitor (500 MFD, 25 V, Axial)	CAP91523	1.50	15.00
5	10	10 WH		Capacitor (2200 MFD, 25 V, Axial)	CAP91524	1.00	10.00
6	10	10 WH		Capacitor (680 MFD, 50 V, PC moun	CAP91540	0.35	3.50
7	2	2 WH		Thermoswitch (-100 to 400 deg F, 2	HTS8951	12.50	25.00
8	2	2 WH		Thermoswitch (-100 to 300 deg F, 1	HTS8952	12.50	25.00
9	4	4 WH		Heavy Duty Caster (6" dia x 2" wide	CAS9951	11.25	45.00
10	4	4WH		Aluminum Carrying Case (16"x13"x	CC8900	24.95	99.80
				Waterproof, Weight - 16 lbs			
11	10	10 WH		Feed Through Terminal Block (7 Te	CJ8304	1.05	10.50

12	10	10 WH		Barrier Terminal Strip (15 A, 4 Term	CJ92512	0.60	6.00
13	10	10 WH		Barrier Terminal Strip (20 A, 10 Ter	CJ9254	1.50	15.00
14	10	10 WH		Barrier Terminal Strip (20 A, 11 Ter	CJ9256	1.65	16.50
				with solder lugs			
15	2		2	Fan (112 CFM, 12 VDC, 0.42 A)	DCB9154	22.50	0.00
16	2	2 WH		Motor (24 VDC, 2900 RPM, 0.5A no	DCM9053	12.50	25.00
17	2	2 WH		Motor (12 VDC, 3300 RPM, 60 oz-in	DCM8851	7.95	15.90
18	5	4 WH	1	Heatsink (10"x3.5"x1 3/16")	HD9053	6.95	28.00
18	5	5 WH		Hellpot (2K)	PDP8400	5.00	25.00
18	10	10 WH		Switch (DPDT, 5A, 1/4" dia)	TS8851	1.95	19.50
18	10	10 WH		Relay (3PDT, 12 VDC, 105 ohm, 10 A	RL8200	2.50	25.00
18	10	10 WH		Relay (SPST, 12 VDC, 150 ohms, 30	RL9257	1.75	17.50
18	6	6 WH		Rheostat (3.5 ohm, 300W)	RH7701	9.95	59.70
18	20	20 WH		Resistor (10 ohm, 10 W)	RS9104	9.95	199.00
18	10	10 WH		Voltage Regulator (LM317)	LM317	1.00	10.00
18	10	10 WH		Transistor (2n3055)	2N3055	0.85	8.50
FROM FPO A 28328							
1	10	4 STR	6	SSAC Timer (ERD11611)		32.74	130.96
2	22	12 STR	10	SSAC Timer (TDR1A33)		62.71	752.52
3	22	20 STR	2	8 Pin Socket (OTS-PC)		2.92	58.40
4	3	0	3	DIN Rail (C102P)		6.12	0.00
5	50	0	50	Terminal (Non Insulated) P1015-47		0.32	0.00
6	50	0	50	Terminal (Insulated) P1013)		0.37	0.00
7	20	0	20	Terminal (Screw) P1015-18)		0.30	0.00
				TOTAL			23481.31
	Compiled by:		G. Mandishona		Date: 18/9/95		
			National Project Manager				
	Signed by:		C. T. Mzezewa		Date: 18/9/95		
			Director of Energy				