

CLIMATE INVESTMENT FUNDS

SREP/SC.6/6/Add.1
October 13, 2011

Meeting of the SREP Sub-Committee
Washington, D.C.
November 1, 2011

Agenda Item 6

APPENDICES: INVESTMENT PLAN OF MALI



REPUBLIC OF MALI
MINISTRY OF ENERGY AND WATER



NATIONAL DIRECTORATE OF ENERGY

SREP-MALI INVESTMENT PLAN

Scaling Up Renewable Energy in Mali



Volume 2: Appendices

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Appendix 1: Overview of RE experiences in Mali

Solar PV experiences:

N°	Type	Quantity	Installed Capacity (MW)	Power generated (Kwc)	Power generated in Mwh/year	Cost of Kwc off-grid in USD	Uses
1	Solar Pumps	1300	2,4	0,900	3500	16,6	Water pumping
2	Off grid installations	700	0,21	0,6	360,6	11,1	Lighting, freezers, buildings
3	Mini grid installations	400	0,5	1,2	730	8,9	Telecommunication, Offices, City Halls, Schools, Hospitals, etc.
4	On grid installations	None	N/A	N/A	N/A	N/A	N/A
5	Solar kits	130 000	5.8	75	8468	7,8	Solar kits disseminated in households, schools, health centers, etc.

Biofuels experiences:

1) Production (2010)

* Oil (direct use) :	7 840 litres
* Biofuel:	67 000 litres
* Number of pressing units:	13

2) Off grid installations (functionning with biofuel) :

Number of generators:	15
Installed capacity:	645 KW

Hydroelectricity experiences:

		Installed capacity (MW)	Power generated (GWh)	Production cost Kwh (in USD)
Mini hydro on grid power plants	Sotuba	5, 7 MW	36 GWh	0,07 (average)
Large scale on grid power plants	Sélingué	46, 24 MW	220 GWh	
	Manantali	104 MW	416GWh	

Examples of rural electrification projects:

Project location	Town of Ménaka (Gao Region)	Commune of Sanankoroba (Koulikoro Region)	Twon of Garalo (Sikasso Region)
Promoter	<ul style="list-style-type: none"> Private company TILGAZ 	<ul style="list-style-type: none"> Private company Energie Rurale Durable (ERD) 	<ul style="list-style-type: none"> Private company Access SARL
Project background	<ul style="list-style-type: none"> TILGAZ aimed at electrifying the town of Ménaka, which is a Prefecture 	<ul style="list-style-type: none"> ERD has initially implemented a pilot project in Sanankoroba (22 km from Bamako) consisting of 40 Solar Home Systems supplying households and community buildings. The pilot project was extended later to the setting-up of a multifunctional platform supplying a 2-km grid for public lighting and connection of productive customers along the main road Based on the success of this pilot project, ERD decided to engage in a PCASER procedure for electrification of all the Commune (2 villages: Sanankoroba and Banankoro) 	<ul style="list-style-type: none"> Access SARL aimed at electrifying the town of Garolo, which is the Commune' administrative centre Garolo area is a large producer of jatropha, which could be transformed in a bio-fuel (jatropha-oil) to feed generators
Project milestones	<ul style="list-style-type: none"> Commune' prior notice: 09/05/2005 Application for preliminary permit: 02/14/2006; issue: 02/21/2006 Call for competition: 02/22 to 04/20/2006 Submission of electrification scheme and business plan: 05/17/2006 Validation by AMADER' Evaluation Committee: 06/05/2006 Negotiation of project financing: 07/17/2006 Signature of contractual documents: 	<ul style="list-style-type: none"> Commune' prior notice: 03/04/2005 Application for preliminary permit: 03/07/2005; issue: 04/01/2005 Call for competition: launched on 04/07/2005 for a 60-days duration Submission of electrification scheme and business plan: 06/20/2005 Validation by AMADER' Evaluation Committee: 10/17/2005 Negotiation of project financing: 07/05/2005 	<ul style="list-style-type: none"> Commune' prior notice: 04/20/2005 Application for preliminary permit: 05/18/2005; issue: 06/09/2009 Call for competition: from 06/15 to 08/15/2005 Submission of electrification scheme and business plan: 09/25/2005 Validation by AMADER' Evaluation Committee: 07/04/2006 Negotiation of project financing: 07/13/2006

	07/21/2006 • Financing agreement effectiveness: 10/10/2006	• Signature of contractual documents: 01/20/2006 • Financing agreement effectiveness: 04/25/2006	• Signature of contractual documents: 07/21/2006 • Financing agreement effectiveness: 01/05/2007
Target	• 767 new customers, among a population of 12,000 inhabitants	• 580 customers, among a population of 7,156 inhabitants	• 647 new customers, among a population of 8,000 inhabitants (20,000 in the Commune)
Electrification scheme	• Stand-alone grid supplied by gasoil-fueled generators • Installed capacity: $275+150=325$ kVA • 1.5 km of MV line and 15 km of LV line	• Stand-alone grid supplied by gasoil-fueled generators, and MV grid extension • Installed capacity: $100+60=360$ kVA • 3 km of MV line (MV grid extension) and 12 km of LV line	• Stand-alone grid supplied by a jatropha-oil fueled generator • Installed capacity: 300 kVA • Length of LV lines: 16 km

Appendix 2: Additional information on Project 1

Project Estimated Total Cost. Usually, the estimated cost per MW of Solar PV technology is capped at about USD 1.5 – 2 million. For Project 1, the project cost was calculated on the basis of USD 3 million per MW installed. This estimated cost takes into account a number of items that potentially may be part of the capital expenditures which at this stage are unclear. These can include: (i) Project studies; (ii) Financing and Legal fees; (iii) Interest During Construction; (iv) Debt Service Reserve Account; and (v) Maintenance Reserve Account, among others. It is vital to mention that these components can significantly increase the Project's cost and it is advisable to have them on the high rather than on the low in order to ensure that the co-financiers have an idea of what the financing needs will be. Furthermore, the MDBs will ensure the SREP resources are utilized in accordance with the principle of the minimum concessionality with the sole objective of benefiting the end users without putting at risk the financial viability of EDM SA, the off taker.

Project Structure. Project 1 is being structured as a Project Finance type of transaction under a non-recourse finance scheme. Therefore, in case of project default, the envisaged security provided to the Lenders (in this project AfDB Private Sector and IFC) only includes the assets of the Special Purpose Vehicle (SPV) that shall be created to carry the concession, step-in rights and access to the reserve accounts. This can be seen as an example of a Public-Private Partnership as the Government will be expected to provide a Sovereign Guarantee to the obligations assumed by EDM (national utility) on the Power Purchase Agreement signed with the SPV. The Government can even become a shareholder in the SPV and cash-in dividends provided by the project.

After discussions with MDBs, the GoM confirmed its choice of having a single project under the envelope of Project 1, considering that having a number of Project Developers to implement several smaller plants would mean loss of scale and economies of scale, and higher transaction costs.

Financing Scheme and Co-financing of the Project. The MDBs co-financing and the SREP resources can only be used to finance the Capital Expenditures of the Project (e.g. infrastructure and development costs) and the Loan Agreement shall be signed between the MDBs and the SPV. This means, that the resources committed to this project, apart from the SREP Project Preparation Grant, will flow directly to the SPV (owned by the successful bidder) and not to any Public entity.

The only factor that makes Solar PV (Project I technology) not competitive with other energy sources currently feeding the grid is the expensive capital expenditures. Therefore, to make such a project viable there are two options that could be implemented: (i) the Government subsidize the incremental cost between present tariffs and the project tariff that makes the project commercial viable; or (ii) SREP resources are used to buy down the capital expenditures which will decrease the costs of financing and ultimately the project's total cost. The tariff under the PPA will be brought down to acceptable levels by the utility (off-taker) and the project owner. SREP resources will target option (ii).

At this early stage, any financial contribution is seen as tentative, even though the Financing Table already details some contributions. The Investment Plan therefore includes envisaged contributions and not final ones. The instruments, amounts to be financed and involved financiers will be defined in due time. A rule of thumb for financing is the equity to debt ratio of 70/30, with the winning bidder and other investors bringing 30% of the Project's Total Cost while the senior lenders put the remaining as debt. AfDB Private Sector is able to finance up to 30% of a Project's Total Cost and has agreements with other financiers (e.g. African Financing Partnership) that facilitates the co-financing of project developed under the proposed structure.

Selection of the Winning Bidder. Under the above structure, the Government is expected to launch a competitive bidding process. At the time of the launching of the Bidding Process, bidders shall know that the Project will benefit from a SREP Grant/Concessional Loan that will serve as capital buy-down to reduce financing costs (this is expected to bring generations costs per kWh to acceptable values) and that the MDBs involved are supporting the Project through competitive and long term financing. Based on this, the bidders will submit their technical and financial proposals. A choice of a Project Developer will be made in terms acceptable to the Government and the co-financiers and will give the Build-Own-Operate and Transfer (BOOT) right (or other acceptable and viable scheme) to a private company to install the Solar PV Facility in accordance with their Technical Proposal. The due diligence process will then start and the SREP resources will be disbursed at the same time of the co-financing provided by the MDBs. The details of the competitive bidding process will be further defined as part of the project preparation phase.

One of the benefits of a structure of this type is to distribute more efficiently and evenly the risks of a project of this nature between the Public and the Private Sector. For instance, at this stage it is expected that the Public Sector will assume the market risk (likelihood of EDM not paying for the energy bought under the PPA) and the Private Sector will assume the Design, Build, Operation and Maintenance risks.

Choice of RE Technology for the IPP. Initially, all forms of RE have been considered. They were discussed during the various joint missions with all stakeholders and a choice was done to focus on Solar PV for the IPP because there are many private operators currently interested in investing in such technology in Mali. Nonetheless, a number of constraints have been identified and prevented deals to be finalized so far. Therefore, this project is designed to further identify and unlock specific bottlenecks in order to allow other private sector operators to invest in similar projects in the coming years. In such context, the replication effect of this project structure, even with other RE technologies, should be relatively high.

Tariff per kWh. The tariff per kWh under the PPA will need to be enough to repay the senior debt, the operational costs and to provide a certain return on the equity investment to the shareholders of the project. This return is directly correlated with the perceived risk by the investors in Mali. The Ministry of Finance, Ministry of Water and Energy and the EDM will negotiate with the winning bidder a tariff under the PPA that is acceptable to all parties and makes the project commercially viable.

Estimated benefits of the project. Information will be provided when the feasibility study is done, but at this stage, preliminary information show that the project will potentially:

- save 66.500 metric tons per year of CO2 emissions;
- provide about 170,000 additional malians with electricity (obviously, since the solar plant is grid connected, it will not only provide electricity to Malian people but also to productive activities, businesses, etc.) ;
- create 200 new jobs during construction and further 8 during operations.

Appendix 3: Cost estimates for Project 2

Timeline	Estimated connections	Capacity (kW)	Capital investment costs (US\$m)	Average cost per connection (US\$)	Average investment costs per kW (US\$)	Average investment costs per kW (XOF)
2nd year	5,000	1100	12.7	2530	11500	5,462,500
3rd year	6,500	1300	13.7	2100	10500	4,987,500
4th year	6,000	1200	12.0	2000	10000	4,750,000
5th year	3,500	900	8.1	2314	9000	4,275,000
TOTAL	21000	4500	46.1	2,196	10,250	

Assumptions:

- Estimated connections include households, commercial/small industries, and community institutions
- Technologies include scale up of existing diesel mini-grids with RE component and construction of new hybrid mini-grids and other small scale investments (multi-functional platforms, SHS, etc.)
- Capital investment costs include construction, mini-grid infrastructure for generation + distribution, connection costs, buildings, land purchase, transport of equipment to project site
- Average investment cost per kW are estimated to decrease over time, as mini-hybrid systems are further optimized and market for renewable energies is expanding
- Cost estimates exclude contingencies

Appendix 4: Analyse technico-économique sommaire de l'impact d'un système hybride sur certains coûts totaux actualisés de l'alimentation en énergie électrique d'une localité PCASER

Généralités

La localité considérée présente une population de X habitants à l'année de son électrification. L'électrification se fait sans système hybride avec les infrastructures suivantes :

- Une centrale Diesel ;
- Un réseau MT&BT équipé de poste de transformation sur poteaux (type H61).

Lorsque l'électrification se fait avec un système hybride, une centrale PV d'une puissance de crête de Y kWc est couplée à la centrale Diesel. Cette centrale PV peut être équipée d'une batterie ou non.

Il est admis dans l'analyse qu'avec et sans système hybride le réseau MT&BT est le même et que la centrale Diesel présente la même puissance installée.

La comparaison des coûts totaux actualisés tient donc uniquement compte des coûts suivants :

- Sans système hybride :
 - Coûts du combustible et du lubrifiant de la centrale Diesel;
- Avec système hybride :
 - Coûts d'investissement de la centrale PV (en tenant compte de la subvention) ;
 - Coûts de maintenance et d'exploitation de la centrale PV ;
 - Coûts de remplacement de la batterie (sans subvention) ;
 - Coûts de remplacement de l'onduleur (sans subvention) ;
 - Coût du combustible et du lubrifiant de la centrale Diesel;
 - Valeur restante de la centrale PV à la fin de la période d'autorisation (15 ans).

Prévision de la demande de la localité

La prévision de la demande de la localité est réalisée avec le modèle qui a été utilisé dans le cadre de l'étude de faisabilité des projets d'électrification rurale du Mali.

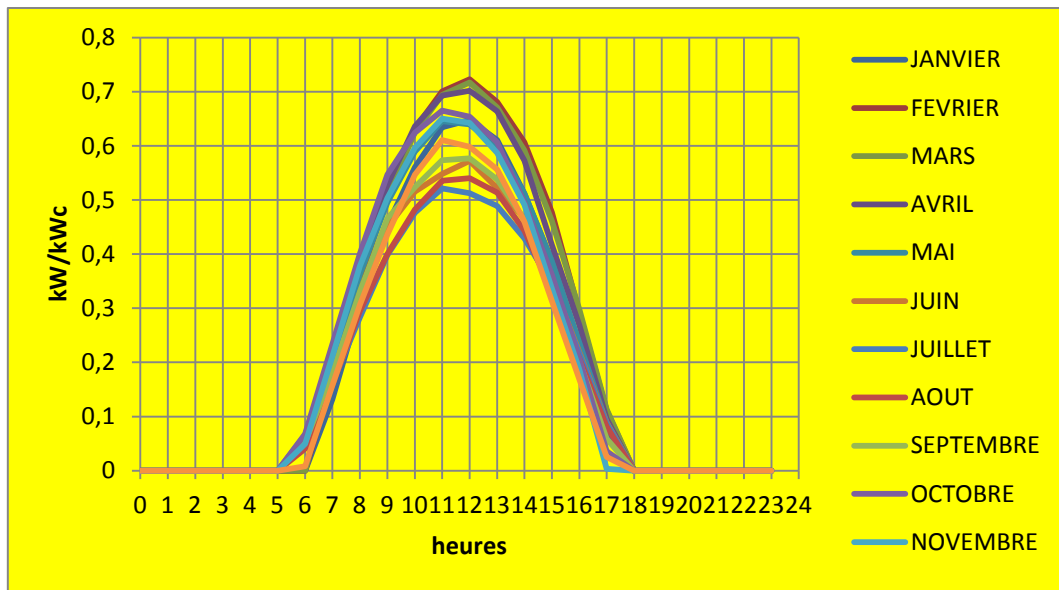
Ce modèle donne :

- La prévision de la demande en énergie année par année ;
- La courbe de charge horaire par année.

Production de la centrale PV

La production de la centrale PV est estimée sur base de données d'irradiation valable pour la région de Bamako.

Le diagramme suivant donne la production moyenne journalière nette en kW/kWc installée pour chaque mois de l'année. Les pertes en système PV (pertes dans les câbles, pertes dues à la température des panneaux, pertes dans l'onduleur sont estimées à 16 %).



Production Diesel sans centrale PV

La production de la centrale Diesel sans centrale PV est classique et basée sur la demande annuelle tenant compte des pertes et d'une consommation spécifique par kWh produit.

Production Diesel avec centrale PV et batteries

La production Diesel est calculée sur base de la courbe de charge horaire de la demande et de la courbe de production horaire de la centrale PV.

- D_h : demande moyenne horaire à l'heure h (kWh) ;
- PV_h : production moyenne horaire PV à l'heure h (kWh) ;
- $PDiesel_h$: production Diesel à l'heure h (kWh) ;

Si $PV_h > D_h$

La centrale PV injecte dans le réseau la demande D_h et injecte dans la batterie la différence. La production Diesel est nulle ($PDiesel_h = 0$).

Si $PV_h < D_h$

La centrale Diesel produit la différence pour satisfaire la demande D_h en tenant compte de l'énergie emmagasinée dans la batterie et qui est injectée dans le réseau à l'heure h (EB_h). L'énergie injectée dans le réseau à partir de la batterie représente une portion de l'énergie emmagasinée dans la batterie pour tenir compte des pertes batterie.

$$PDiesel_h = D_h - PV_h - EB_h$$

Si $PV_h = 0$

La centrale Diesel produit la demande D_h en tenant compte de l'énergie de la batterie qui est injectée dans le réseau à l'heure h.

$$PDiesel_h = D_h - EB_h$$

Production Diesel avec centrale PV sans batterie

Dans ce cas, la puissance installée PV doit être telle que sa production ne soit pas très différente de la demande au risque d'avoir des surtensions au niveau de l'onduleur qui conduiraient à son déclenchement.

Dans ce cas, si $PV_h \leq D_h$, la production Diesel est :

$$PDiesel_h = D_h - PV_h$$

$$\text{Si } PV_h = 0$$

La centrale Diesel produit la demande D_h .

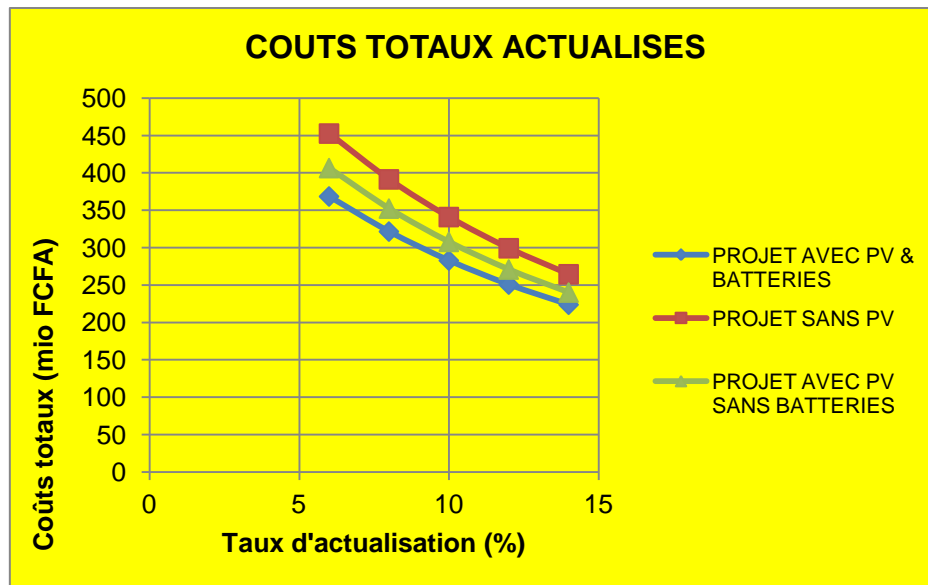
$$PDiesel_h = D_h$$

Résultats des simulations

Les simulations sont réalisées dans le cadre d'une demande moyenne et avec les hypothèses suivantes :

- Diesel
 - Prix du Diesel : 610 FCFA/litre ;
 - Poids spécifique du Diesel : 0,83 kg/litre ;
 - Consommation spécifique sans PV : 240 gr/kWh ;
 - Consommation spécifique avec PV : 250 gr/kWh ;
 - Coût du lubrifiant : 2 FCFA/kWh
- Centrale PV
 - Subvention des coûts d'investissement : 80 %
 - Coût des panneaux : 1.560.000 FCFA/kWc ;
 - Durée de vie des panneaux : 25 ans ;
 - Onduleur : 600 FCFA/W ;
 - Durée de vie de l'onduleur : 12 ans ;
 - Batteries : 135.000 FCFA/kWh de capacité;
 - Durée de vie des batteries : 8 ans ;
 - Régulateur de charge : 250 FCFA/W ;
 - Durée de vie du régulateur : 12 ans ;
 - Maintenance et exploitation du système PV avec batteries : 1,0%/an des coûts d'investissement par an ;
 - Maintenance et exploitation du système PV sans batteries : 0,2%/an des coûts d'investissement par an ;
 - Pertes batterie : 10 % de l'énergie emmagasinée.

Le diagramme suivant donne les coûts totaux actualisé pour une localité de 10.000 habitants. Dans le système PV avec batteries, la puissance PV installée est fixée à 50 kW. Sans batteries, la puissance PV installée est fixée à 25 kW pour éviter les surtensions au niveau de l'onduleur.

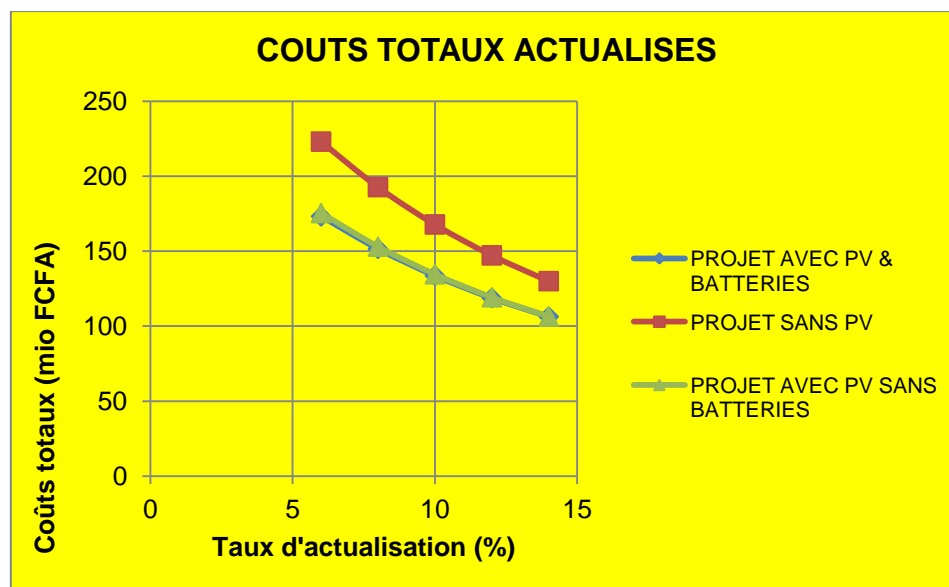


Ce diagramme montre que la solution la plus économique en terme de coûts totaux actualisés est la solution avec système hybride avec batteries.

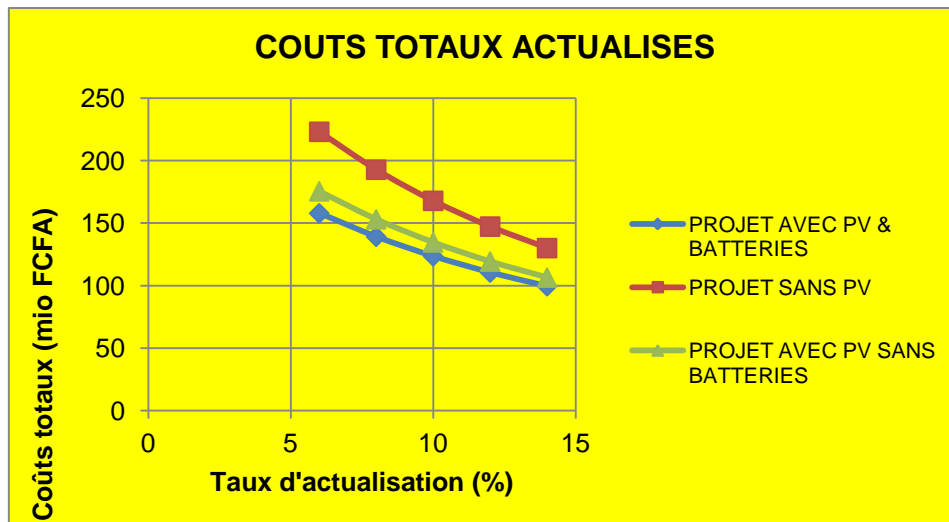
La différence de coûts totaux avec la solution Diesel seule devrait conduire à une réduction des tarifs pour une rentabilité donnée ou à une augmentation de la rentabilité pour un tarif donné.

Le diagramme suivant donne les coûts totaux actualisés pour une localité de 5000 habitants.

Dans la solution avec batteries, la puissance installée en PV est de 30 kWc. Dans le système sans batteries, la puissance installée est de 12 kW.



Dans ce cas, les solutions avec et sans batteries sont identiques en termes de coûts. Par contre si on augmente la puissance de crête installée de 10 kWc dans la solution avec batteries (40 kWc), on réduit les coûts de la solution hybride avec batteries comme le montre de diagramme ci-dessous.



Les simulations sont réalisées avec les deux modèles suivants :

Demande proder-kfw-hp-jpa-PV avec batteries.xls

Demande proder-kfw-hp-jpa-PV sans batteries.xls

Les feuilles de calcul dans les deux modèles sont :

- DG1,ZEM,TARIF_CONS SPE : données générales pour le calcul de la demande ;
- DEMANDE FAIBLE, MOYEN, FORT : résultats de la prévision de la demande ;
- Pointe horaire ;
- Courbes de charges : calcul de la production Diesel ;
- SURPLUS : uniquement sans batteries pour déterminer la puissance PV pouvant être installée ;
- P PV : production photovoltaïque ;
- COUTS TOTAUX ACTUALISES-g diagramme (lien entre les deux modèles uniquement dans le modèle avec batteries) ;
- Modèle : calcul des coûts totaux actualisés.

Appendix 5: Characteristics of mini/micro hydroelectric power plants and technical and financial information on Project 3

Selected locations for micro-mini hydroelectric power plants:

N°	Site	Region	Installed capacity (kW)	Energie moy annuelle (MWh)	Expected Time for the Studies	Expected Time for the Construction
<i>Phase 1</i>						
1	Farako 1	Sikasso	55	280	4 months	8 months
2	Billy	Kayes	170	968,0	6 months	12 months
3	Kéniéto	Kayes	280	1214	6 months	12 months
4	Woroni	Sikasso	393	1319	8 months	12 months
5	Djenné*	Mopti			10 months	
6	Talo	Ségou	3 700	16206	10 months	24 months
7	Kourouba	Koulikoro	10 000	43800	10 months	24 months
TOTAL Installed Capacity under Phase 1			14 598			
<i>Phase 2</i>						
	Djenné	Mopti	7000	30660		24 months
TOTAL Installed Capacity under the two phases			21 598			

* For Djenné, the feasibility studies will be done under Phase 2 of the Project.

The following pages provide more information related to technical and financial aspects of the proposed Project 3. This is based on initial work done by an international expert in August/September 2011, with the objective of preparing the TORs for the feasibility studies of the mini/micro hydroelectric plants and their transmission/distribution lines. Therefore, such preliminary data/information should be expected to be fine tuned when the feasibility studies are available (second semester of 2012).

The information provided in the following pages is available in French only. It has been validated by the Ministry of Energy under the assumption that it would become more specific and accurate when the feasibility studies are available.

A/ DONNEES TECHNIQUES DU PROJET

1) Données énergétiques des sites de mini/micro centrales hydroélectriques

Site		Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL
Puissance (kW)		55	170	280	393	7000	3700	10000	21598
Energie (MWh)		280	968	1214	1319	30960	16209	43800	94750

2) Postes éleveurs

Site	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba
Nombre de transformateurs	2	2	2	2	2	2	3
Puissance unitaire (kVA)	50	100	160	250	5000	2500	5000

NB: Pour Farako 1, Billy, Kéniéto et Woroni, les transformateurs éleveurs auront la tension de sortie de 15 kV

_Pour Djenné, Talo et Kourouba, la tension de sortie des transformateurs sera de 30 kV

3) Affectation de la production des mini CHE

Hypothèses de base

<i>Consommation des auxiliaires</i>	2 %	<i>(Moyenne universelle pour les centrales hydroélectriques)</i>
<i>Consommation rurale nouvelles localités à électrifier</i>	50 %	<i>(Hypothèse considérée comme minimaliste pour l'accroissement significatif du taux d'électrification rural)</i>
<i>Consommation abonnés ruraux et urbains existants et irrigation</i>	48 %	

Affectation production mini CHE	Djenné	Talo	Kourouba	TOTAL
Consommation des auxiliaires (MWh)	619	324	876	1819
Consommation rurale (MWh)	15480	8104,5	21900	45485
Consommation abonnés ruraux et urbains existants et irrigation	14861	7780	21024	43665

4) Répartition de la consommation de l'énergie en milieu rural

Répartition de l'énergie en milieu rural (%)	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba
Pertes techniques* + Consom auxiliaires	13,5	13,5	13,5	13,5	13,5	13,5	13,5
Consommation domestique	60	60	60	60	60	60	60
Autres catégories d'abonnés	25	25	25	25	25	25	25
Eclairage public	1,5	1,5	1,5	1,5	1,5	1,5	1,5

* D'une manière générale, le niveau des pertes techniques dans les réseaux de distribution est compris entre 8 et 12% de l'énergie injectée.

Répartition de l'énergie en milieu rural (MWh)	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba
Pertes techniques	37,8	130,68	163,89	178,065	2089,8	1094,1075	2956,5
Consommation domestique	168	580,8	728,4	791,4	9288	4862,7	13140
Autres catégories d'abonnés	70	242	303,5	329,75	3870	2026,125	5475
Eclairage public	4,2	14,52	18,21	19,785	232,2	121,5675	328,5

5) Estimation du nombre de consommateurs ruraux par catégorie

Hypothèses de charge moyenne par type de consommateur (Valeurs découlant de la puissance moyenne souscrite par les clients des permissionnaires de l'AMADER en tenant compte du fait que la grande majorité des abonnés en milieu rural n'ont que l'éclairage avec des lampes à basse consommation d'énergie).

Abonnés domestiques 0,3 kW

Autres catégories d'abonnés 1 kW

Lampe d'éclairage public 0,036 kW

Hypothèses de consommation (Valeurs découlant des informations fournies par l'AMADER)

Abonné domestique 80 kWh par mois

Autres catégories d'abonnés 200 kWh par mois

Lampe d'éclairage public 13 kWh par mois

Abonnés domestiques 0,768 MWh par an

Autres catégories d'abonnés 1,92 MWh par an

Lampe d'éclairage public 0,12 MWh par an

Nombre de consommateurs ruraux	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL
Domestiques (ménages ruraux)	219	756	948	1030	12094	6332	17109	38489
Autres catégories d'abonnés*	36	126	158	172	2016	1055	2852	6415
Eclairage public	34	117	146	159	1866	977	2640	5940
Nombre total d'abonnés hors éclairage public	255	882	1107	1202	14109	7387	19961	44903

* Les autres catégories d'abonnés en milieu rural sont constituées d'écoles, administrations locales, centres sociaux, structures d'accueil, commerces, artisans, etc. Leurs activités favorisent toutes des créations d'emplois.

6) Calcul des longueurs des nouveaux réseaux ruraux moyenne tension (MT) et basse tension (BT) par centrale

Hypothèses de données spécifiques par abonné en longueur de réseau MT, BT et en puissance de transformation MT/BT

(Les valeurs ci-dessous découlent à la fois des informations de l'AMADER et de la SOPIE de la Côte d'Ivoire. Elles sont dans l'ordre général pour l'électrification rurale).

Pour les micro CHE (Ligne MT de 15 kV)

Longueur de ligne MT simple terne par abonné	0,02 km
Longueur de ligne mixte MT /BT par abonné	0,005 km
Longueur de ligne BT par abonné	0,02 km
Puissance de transformation MT/BT par abonné domestique	0,375 kVA
Puissance de transform. MT/BT par abonné d'autres catégories	1,2 kVA

Pour les mini CHE (Ligne MT de 33 kV)

Longueur de ligne MT simple terne par abonné	0,03 km
Longueur de ligne mixte MT /BT par abonné	0,005 km
Longueur de ligne BT par abonné	0,02 km
Puissance de transformation MT/BT par abonné domestique	0,375 kVA
Puissance de transform. MT/BT par abonné d'autres catégories	1,2 kVA

Type de ligne	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL
Ligne MT double terne 33 kV(km)	0	0	0	0	100	100	150	350
Ligne MT simple terne 33 kV(km)	0	0	0	0	423	222	599	1244
Ligne mixte MT (33 kV)/BT (km)	0	0	0	0	71	37	100	207
Ligne MT simple terne 15 kV(km)	5	18	22	24	0	0	0	69
Ligne mixte MT (15 kV)/BT (km)	1	4	6	6	0	0	0	17
Ligne BT en câble préassemblé (km)	5	18	22	24	282	148	399	898

7) Calcul des capacités de transformation et du nombre de transformateurs par type

Hypothèses de répartition indicative de la capacité totale de transformation par centrale

(Cette répartition est basée sur les données de l'AAO lancé par SONABEL en 2010 pour le projet d'ER financé sur Don du FAD)

Pour Farako 1

Transformateur de 25 kVA

100 % de la capacité totale installée sur le réseau issu de la centrale

Pour les autres mini et micro CHE

Transformateur de 25 kVA

50 % de la capacité totale installée sur le réseau issu de la centrale

Transformateur de 50 kVA

30 %

Transformateur de 100 kVA

15 %

Transformateur de 160 kVA

5 %

Transformateurs MT/BT	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL
Capacité totale installée (kVA)	88	261	327	356	5563	2184	5903	14682
Nombre de transformateurs de :								
25 kVA	4	5	7	7	111	44	118	295
50 kVA	0	2	2	2	33	13	35	88
100 kVA	0	0	0	1	8	3	9	22
160 kVA	0	0	0	0	2	1	2	5

8) Répartition des transformateurs entre les niveaux de tension primaire 15 et 33 kV

a. Transformateurs MT/BT pour réseau 15 kV

Type de transformateur	Farako 1	Billy	Kéniéto	Woroni	TOTAL
Nombre de transformateurs de :					
25 kVA	4	5	7	7	22
50 kVA	0	2	2	2	6
100 kVA	0	0	0	1	1

b. Transformateurs MT/BT pour réseau 33 kV

Type de transformateur	Djenné	Talo	Kourouba	TOTAL
Nombre de transformateurs de :				
25 kVA	111	44	118	273
50 kVA	33	13	35	82
100 kVA	8	3	9	20
160 kVA	2	1	2	4

B/ ESTIMATION DU COÛT DU PROJET

(Etudes, supervision, gestion, fourniture, installation et mise en service)

1) Coûts d'investissement en production mini/micro hydroélectrique, postes élévateurs compris

Site	Farako 1*	Billy	Kéniéto*	Woroni*	Djenné**	Talo**	Kourouba**	TOTAL GL
Puissance (kW)	55	170	280	393	7000	3700	10000	21598
Coût spécifique d'investissement (EUR/kW)	7350	3860	2730	1500	2400	2200	2700	
Coût d'investissement par centrale (EUR)	404250	656200	764400	589500	16800000	8140000	27000000	54354350
Coût d'investissement par poste source (EUR)	18000	36000	57600	90000	1500000	750000	2250000	4701600
TOTAL PAR CENTRALE, POSTE ELEVATEUR COMPRIS (EUR)	422250	692200	822000	679500	18300000	8890000	29250000	59055950

* Les coûts d'investissement pour les centrales de Farako 1, Woroni et Kéniéto ont été extraits du Plan Directeur d'Electrification rurale datent de 2008, puis actualisés au taux de 10% l'an jusqu'en 2011

** Les coûts d'investissements spécifiques pour les centrales de Talo, Djenné et Kourouba ont été tirés de l'étude du projet de mini centrale hydroélectrique de Markala réalisée par CONTOURGLOBAL en 2010, puis projeté pour Kourouba pour l'horizon de réalisation du projet

Les coûts spécifiques suivants pour les postes sources se réfèrent à des projets similaires en Guinée (Etude du potentiel en mini/micro CHE dans le bassin guinéen du fleuve Sénégal et projet de mini CHE de Loffa à Macenta)
Ils sont vérifiés par la considération que d'une manière générale le coût du poste source d'une centrale est de l'ordre de 8 à 13% du coût total du projet pour les micro centrales et 3 à 5% à partir des mini centrales.

Transformateurs élévateurs à 15 kV: 180 EUR/kVA

Transformateurs élévateurs à 30 kV: 150 EUR/kVA

2) Coût d'investissement pour les lignes de répartition, distribution, postes MT/BT, branchements et éclairage public

Hypothèses de prix

Les coûts spécifiques pour les lignes MT et BT, points lumineux d'EP, postes de distribution MT/BT et branchements sont les suivants:

* Les coûts moyens unitaires des lignes MT et BT, postes de transformation MT/BT sont déduits de ceux contenus dans le plan directeur d'ER du Mali

Coût unitaire ligne MT à double ternes 30 kV	31500	EUR
Coût moyen unitaire ligne MT à simple terna 30 kV	22 500	EUR
Coût moyen unitaire ligne mixte MT (30 kV)/BT	24 000	EUR
Coût moyen unitaire ligne MT à simple terna 15 kV	15 000	EUR
Coût moyen unitaire ligne mixte MT (15 kV)/BT	20 000	EUR
Coût moyen unitaire ligne BT simple	16 000	EUR
Coût unitaire point lumineux d'EP	100	EUR
Coût unitaire poste 30/0,4 kV de 160 kVA =	15000	EUR
Coût unitaire poste 30/0,4 kV de 100 kVA =	13000	EUR
Coût unitaire poste 30/0,4 kV de 50 kVA =	10000	EUR
Coût unitaire poste 30/0,4 kV de 25 kVA =	7500	EUR
Coût unitaire poste 15/0,4 kV de 100 kVA =	11000	EUR
Coût unitaire poste 15/0,4 kV de 50 kVA =	8360	EUR
Coût unitaire poste 15/0,4 kV de 25 kVA =	6600	EUR
Coût unitaire branchement/comptage monophasé =	80	EUR
Coût unitaire branchement/comptage triphasé	120	EUR

Détail Coûts d'invest. réseau par centrale (EUR)	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL GL
Lignes MT à double ternes 30 kV	0	0	0	0	3150000	3150000	4725000	11025000
Lignes MT simple terna 30 kV	0	0	0	0	9523828	4986167	13473633	27983628
Lignes mixte MT (30 kV)/BT	0	0	0	0	1693125	886430	2395313	4974867
Lignes MT simple terna 15 kV	76563	264688	331953	360664	0	0	0	1033867
Lignes mixte MT (15 kV)/BT	30625	105875	132781	144266	0	0	0	413547
Lignes BT simple en câble préassemblé	81667	282333	354083	384708	4515000	2363813	6387500	14369104

Branchements monophasés	18375	63525	79669	86559	903000	472763	1277500	2901391
Branchements triphasés	3063	10588	13278	14427	338625	177286	479063	1036328
Elairage public	3376	11671	14636	15902	186632	97711	264034	593961
Poste de distribution 30/0,4 kV - 160 kVA	0	0	0	0	26077	10239	27669	63986
Poste de distribution 30/0,4 kV - 100 kVA	0	0	0	0	108481	42596	115103	266180
Poste de distribution 30/0,4 kV - 50 kVA	0	0	0	0	333788	131065	354164	819017
Poste de distribution 30/0,4 kV - 25 kVA	0	0	0	0	834469	327662	885410	2047541
Poste de distribution 15/0,4 kV - 100 kVA	0	4305	5399	5866	0	0	0	15570
Poste de distribution 15/0,4 kV - 50 kVA	0	13087	16413	17832	0	0	0	47332
Poste de distribution 15/0,4 kV - 25 kVA	23244	34440	43192	46928	0	0	0	147803
Investissement total en réseau par centrale	236912	790510	991405	1077152	21613024	12645731	30384388	67739123

TABLEAU RECAPITULATIF DES COUTS D'INVESTISSEMENTS PHYSIQUES (EUR)

Site	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL GL
Centrale et poste éleveur	422250	692200	822000	679500	18300000	8890000	29250000	59055950
Réseau de répartition et de distribution, yc branch.	236912	790510	991405	1077152	21613024	12645731	30384388	67739123
Total par centrale	659162	1482710	1813405	1756652	39913024	21535731	59634388	126795073

AUTRES FRAIS LIES AU PROJET (EUR)

Site	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL GL
Frais de gestion	60000	60000	60000	60000	250000	250000	250000	990000
Frais d'études	100000	150000	150000	150000	600000	600000	0	1750000
Frais de supervision	200000	250000	250000	250000	2000000	2000000	2000000	6950000
Total Autres frais	360000	460000	460000	460000	2850000	2850000	2250000	9690000

NB: Les frais de gestion, d'études et de supervision sont des montants forfaitaires tenant compte de la taille des projets

TABLEAU RECAPITULATIF GENERAL DES COÛTS DU PROJET (EUR)

Site	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL GL
Investissements physiques proprement dits	659162	1482710	1813405	1756652	39913024	21535731	59634388	126 795 073
Autres frais liés au projet	360000	460000	460000	460000	2850000	2850000	2250000	9 690 000
Total par centrale	1019162	1942710	2273405	2216652	42763024	24385731	61884388	136 485 073

COÛT TOTAL DU PROJET (EUR) : 136 485 073 Soit la somme de Cent trente six millions quatre cent quatre vingt cinq mille soixante treize EUR
Equivalent à: US\$ 191,079,102 Soit Cent quatre vingt onze millions soixante dix neuf mille cent deux US Dollars

Préparation commune et phasage de la réalisation physique des projets en tenant compte de leur faisabilité à court, moyen termes (Coûts en EUR)

	Farako 1	Billy	Kéniéto	Woroni	Djenné	Talo	Kourouba	TOTAL GL
Phase 1 (Horizon 2012 - 2015)	1019162	1942710	2273405	2216652	600000	24385731	61884388	94 322 048
Phase 2 (Horizon 2014 - 2016)	0	0	0	0	42163024	0	0	42 163 024

C/ QUELQUES INDICATEURS D'IMPACT DU PROJET

	Impacts sur le milieu rural (hors émission de CO2 évitée)							
	- Pinst (MW)	- Ean (MWh)	Nbre de foyers électrifiés	Nbre de person. directement bénéficiaires	Population rurale vivant en zones électrifiées (hbts)	Emission de CO2 évitée (tonnes)	Nbre d'activités génératrices de revenus créées	Nombre d'emplois créés en milieu rural
Phase 1 (Horizon 2012 - 2014)	14,6	63 790	26 395	158 370	243 645	12 758	4 399	13 197
Phase 2 (Horizon 2014 - 2016)	7	30 960	12 094	72 563	111 635	6 192	2 016	6 047
Total	21,6	94 750	38 489	230 932	355 280	18 950	6 415	19 244

Les hypothèses pour ces indicateurs sont les suivants:

- 1) *Desserte effective en électricité: 65% des foyers vivant en zone électrifiée*
- 2) *Nombre de personne par famille : 6 en moyenne selon le résultat du recensement général de 2009*
- 3) *Réduction de l'émission de CO2 : 1 kg de CO2 pour 5 kWh d'électricité d'origine hydraulique (Etude d'APD/DAO projet Energie OMVG)*
- 4) *Il est estimé que chaque activité génératrice de revenus créera en moyenne 3 emplois*

Appendix 6: Program Strategic Coordination Mechanism

Context and Rationale / Statement of Problem

Mali was selected as pilot country for the Scaling Up Renewable Energy Program. In this context, an investment plan is being prepared and will be implemented through several projects. A Strategic Coordination Component will be in place for the SREP-Mali Program to ensure that the three proposed investment projects, targeting renewable energy (RE) technologies, do not operate as separate entities outside the programmatic approach defined by the Government in the light of existing national policies and strategies. Without this strategic coordination, the SREP projects would operate on a “business as usual” mode, which would work against SREP’s transformational objective and jeopardize the achievement of expected outputs.

Objective / Proposed Input to Drive the Transformation

The general objective is to ensure the strategic/programmatic coordination of the SREP Program in Mali. That includes several specific objectives such as:

- Ensure that all projects activities are consistent with SREP guidelines and are in line with national policy orientations and strategies;
- Promote efficient knowledge management and exchange of best practices (information sharing and lessons learning activities) between projects and with other African countries, and define an efficient monitoring/evaluation system that contributes in improving SREP’s impacts;
- Ensure a favourable environment for the rapid expansion of RE, that is, promote a crosscutting approach aimed at building the capacities of all the stakeholders and review elements of the legal, regulatory and institutional framework, where necessary;
- Strengthen the Government’s political commitment and the involvement of sector stakeholders to ensure that a favourable environment is in place for the expansion of RE;
- Ensure that SREP activities and investments can be sustained beyond the SREP;
- Make the SREP known in order to raise additional funds and foster the large-scale replication of activities (countrywide and in the sub-region);
- Ensure that SREP projects are designed and implemented with a view to produce transformational impact and the expected catalytic outcomes in terms of development based on low GHG emissions.

The activities built into the Strategic Coordination Component are a key contribution to the transformation of the sector since they will clarify and consolidate the necessary environment for the rapid and efficient implementation of investments. They should also help to spur and facilitate additional investments in the coming years.

Project Supervision / Institutional Framework

The proposed institutional set up to coordinate and implement the program tries to match the institutional responsibilities within Government departments as closely as possible, while considering the operational imperatives that are tied to program components. The proposed institutional

arrangement to coordinate and implement the program is based on the following key functions/structures:

- **A Steering Committee;**
- **A Program Strategic Coordination Unit;**
- The **Executing Agencies, namely** DNE, AMADER, ANADEB, and CNESOLER, EDM and
- **A Consultative Committee.**

Steering Committee

Mandate. The Steering Committee is responsible for general strategic orientation, supervision and implementation of the program, and for assessing progress. It will ensure that program implementation complies with SREP principles, in light of the national energy policy and in the context of the National Renewable Energy Development Strategy. It will also have the role of guiding, supporting and advising all activities implemented as part of investment programs and projects.

The Steering Committee that exists at the programmatic level justifies the fact that there is no steering committee for the three investment projects. The person in charge of the implementation unit of each project will sit in the Steering Committee of the program to ensure consistency between the "project" and "program" levels.

Specifically, the Steering Committee:

- Approves action plans and annual budgets of the program, and monitors the financial execution of credits allocated;
- Monitors the progress of the program and projects, identifies and updates the potential impact and expected outcomes, and decides on possible adjustments;
- Approves the annual programs of activities and budgets of projects;
- Audits and approves the technical and financial appraisal and the performance reports of the program;
- Ensures that program resources are effectively utilized to support planned activities;
- Proposes or takes necessary measures to tackle obstacles to the smooth implementation of the program;
- Ensures the effective involvement of all Program stakeholders;
- Ensures synergy between program activities and other projects/operations financed by development partners;
- Evaluates the performance of the program's Strategic Coordination Unit.

Composition. The Steering Committee comprises representatives from the following structures:

- The National SREP Focal Point;
- The managers of the implementation units of the investment projects;
- Three representatives of the Ministry of Environment (AEDD/DNEF/DNACPN);
- One representative of the Ministry of Economy and Finance;
- One representative of the Ministry of Agriculture (DNAGR);

- One representative of the National Directorate of Hydrology;
- One representative of the Ministry in charge of the Local Authorities.

Sessions of the Steering Committee are chaired by the SREP National Focal Point and the secretariat is managed by the Program's Strategic Coordination Unit.

Frequency. The Committee meets four times every year in ordinary session. It may meet in extraordinary session whenever necessary, as convened by its Chairperson.

○ Meeting in Ordinary Session

For ordinary sessions, the agenda and working documents must be sent by the Chairperson to Committee members at least fifteen (15) days to the date of the meeting. Minutes of meetings will be drafted by the Program's Strategic Coordination Unit. The Chairperson will verify their consistency with the deliberations of the Committee and appose his/her signature. Subsequently, the minutes will be circulated to Committee members by the Program's Strategic Coordination Unit, latest fifteen days following the holding of the session.

○ Extraordinary Sessions

These sessions will be convened by the Committee Chairperson, when the need so arises. Generally, one or two items feature on the agenda and may relate to subjects such as:

- The provision of information that is crucial to the implementation of the Program;
- The search for a solution to a problem whose immediate resolution is necessary for Program continuation or smooth implementation;
- The consideration of recommendations arising from an external audit, supervision or appraisal report; and
- A budget review.

Deadlines for convening sessions and dispatching documents may be reduced to one week or at the convenience of members. The Program's Strategic Coordination Unit will prepare a summary note on each agenda item for Committee members, highlighting the importance of the issues treated and the proposed decision to take. Minutes of extraordinary sessions will be prepared and circulated under the same conditions (addresses, deadlines) as those mentioned for ordinary sessions.

Program's Strategic Coordination Unit

Mandate. Under the supervision of the Steering Committee, the Unit will implement its half-yearly work program, once validated by the Steering Committee. This work program must allow the implementation of the activities listed in the section below titled "Components".

Composition. The Program's Strategic Coordination Unit will be housed in the Energy Directorate, Ministry of Water and Energy. This Unit will comprise several experts, including:

- A policy/institutional expert – responsible for planning and general coordination of the Program, who will ensure consultation among all stakeholders and carry out reform-related activities at the institutional, regulatory and other levels.

- A monitoring/evaluation expert – responsible for M/E system operation, in collaboration with Energy and Environment CPSs¹, the monitoring/evaluation experts of the three projects and in liaison with the communication/knowledge management expert.
- A communication/knowledge management expert – responsible for defining and implementing the Program’s communication strategy and for undertaking capacity-building/knowledge management activities (Country-managed information sharing and lessons-sharing activities).
- An energy/environment officer and a financial/procurement officer would eventually be added, depending on needs to be specified in the coming months.

Experts² of the Strategic Coordination Unit lodged in MEE, will be part of MEE staff. Each expert will be bound to the program by a *performance contract*, to be evaluated annually. Administrative modalities concerning the recruitment and remuneration of experts will comply with the malian regulations.

The Coordination Unit will also benefit from the *ad hoc* services of an *external expertise*, as the need arises (the Unit’s staff is responsible for preparing the ToR of external consultants and monitoring their activities). This could be the case of an expert capable of assessing the RE financing mechanisms used and mobilizing future mechanisms, etc.

Consultative Committee

Mandate. The Consultative Committee must provide SREP Program stakeholders (including NGOs, the private sector, etc.) with information on the status of program activities and allow them to express their views/concerns on Program implementation.

Composition. The Consultative Committee comprises SREP and CIF National Focal Points, representatives of the Ministries of Energy and Environment, representatives of the national agencies implementing program activities, NGOs involved in Program implementation, representatives of the private sector, MDBs and other development partners including the UN, etc.

Frequency. The Consultative Committee meets once every year at the start of the year.

MDB Responsible for Supporting the Implementation

Funds meant for Strategic Coordination activities will be channelled through one of the investment projects – namely, the project supported by the African Development Bank, the lead MDB for SREP-Mali.

Development Partners

The Strategic Coordination will build on the existing activities financed by DPs (see table at the end of the investment plan) in terms of building stakeholder capacity, analytical studies, etc. Moreover, some strategic coordination-related activities will either be co-financed or strengthened by activities implemented by other DPs. Some examples are listed below:

¹ National Statistical and Planning Units.

² See proposed ToR in annex.

- At the end of 2011, the IAEA will start a program aimed at building DNE capacity to improve national energy planning (amount = USD 200,000) ;
- At the end of 2011, the European Union will start an initial and continuing training program for rural electrification operators and actors (amount = USD 1,300,000);
- Etc.

Estimated Cost of the Component / Financing Plan / Rationale of SREP Financing

The budget of SREP-Mali Strategic Coordination is estimated at USD 4 million in SREP contribution. This budget reflects the importance the Government of Mali pays to the programmatic approach, the efficiency of the monitoring/evaluation system of the program and projects, the improved effectiveness of investments through knowledge management and capacity building.

The use of SREP funds is justified by the fact that this Strategic Coordination is the very core of the SREP programmatic approach and must multiply the positive impact of investment projects. Strategic Coordination will ensure that projects are not implemented separately and that they benefit from knowledge acquired more widely at the country, regional and international levels. For activities related to Strategic Coordination, SREP funds will be allocated in the form of grant.

The financing plan is available in the investment plan.

Components and Sub-Components

Component 1: Strategic Coordination- Budget: USD 500,000

- Ensure the Program's administrative/financial management and especially: (i) prepare the Program's annual work plans, incorporating the work plans of the three projects; (ii) prepare cash withdrawal requests under Financing; (iii) manage the Special Account and keep program-related books and accounts, making necessary arrangements for their audit; (iv) participate in the administration of bid invitation and contract procedures under the Program; (v) prepare quarterly consolidated progress reports for submission to the Steering Committee and the MDB supporting the Program's Strategic Coordination;
- Ensure the 'general coordination' of SREP-Mali, while strengthening collaboration among all stakeholders (put in place effective/appropriate communication/information channels);
- Ensure synergy between the three investment projects;
- Harmonize the SREP programmatic approach with the orientations of the national Poverty Reduction Strategy (PRSP) on the one hand, and those of the National Energy Policy and Renewable Energy (RE) Strategy on the other hand, to ensure sustainable social and economic development;
- Support the start-up of the National Renewable Energy Commission, an inter-sectoral entity, to mainstream RE in different sectors and thus facilitate the achievement of development objectives;

- Organize fundraising to ensure project co-financing and the sustainability of investments made (include the contributions of new co-financiers, prepare dossiers to benefit from carbon funds, trust funds, etc.)³. The result of this work must contribute to increase RE investments in the country;
- Anticipate the disbursement of new funds via the new funding mechanisms being prepared internationally (stemming from UNFCCC negotiations), and ensure Mali's readiness to benefit from these funds.

Component 2: Information Sharing and Lessons Learning (ISL), Communication and Advocacy-

Budget: USD 1,500,000

- Define and implement an RE communication strategy with a built-in advocacy component strengthening stakeholders' political commitment;
- Disseminate and communicate the SREP outputs at local, regional, national and international level (especially by posting knowledge management products online);
- Support the management of knowledge acquired by the program in RE (approaches, methodologies and lessons);
- Ensure linkage with the CIF Administrative Unit and draft regular program implementation reports meant for the SREP sub-committee;
- Conduct targeted studies, organize consultation workshops and develop/support dialogue to make project implementation more efficient;
- Review international experience on RE that has common points with SREP and ensure that the Strategic Coordination draws from the lessons of these projects to improve the implementation of SREP;
- Regularly monitor progress achieved in other SREP countries and share experience in the operational management of the program;
- Participate in fora organized by CIF or other partners to exchange experiences with other pilot countries, or other countries that are actively developing RE;
- Organize information and exchange sessions with countries of the sub-region to disseminate best practices and SREP's program-based approach (in collaboration with the ECOWAS/WAEMU Regional RE and Energy Efficiency Centre, and with Mali's Training Centre for Development);
- Strengthen institutional links and technical participation in activities with relevant institutions, for example the Regional RE and Energy Efficiency Centre, ECOWAS, IRENA, the international year of renewable energies organized by the United Nations, etc.

³ Distinguishing between contributions of MDBs, governments, multilateral and bilateral organizations, credit services bodies, the private sector).

SREP Mali Information Sharing and Lessons Learning System

The SREP-Mali ISL system aims to define and implement a key element of CIF Programs, in general, and SREP, in particular, namely: *a system of filtering, presenting, critically analysing and disseminating main Program achievements* (with regard to information concerning the approaches, methodologies, lessons learned, synergies and partnerships).

This is a fundamental element of the development process put in place by SREP, as it aims to build on the achievements of the Program's *learning by doing* and monitoring/evaluation systems. Through the ISL, all operators involved in implementing the Program will be able to gain access to the necessary technical data in a *timely manner* and in *real time*, and all the stakeholders of the energy sector will become aware of and draw on lessons from on-going operations. This will make it possible to have a parallel reading of the challenges and outcomes of the general Program and its individual investment projects, depending on their objectives.

To this end, the coordination of all the ISL activities will constitute a key element of SREP implementation. The methodology will consist in addressing issues concerning the following aspects: Program priorities and objectives as well as those of its investment projects, modalities envisaged for achieving these objectives, the results achieved (through the two components of the three projects namely 'Investments' and 'capacity building').

The key themes that will be pursued by the SREP-Mali ISL are as follows:

Configurations of Program Approach

- The current and potential involvement of the GoM in energy matters (inventory of new and general legal measures, including those SREP may have contributed to defining, and administrative and technical decisions concerning the RE.
- The active participation of UN agencies, development partners, private sector, local governments, NGOs and civil society associations in the main issue areas of the Climate Fund (particularly to address impact of deforestation and effects of CO² emissions).
- The consultative spaces existing between decision-makers and civil society to assess the approaches and most relevant methodologies to address Mali's energy challenges.

Program Implementation Modalities

- Constraints and impediments encountered by the three investment projects (technical, financial, institutional aspects, etc.), especially in relation to their capacity to change the market and create catalytic effects.
- The results of the Program with regard to additional financial resource mobilization.
- Reforms (legal/administrative) that can guarantee greater sustainability of the Program.
- Weaknesses and strengths of the financial instruments used in the various investment projects.
- Operating links existing between the RE objectives pursued by SREP and those of the forestry sector and the GoM's fight against climate change.
- Comparison between the outcomes of the SREP capacity building initiatives and those used by other Programs, and the possibility of using the 'cross-fertilization process'.

At the Coordination Unit level and under the supervision of the Program Coordinator, a communication/knowledge management expert will be responsible for the cross-sectoral capacity building activities, and will support the implementation of the 'Capacity Building' component of the three projects. Close partnership will be established with the relevant sector ministries in charge of M&E and capacity building. Possible activities will include conducting of targeted studies, organization of consultative workshops, support to dialogue spaces, participation in for organized by CIF/SREP, etc.

Component 3: Monitoring and Evaluation (M/E) - Budget: USD 500,000

- Develop an efficient data collection system and ensure regular data collection;
- In support of the strengthening of the national energy monitoring/evaluation systems, operate the SREP monitoring/evaluation system and fill-in the logical framework indicators;
- Based on outputs regularly obtained, make recommendations to improve Program implementation and its transformational impact;
- During monitoring/evaluation, determine the potential for further development of RE in the country and the investments needed in that regard;
- Assess the social, economic and environmental impacts of all project investments and program activities (including those related to ISL) and ensure the implementation of the SEA recommendations.

Component 4: Capacity-building - Budget: USD 1,500,000

- *At the institutional level:* (i) review the RE sector's institutional framework and the mandate of national institutions (to ensure consistency between them) and build their capacity (especially in carbon finance); (ii) review arrangements (legal, legislative, regulatory, tariff⁴, fiscal, etc.) governing the sub-sector, notably in the context of the design of the new PRSP and gender mainstreaming; (iii) adapt RE technologies to the Malian context, deepen resource mapping works and build national energy planning capacity (in coordination with AIEA);
- *At the level of private operators:* (i) support training in management techniques (human and financial resources, administration, design of business plans, marketing, environmental impact of investments, sensitization on social issues, etc.); (ii) understand the regulatory frameworks governing the sub-sector (legal, legislative, regulatory, tariff, fiscal, etc.); (iii) transfer knowledge on technologies available at the international/regional level and on applications that may be relevant to the case of Mali;
- *At the level of commercial banks:* (i) assess needs, (ii) develop specific lending products for renewable energies; (iii) sensitize and train executives, especially on potential returns on investments for RE investments, RE technologies, etc.; (iv) present and discuss potential funding mechanisms that may enable better access to the RE technologies market.

⁴ Feed-in tariffs for instance.

Annex: Terms of Reference for Experts of the Coordination Unit

Principal Coordinator, Institutional Expert

I. CONTEXT

In July 2010, Mali was selected as pilot country for the Scaling Up Renewable Energy Program (SREP). The Program's objective is to test low carbon-intensive strategies in order to address climate change. This entails demonstrating the economic, social and environmental viability of these approaches by generating new economic opportunities and broadening access to energy services using renewable energies. The SREP program must enable beneficiary countries to initiate the process of transformational change that will lead the country to adopt a development method based on low greenhouse gas emissions. This will be possible by harnessing the country's renewable energy potential instead of resorting to expensive, polluting fossil fuels and the inefficient use of biomass.

In this context, an investment plan is being designed and will be implemented through several projects. A Strategic Coordination Component of the SREP-Mali Program is in place to ensure that investment projects are not managed as separate entities outside a program-based approach. SREP adopts a holistic approach and involves many State institutions, multilateral development banks (namely, the African Development Bank, the World Bank and the International Finance Corporation), and all national and international stakeholders, including the private sector. Moreover, efficient coordination is key to achieving the expected outputs of SREP-Mali.

The Strategic Coordination Unit housed in the National Directorate of Energy oversees the strategic coordination of the Program. It comprises three experts working under the supervision of the SREP National Focal Point and is answerable for implementing decisions taken by the SREP National Steering Committee. The Principal Coordinator is one of these three experts.

II. TASKS AND RESPONSIBILITIES

II.1 Tasks

The Principal Coordinator will be responsible for all aspects related to Program activity coordination and will manage activities linked to the revision of the institutional, policy, regulatory and legislative frameworks. S/he will work under the responsibility of the SREP National Focal Point and ensure the implementation of decisions taken by the SREP National Steering Committee. Relations of collaboration will be established with representatives of the sectoral ministries involved in implementing SREP-Mali activities.

II.2 Responsibilities

The Principal Coordinator / institutional expert will be responsible for coordinating SREP-Mali activities, in general, and the institutional aspects, in particular. S/he will implement the activities listed in the SREP-Mali Investment Plan concerning the Strategic Coordination. Generally, his/her activities will involve:

In terms of program coordination

- Supervising and coordinating, as appropriate, the implementation and completion of SREP-Mali activities, based on the annual work program.
- Ensuring the Program's compliance with key Government and MDB regulations and standards regarding all financial and administrative aspects.
- Ensuring collaboration with investment project coordinators to enhance the program's efficiency and effectiveness by identifying bottlenecks in activity implementation and appropriate solutions for their reduction or elimination.
- Creating, in relatively direct ways, synergy with the key development partners in the area of renewable energies.
- Organizing and conducting joint Government/MDB supervision missions, mid-term review and final evaluation of the Program.
- Organizing meetings of the National Steering Committee and producing/circulating reports and minutes.
- Supervising the preparation of the Program's annual activity report and submitting it to the National Steering Committee.
- Coordinating the management of Program assets, including office equipment, offices and facilities.
- Organizing fundraising to ensure projects co-financing and sustainability of investments.
- Making available new funds well in advance through the new funding mechanisms being prepared at the international level (especially stemming from UNFCCC negotiations), and ensuring Mali's preparedness to benefit from these funds.
- Actively overseeing the implementation of activities to ensure that they comply with SREP guidelines and are in line with the country's policy and strategic orientations.

Regarding institutional and policy aspects

- Coordinating all national institutions involved in Program implementation, to harmonize approaches.
- Coordinating all international institutions involved in Program implementation, to consolidate and firm up synergy.
- Forging partnerships with key development partners, to mobilize additional and complementary resources.
- Participating in meetings of existing social and economic development networks or working groups to represent SREP and guaranteeing the consideration of energy challenges.
- Implementing the Unit's activities relative to the revision of the institutional, legislative, regulatory and other frameworks that help to consolidate the environment and foster greater and sustainable investments in the sector.

II.3. Skills, Qualifications and Experience

- A graduate degree (at least A-level+4) in the following fields: social/political sciences, economics, public administration, international development. Additional training in energy and/or environment/climate change will be an added advantage.
- At least 7 years' professional experience in project/program management with international partners in the energy and/or climate change sectors.
- Excellent knowledge of the energy sector's institutional landscape in Mali.

- Good knowledge of energy, environmental/climate-related issues in Mali.
- Self-driven, autonomous and capable of organizing his/her own work and that of the Unit (management and leadership skills needed).
- Excellent written and oral communication skills; excellent drafting and précis-writing skills.
- Excellent knowledge of written and spoken French; knowledge of spoken and written English will be an advantage
- Previous work experience on development programs/projects, especially in the energy sector.

Monitoring/Evaluation Specialist

I. CONTEXT

In July 2010, Mali was selected as pilot country for the Scaling Up Renewable Energy Program (SREP). The Program's objective is to test low carbon-intensive strategies in order to address climate change. This entails demonstrating the economic, social and environmental viability of these approaches by generating new economic opportunities and broadening access to energy services using renewable energies. The SREP program must enable beneficiary countries to initiate the process of transformational change that will lead the country to adopt a development method based on low greenhouse gas emissions. This will be possible by harnessing the country's renewable energy potential instead of resorting to expensive, polluting fossil fuels and the inefficient use of biomass.

In this context, an investment plan is being designed and will be implemented through several projects. A Strategic Coordination Component of the SREP-Mali Program is in place to ensure that investment projects are not managed as separate entities outside a program-based approach. SREP adopts a holistic approach and involves many State institutions, multilateral development banks (namely, the African Development Bank, the World Bank and the International Finance Corporation), and all national and international stakeholders, including the private sector. Moreover, efficient coordination is key to achieving the expected outputs of SREP-Mali.

The Strategic Coordination Unit housed in the National Directorate of Energy oversees the strategic coordination of the Program. It comprises three experts working under the supervision of the SREP National Focal Point and is answerable for implementing decisions taken by the SREP National Steering Committee. The Monitoring/Evaluation Specialist is one of these three experts.

II. TASKS AND RESPONSIBILITIES

II.1 Tasks

The Monitoring/Evaluation Specialist will be responsible for all program monitoring/evaluation activities and must ensure coordination with the monitoring/evaluation systems of SREP projects. S/he will work under the responsibility of the Unit's Principal Coordinator, in collaboration with the other SREP and investment project experts, and in synergy with the monitoring/evaluation units of the ministries concerned.

II.2 Responsibilities

The M/E Specialist will in particular:

- Develop solid M/E mechanisms for SREP-Mali
- Collect data and implement the M/E system in collaboration with all the other program experts, particularly with persons responsible for the M/E of investment projects
- Ensure that the action plans of the program and projects adhere to the program logical framework
- Ensure adequacy between the financial data and physical achievements of the program

- Assist project executing agencies/implementation units to interpret activity-related data and to present them in a simple, concise manner, to help decision-making and improve the modalities of the program implementation structure
- Supervise the preparation of periodic program performance reports and, in collaboration with the communication specialist, contribute to disseminate them and present them to different audiences
- Prepare the terms of reference and contracts of external consultants involved in the monitoring/evaluation of SREP-Mali activities and supervise their activities
- Prepare regular comprehensive reports on M/E activities, for their inclusion in the annual activity report
- Based on the environmental and social analysis conducted during Phase 1, implement the program's SEA recommendations and ensure consistency between the ESIA and ESMP designed for investment projects. This work will be done in collaboration with DNACPN and could benefit from the support of environmentalists of MDBs
- Carry out any other activity agreed with the SREP-Mali Coordinator and the National Focal Point.

II.3. Skills, Qualifications and Experience

- Graduate degree (at least A-level +4 years) in the following fields: social/political sciences, economics, public administration or international development. Specialized training in M/E is an added advantage.
- At least 5 years' work experience in monitoring/evaluation of development projects and programs, preferably in the energy sector and/or climate change.
- Good knowledge of the institutional landscape in the energy sector in Mali.
- Good knowledge of energy, environmental/climate issues in Mali.
- Self-driven, autonomous and capable of organizing his/her work.
- Excellent written and oral communication skills; excellent drafting and précis-writing skills.
- Excellent knowledge of written and spoken French; knowledge of written or spoken English is an added advantage.

Communication/Knowledge Management Specialist

I. CONTEXT

In July 2010, Mali was selected as pilot country for the Scaling Up Renewable Energy Program (SREP). The Program's objective is to test low carbon-intensive strategies in order to address climate change. This entails demonstrating the economic, social and environmental viability of these approaches by generating new economic opportunities and broadening access to energy services using renewable energies. The SREP program must enable beneficiary countries to initiate the process of transformational change that will lead the country to adopt a development method based on low greenhouse gas emissions. This will be possible by harnessing the country's renewable energy potential instead of resorting to expensive, polluting fossil fuels and the inefficient use of biomass.

In this context, an investment plan is being designed and will be implemented through several projects. A Strategic Coordination Component of the SREP-Mali Program is in place to ensure that investment projects are not managed as separate entities outside a program-based approach. SREP adopts a holistic approach and involves many State institutions, multilateral development banks (namely, the African Development Bank, the World Bank and the International Finance Corporation), and all national and international stakeholders, including the private sector. Moreover, efficient coordination is key to achieving the expected outputs of SREP-Mali.

The Strategic Coordination Unit housed in the National Directorate of Energy oversees the strategic coordination of the Program. It comprises three experts working under the supervision of the SREP National Focal Point and is answerable for implementing decisions taken by the SREP National Steering Committee. The Communication/Knowledge Management Specialist is one of these three experts.

II. TASKS AND RESPONSIBILITIES

II.1 Tasks

Raising awareness among all national and local stakeholders about the challenges in the energy sector is a key element of SREP-Mali. Consequently, communication is a necessary tool for achieving the expected objectives. The very nature of SREP-Mali requires the efficient management of knowledge to measure the outputs obtained and share them with national and local stakeholders at all levels, as well as with the other pilot countries and, more widely, with countries of the sub-region.

The communication/knowledge management specialist must assume responsibility for all communication, information, knowledge management and advocacy activities of the Program. S/he will also support capacity-building activities by liaising with the "capacity-building" components of investment projects. S/he will work under the responsibility of the Unit's Principal Coordinator, in collaboration with the monitoring/evaluation expert, the other "communication" experts of investment projects and in synergy with the communication services of the ministries concerned.

II.2. Responsibilities

1. Define and coordinate the implementation of all **activities related to the management of knowledge and sharing of lessons learned**, in order to timely incorporate them in the SREP investment plan and promote the replication of the approach throughout Mali and in other countries of the sub-region. As such, the communication/knowledge management expert must:

- Establish forms of dialogue with all institutional players involved in the energy sector in Mali in general, and in SREP implementation, in particular
- Define and encourage any initiative aimed at documenting and presenting the good practices of SREP (in terms of approaches, methodologies, techniques, forms of partnership, etc.), including through targeted studies on a range of topics. In this context, place emphasis on the good practices implemented for or dedicated to women
- Share SREP information by organizing consultative workshops attended by various categories of actors (representatives of technical services, local government authorities, the private sector and civil society associations, development partners, as well as specialists in different fields (foresters, agronomists, climate experts, socio-economists, etc.)
- Organize information and exchange sessions with countries of the sub-region to disseminate good practices and the SREP program-based approach (in collaboration with the ECOWAS/WAEMU Regional RE and Energy Efficiency Centre)
- Based on the existing site, create and maintain a dedicated website where SREP-related information will be posted
- Supervise the design of training modules on managerial techniques in RE for private sector operators (human and financial resources, administration, development of business plans, marketing, environmental impact of investments, sensitization on social issues, etc.).

2. Assume responsibility for the design and implementation of a suitable **communication strategy** for SREP-Mali, in order to:

- Develop communication tools and disseminate appropriate information on renewable energies and energy efficiency at country level (information tailored to different audiences and especially advocacy tools for the policy level)
- Supervise and ensure the production of annual reports and miscellaneous progress reports
- Assure linkage with the CIF Administrative Unit and draft regular program implementation reports addressed to the SREP sub-committee
- Collaborate with the M/E expert to identify key information on the SREP-Mali's general approach and key lessons learned, and share them at the regional and international levels
- Design documents facilitating fundraising.

3. Assume responsibility for the organization of **suitable capacity-building initiatives** on problems linked to renewable energies and present it in appropriate packages to different audiences, including community organizations and the private sector which operate production systems:

- Organize, in collaboration with all the investment project experts, general sensitization initiatives on renewable energies for rural communities

- By involving all investment project experts, organize more specialized training sessions for key actors, including decision-makers, elected local officials, representatives of deconcentrated services and private sector in the areas of opportunity and risk linked to renewable energies and available resources for the development of renewable energies in Mali
- For commercial banks, enlist the services of experts to: (i) assess needs, (ii) develop specific lending products for renewable energies; and (iii) sensitize and train senior staff
- Prepare the terms of reference and contracts of external consultants involved in communication/knowledge management activities and supervise their activities.

4. Carry out any other activity agreed with the Principal Coordinator and the National Focal Point.

II.3. Skills, Qualifications and Experience

- Graduate degree (at least A-level +4) in one of the following fields: education, social sciences, communication. Additional training in the environmental and energy sectors will be an added advantage.
- At least 5 years' professional experience in corporate communication and/or knowledge management, preferably in the field of energy and/or climate change.
- Previous work experience on development programs/projects with international partners.
- Prior knowledge of the institutional landscape in Mali.
- Good knowledge of energy, environmental/climate-related issues in Mali.
- Self-driven, autonomous and capable of organizing his/her own work and to work in good collaboration with the rest of the team.
- Excellent written and oral communication abilities; excellent drafting and précis-writing abilities.
- Excellent knowledge of the information technologies and communication software.
- Excellent mastery of written and spoken French and ability to speak and draft documents in English.

Appendix 7: Monitoring and Evaluation system of the Program

INTRODUCTION

A key component of the SREP-Mali program will be to define a participatory, coherent and permanent system for collecting, analyzing, monitoring/evaluating and reporting all activities. This system will allow for crosscutting management of all initiatives and investments undertaken in a pilot innovative project to give them internal consistency and build on them in the short-, medium- and long-term. Beyond the SREP-Mali's monitoring/evaluation system itself, the work will consist in incorporating the system into the larger national M&E system and strengthening it.

Based on the guidelines of the SREP Sub-Committee, this appendix has been prepared by the SREP National Committee to present the main aspects of the proposed M&E system.

KEY CHARACTERISTICS OF THE SREP M&E SYSTEM

The key objective of the M&E system is to define principles and procedures for assessing outcomes, effects and impacts of all activities to be implemented under SREP-Mali. It concerns the financial and technical aspects of the program (as regards renewable energies), as well as the general environmental, social and economic implications of these investments.

A complementary objective is to incorporate this M&E system into the global national system, consolidated with the support of SREP.

By using an appropriate logical model, the M&E system will highlight the causal links between projected operations and their potential synergies. Specific indicators will concretely define the outputs (quantity and quality) so that, at the appropriate time, the Government will have all the information required for implementing and managing socio-economic development based on low carbon emissions.

The M&E system will operate in close association with the knowledge management system. Information gathered during M&E will be used not only for knowledge management activities, but also for identifying and sharing good practices, identifying problems and hence contributing to continuous improvement under the program and, beyond, at the national level.

The proposed M&E system in Mali will have a broad scope because it will seek to:

- Be fully integrated into a consolidated national monitoring/evaluation system, interconnected with climate change monitoring/evaluation.
- Be instructive, relevant and comprehensive, by analyzing targeted data collected and analyzed at an appropriate time and by adequately using this information (for possible revision of guidelines and making adjustments).
- Be simple and practical, containing a limited number of realistic indicators.
- Deal with the direct effects of energy operations, without necessarily neglecting the related benefits (for example, reducing the human-induced pressure on forest resources or strengthening local climate change adaptation and coping mechanisms).
- Include among its priorities the improvement of the people's means and modes of livelihood, the protection of the poorest and most vulnerable rural population, and attention to aspects related to gender equity (gender approach).

- Harmonize the SREP program's M&E mechanisms with those of its specific investment projects, by integrating its core indicators and the specific indicators of projects since such integration is very important for reflecting the fact that SREP is not a sum of individual projects but a unique and perfectly integrated program; and to ensure information feedback at the program level.
- Be comprehensive, by considering all the different levels (project, program, country and CIF).

In its structure, SREP-Mali's M&E system will take into account the indicators proposed by the SREP Sub-Committee to all pilot countries, while adapting them to the conditions in Mali and designing other indicators more specific for investment projects and to the Malian context.

To the extent possible, the SREP M&E system will include some baseline indicators from the National Energy Policy matrix table, while supplying the National Energy Policy system with data.

CHARACTERISTICS OF THE EXISTING NATIONAL ENERGY MONITORING/EVALUATION SYSTEM

Policy and Strategy

In the *National Energy Policy*, there are matrix tables for evaluating and monitoring the development of each sub-sector identified, including RE. The tables present the overall goals, specific objectives, strategic areas of National Energy Policy and indicators for each specific objective. The SREP M&E system will factor in these elements to ensure consistency with the National Policy indicators and sustain them. The assessment of SREP showed that the National Energy Policy monitoring framework was not effective. Therefore, in a sense, SREP should contribute to the review and revitalization of this framework.

There is no specific M&E system in the *National Strategy for the Development of RE*.

Projects

RE-related M&E frameworks exist at the level of *projects*. Data emanating from these RE projects are a useful source of information, but need to be consolidated at national level and developed under a national M&E system. A subsequent revision of the National Energy Policy monitoring framework will take into account the work already done at project level to ensure the system's overall consistency from national to project level.

Planning and Statistics Units

With regard to RE, relevant national Planning and Statistics Units (PSU) are mainly the Energy and Environment PSUs which centralize useful data at national level (gathered from national bodies/departments). A number of indicators have been defined for some years now, despite persistent difficulties in terms of data-collection. Such data are used, for example, in the Energy Information System, which is used for preparing the Annual Energy Sector Monitoring Report. The data will be developed within SREP-Mali's M&E system to supply baseline data.

STRENGTHS AND WEAKNESSES OF THE NATIONAL ENERGY MONITORING/EVALUATION SYSTEM

There were some discussions with representatives from various departments and agencies of the Ministry of Energy to obtain their views on the strengths and weaknesses of the existing national energy sector monitoring/evaluation system. The analysis highlighted the following:

- the existing system focuses on the physical and financial monitoring of projects, and it collects, processes and disseminates information on project performance;

- the current system does not allow the Ministry of Energy to identify future trends because evaluations are not systematic for all projects. For some projects, evaluations are only circumstantial. A distinction should be made between : (i) evaluations at the request of the project sponsor for externally funded projects, and (ii) the annual sector review in which evaluation is sometimes not exhaustive, although it concerns all the projects ;
- the key strengths of the system are the existence of M&E-dedicated structures (National Energy Committee, Planning and Statistics Unit with its “M&E and IT Unit”, etc.), formal indicators and an Energy Information System;
- the irregularity of evaluation missions, the relative reliability of data and the inadequacies of the policies and strategies evaluation framework (all due to insufficient financial and material resources, inadequate and lack of qualified human resources) are the main weaknesses of the system (the Energy Planning and Statistics Unit lacks adequate financial resources for its evaluation missions and still awaits external financing). The number of PSU evaluation missions rose from 1 in 2010 to 2 in 2011 ;
- very few indicators monitored by the Energy PSU are specific to RE. The Environment PSU does not monitor indicators specific to climate change.

Summary Table of Findings

Key Strengths of the Existing System		
Existence of an Energy Planning and Statistics Unit, with an M&E and IT Unit		
Existence of a series of indicators defined for project monitoring and implementation		
Existence of an Energy Information System (EIS)		
Existence of a framework for assessing the energy sector policies and strategies (CNE)		
Key Weaknesses of the Existing System and Mitigation Measures		
Weaknesses identified	Main Reasons Given	Proposed Mitigation Measures
Institutional framework (CNE) not operational	Lack of financial resources Inadequate and lack of skilled human resources	Provision of adequate financial resources Capacity building and revitalization
Absence of consolidated M&E system at national level for the energy sector, and much less for REs	Lack of financial resources Inadequate and lack of skilled human resources	Strengthening of the financial, material and human capacity of the Ministry (PSU and DNE) to consolidate and strengthen the existing structures through better mainstreaming of REs
Irregular/unsystematic evaluation and data collection missions	Lack of financial resources Lack of material resources Inadequate human resources Lack of the M&E framework at the base	Strengthening of financial, material and human resources Devolution of the M&E framework (PSU) at the regional level
Lack of adequate data collection tools and poor reliability of data	Lack of financial resources Lack of material resources Inadequate human resources	Strengthening of financial, material and human resources Provision of data collection tools
Lack of national energy planning and clear targets based on a clearly identified and collectively validated development scenario.	A system exists, but does not correspond to national needs and is not operational due to lack of qualified human resources	Provision of resources to develop a suitable planning system and training of PSU and DNE for effective implementation

Aware of these constraints, the Malian Government will make arrangements to reduce or even eliminate their impact. In that regard, SREP should contribute to strengthen the national M&E system by carrying out activities to correct the identified drawbacks.

KEY MEASURES TO BE IMPLEMENT UNDER SREP

Arrangements will be made by the Energy Department to sharply reduce or even eliminate these constraints within SREP and establish an effective system. The following measures will be particularly important in that regard (some of them could be initiated during the SREP preparatory phase under the Strategic Coordination of the Program):

- During the design of the new *Growth and Poverty Reduction Strategy Paper*, establish close partnership with the PRSP Technical Unit responsible for reviewing the number and nature of its indicators (depending on its thematic areas)⁵ – since this PRSP is an indispensable reference of all the macro-economic, structural and social policies that Mali plans to implement to promote growth and reduce poverty.
- Establish synergy with the National Energy Policy's M&E system (information collected and analyzed at the level of SREP will supply the National Energy Policy's M&E system and vice-versa) and with indicators monitored by the Energy Planning and Statistics Unit.
- Set up an appropriate institutional mechanism which will be responsible for all M&E system-related aspects (creation of the Strategic Coordination Unit of the Program, with specific M&E responsibilities, in close collaboration with the Energy Sector Planning Unit – see infra).
- Coordinate and update Ministry of Energy's national M&E system.
- Use the services of institutions/resource persons to strengthen, coordinate or establish baseline scenarios.
- Give fresh impetus to the work of key public and private projects operating in renewable energy in Mali, for the production of quality baseline data (performance indicators).
- Set up and use a network of resource persons (belonging to universities, research centres, decentralized technical services, non-governmental organizations, private sector, etc.) to document best practices and lessons learned as part of renewable energy initiatives.
- Organize consumer surveys (even polls) to obtain local views on the strengths and weaknesses of the system of delivery of energy services to people.
- During the program's knowledge management and sharing activities, organize and hold special meetings or presentation workshops on the key outputs of the M&E system, with the participation of key national and local institutional stakeholders.
- Encourage Strategic Coordination Unit members to participate in meetings organized under the CIF and SREP to share the benefits of Mali's M&E experience.

KEY EXPECTED EFFECTS

The Malian Government wants to set up an M&E system i.e. a system that will not be an “end in itself”, but a “key means” for achieving precise operational outputs. The system will aim, in particular, to:

⁵ Note that the 2nd generation CSLP (2007-2011) has only one indicator under the heading ‘Infrastructure’ concerning energy (“rate of access to electricity (rural and urban”).

- give the Malian Government, represented by the National Energy Directorate, the information necessary for optimal management of a countrywide program such as SREP;
- identify, in due time, possible factors of methodological and institutional problems concerning the collection, analysis and use of baseline data related to the supply of energy services to the people, as well as constraints linked to households' access and use of renewable energies, so as to adequately correct them;
- supply data to the knowledge management system used by all the national stakeholders;
- supply data to the knowledge management system at the international level (among SREP pilot countries and other countries having a similar environment, especially in the sub-region);
- identify more in-depth study themes on the renewable energy aspects that the M&E system will identify;
- give priority to harmonization between the M&E mechanisms of SREP, those of the *National Energy Policy* and, more widely, those of the *Growth and Poverty Reduction and Strategy Paper*, particularly the third pillar on "Infrastructure Development and Support to Key Production Sectors".

In addition to these key expected outputs, M&E activities should also strengthen the national energy M&E system.

IMPLEMENTATION

A Program *Strategic Coordination Unit*, located in the Ministry of Energy, will be responsible for defining, installing and managing the SREP-Mali's general M&E system. This institutional arrangement has one major comparative advantage over other possible arrangements: since this same Unit will ensure the strategic coordination of the whole program, the M&E process will be implemented in synergy with knowledge management, capacity-building activities and mobilization of additional financial resources.

With regard to M&E, the Strategic Coordination Unit will, in particular:

- coordinate the optimum integration of the SREP outputs into the *National Energy Policy* M&E system and the *Growth and Poverty Reduction and Strategy Paper*, especially the methodological and institutional aspects;
- monitor and coordinate the implementation of the M&E systems of the three investment projects to harmonize their objectives and integrate them into the program's M&E system. Although these projects' M&E systems are in line with the procedures of MDBs, they must include some of the program's "compulsory" indicators;
- assume responsibility for an inclusive reporting system of SREP activities and its investment projects, by involving all the institutional levels;
- manage all aspects of stakeholders' M&E capacity assessment and appraise weaknesses in baseline scenarios, targeting mechanisms, technologies and human capacity;
- prepare comprehensive annual reports for the Government, SREP Sub-Committee and MDBs, which (in the spirit of the program approach) will help to consolidate any information from individual projects.

FINANCIAL ARRANGEMENTS

The cost of M&E activities will be part of the overhead costs of the Strategic Coordination mechanism of the Program (they are presented in the Investment Plan itself). A budget of USD 500,000 was earmarked for the M&E system at the program level. Additional budget, for the M&E systems developed for each of the three investment projects, will be included in the projects' budget.

CONCLUSION

The Malian Government considers the SREP M&E system as key to the success of the proposed investments, and will consequently make all necessary arrangements for its implementation.

Appendix 8: Overview of Gender and Energy Assessment & Action Plan for AMADER

Background: Gender and Energy Program in the Africa Region

Through the World Bank's trust funded **Africa Renewable Energy Access Program (AFREA)**, the AFREA Gender and Energy program builds off of the work done at the global level to develop a gender sensitive approach for energy projects in Africa together with the energy task teams and government agencies within targeted countries. The program aims to contribute towards the greater outcome of increasing energy access while understanding and addressing the needs of the poor, through capacity building, dialogue and engagement with women and men in the region. Within the AFREA gender and energy program, Mali is one of the first pilot countries in the Africa region to launch the activities on gender mainstreaming. The gender approach has already been integrated into the *Household Energy Universal Access (HEURA)* project where there is a focus on productive uses of energy.

Gender and Energy Assessment

In 2010, scoping missions took place and a gender focal point within AMADER was identified to work with the WB team of gender and energy experts in developing practical activities for gender integration. To date, a team comprised of international and local experts on gender and energy working with AMADER has carried out a **gender and energy needs assessment** for AMADER, which includes a desk review of AMADER's projects, followed by site visits to 12 villages for consultation with the private operators and the community involved in AMADER's projects. Based on the findings and recommendations of the assessment, a time bound **gender and energy action plan for AMADER** is being developed through consultation with AMADER and various partners to have a comprehensive action plan for AMADER to adopt a gender sensitive approach in their work. The plan includes activities, estimated costs, M&E indicators to measure the impact of various activities, and potential partners for implementation. The action plan is i) customized to AMADER's role and responsibilities; ii) based on the information gathered; iii) focused on activities within the village; iv) responsive to identified needs; v) assist with the removal of barriers; and vi) produce impact on the ground. Given the nature of the pilot program and piloted approaches, the process, deliverables and dialogue that take place during the span of this work will be documented in order to capture the experience of "learning by doing" and sharing the lessons learned. Results have already begun to surface from the work, with the formalization and institutionalization of the gender focal point role within AMADER. This shows AMADER's commitment to mainstreaming gender within their work.

Gender and Energy Action Plan - Based on the preliminary information and results of the gender assessment of AMADER's activities, seven categories of potential interventions were identified:

1) Strengthening the Gender Desk within AMADER

The action plan would include activities to strengthen the role and responsibilities of the gender desk within AMADER to ensure sustainability after the project's completion.

2) Mainstream Gender into Monitoring and Evaluation in AMADER's projects

The action plan would include activities to help AMADER strengthen its capacity to monitor the gender interventions and evaluate, through the M&E indicators, the impact of those interventions.

3) Community Level Training

Training would be customized to match the needs of women and men in the communities as identified by the field assessment. Training is expected to take place for women's cooperatives and community organizations. The training will be focused on identifying opportunities to use energy

(both on and off-grid) for income generating activities, based on the information gathered during field visits. For example, this may include training in marketing, improved shea butter production, diverse ways to use Multi-Functional Platform for income-generating activities, accounting, etc.

4) Identification on New Technologies, Best Practices and Sustainable Focal Points

The action plan would include activities that will support identification of new energy solutions, including new technologies, show case best practices within the communities and identifies focal points and champions who are leading or interested in leading these activities. This will serve as an ongoing needs assessment and identification exercise that will take place during the action plan. As activities are implemented, lessons will be learned, new information may surface and it is critical to document this during the implementation period for future interventions.

5) Solutions to the Removal of Barriers

Solutions to remove barriers such as access to credit, training or identifying partners to pilot and monitor the investment in technology to remove barriers are considered. These may include improved stoves, water pumps, multifunctional platforms connected to electricity and other findings surfaced during Stage I. May also include providing seed funding to invest in this equipment or materials to help start small business. The financing mechanism should be clearly outlined in this activity and should be linked to existing frameworks (e.g. working with microfinance banks or NGOs already linked to AMADER).

6) Communication and Information Sharing

The action plan would also have an integrated communication plan for AMADER to facilitate partnerships with associations and individual women, men and youth from the communities. This will help remove the barriers of lack of information and also provide information to the task team.

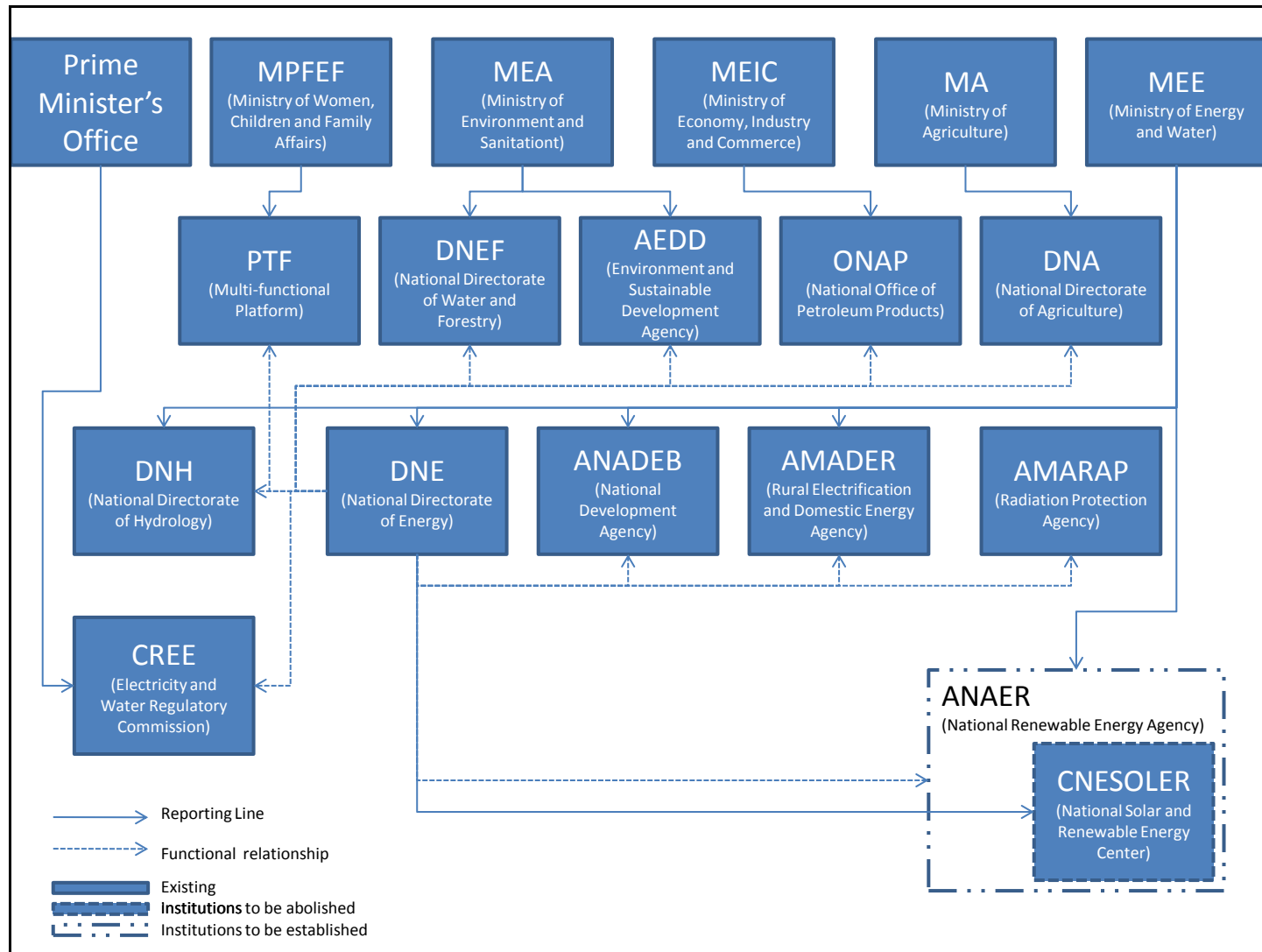
7) Capacity Building and Training of Relevant Organizations

National organizations are well equipped and have capacity for their given sector. For the women's organization, they are well versed in gender issues and for the energy organization they are well versed in energy issues. The aim of capacity building will to be to share information, examples and build the capacity on gender for energy organizations (mainly AMADER but others may be identified as well); and the energy capacity of gender organizations (such as the Ministry of Women and Children and the National Director of Women).

Gender Activities within SREP Investment Plan Projects

The SREP IP has already articulated the need to provide services to both men and women and has a gender balanced participatory approach during implementation. The findings of the assessment and action plan will be shared with the SREP team and specific activities outlined within the action plan will be integrated into the project activities of SREP's Investment Plan. The assessment and action plan are specifically tailored for AMADER's and its programs, but many of the activities can be broadened and implemented by other SREP partners and gender and energy experts can be identified to support with the integration and execution of those activities. Some specific activities discussed were awareness raising and training on new technologies, capacity building of men and women in productive uses of energy and increasing the involvement of women in energy operations.

Appendix 9: Energy Sector Institutional Landscape



Appendix 10: How the proposed investment projects respond to SREP criteria?

SREP Criteria	How the proposed projects respond to the SREP criteria
Increased installed capacity from renewable energy sources	In 2011, the RE installed capacity is estimated at about 12 MW (including on-grid and off-grid systems). The SREP Program will increase this capacity by an estimated 39.1 MW including a utility scale IPP project (about 20 MW), thus scaling-up the installed capacity by more than three times compared to the current level.
Improved access to energy through renewable energy sources	Increased production capacities and locally available sources of RE will allow a larger access of energy to populations living in targeted areas. Project beneficiaries (households, community institutions, SMEs, schools and clinics) with access to clean energy services will be accounted for in the program's M&E system once all feasibility studies are completed.
Low emission development	RE production facilities produce low quantities of GHGs and replace construction of thermal plants that would have otherwise produced high quantity of GHGs. This is why the adoption of these facilities is part of GHG mitigation strategies. The amount of CO2 avoided/replaced will be analyzed in detail during project preparation, in line with a request for carbon funds.
Affordability and competitiveness of renewable sources	Low lifecycle cost of electricity produced by REs in particular in rural areas after sustainable subsidy schemes, and the multiplication of facilities that would enable economies of scale are expected to reduce the cost per kWh of electricity produced.
Productive use of energy	Increased installed capacity in areas, which are still little or not deserved, will help meet the needs of populations and create/develop productive activities, such as small commerce, crafts, etc. The agricultural sector will also be supported, in particular through irrigation, thus improving agricultural yields. Directed and indirect jobs will be created by the proposed projects.
Economic, social and environmental development impact	Main impacts of the proposed projects will be the following : (i) Creation of potential markets, creation of employment, generation of revenues for households, etc.; (ii) Revitalization of the Malian private sector and mobilization of foreign private funding through forward and backward linkages of renewable energy supply; (iii) Improvement of rural livelihoods (especially for women and young people); (iv) Indirect effects on the quality of services provided by different socio-economic facilities (including schools and medical centers); (v) Reduction of the incidence of respiratory diseases (linked to indoor air pollution); and (vi) Significant reduction of GHGs, carbon sequestration, and protection of vegetation resources.
Economic and financial viability	The economic and financial viability of the proposed projects will be ensured, among others, by : (i) Regulatory /tariff measures making investment more attractive, while taking the affordability issues into consideration; (ii) SREP and MDBs attracting other investors; (iii) joint MDB policy dialogue on tariffs and subsidies in the energy sector and mobilization of additional financial resources (grants) by Mali's development partners; (iii) Development of adapted financial instruments by commercial banks and

	provision of concessional funds to the private sector by MDBs; and (iv) Formulation and implementation of a large range of incentives for private investments.
Leveraging of additional financial resources	The program will raise additional funds, by developing an innovative approach that is likely to attract the interest of other donors (in addition to the involvement of private operators, motivated to invest by a more favorable regulatory framework). Against the investment of US\$ 40 million from SREP, about US\$210 million additional will be mobilized by MDBs, other development partners, and the private sector.
Gender	The program will target specific support to income generating activities that are more particularly adapted to women. Rural electrification projects will contribute to: significantly improve the social and economic status of women in so far as its initiatives will contribute to reducing the time and chores involved in collecting firewood (thereby freeing them for other tasks, including children's education); and improve their access to energy for income generating activities. A 2011 gender assessment targeted to rural electrification initiatives identified a considerable potential for gender specific activities to be scaled up under the SREP program.
Co-benefits of renewable energy scale-up	Some of the co-benefits anticipated from the SREP program include: (i) conservation of forest and natural resources; (ii) protection of groundwater resources; (iii) local economic development and job creation; (iv) reduction of fossil fuel-dependency; (v) support to on-going decentralization efforts; (vi) improved investment climate for the private sector; (vii) empowerment of women; and (viii) improved health conditions among rural population.