

CHAPTER V: SENEGALESE RURAL ELECTRIFICATION ADMINISTRATION

ARTICLE 30. - SENEGALESE RURAL ELECTRIFICATION ADMINISTRATION

There is hereby established a Senegalese Rural Electrification Administration (*Agence Sénégalaise d'Électrification Rurale — ASER/SREA*), an independent agency which shall be responsible for providing operators in the electricity industry and individuals with the necessary technical and financial assistance to support projects for rural electrification. To this end, SREA shall develop electrification projects on the basis of the rural electrification plan established by the Minister of Energy. Therefore, it will, each year, organize public tenders for granting new distribution concessions for rural areas. In addition, the Senegalese Rural Electrification Administration will invite and encourage the submission of electrification proposals from private operators. It will make decisions periodically on applications for financing for such projects.

The characteristics and financing methods granted to the Senegalese Rural Electrification Administration shall be set forth in an implementation decree issued jointly by the Minister of Energy and the Minister of Finance.

ARTICLE 31. - PROCEDURES

The Senegalese Rural Electrification Administration shall make no sum available to any operator, until such operator has obtained a license or concession for the proposed operation, in accordance with the applicable provisions of this Law.

The Senegalese Rural Electrification Administration may provide financial assistance, on the basis of a marketing plan, to operators with respect to operations which are not subject to the requirement of obtaining a license or concession.

It may make its loans and grants conditional on the furnishing of any guarantee which it deems appropriate.

It may, in case of default by the operator involved in the repayment of any loan, substitute another operator better able to conduct the operation and resume the loan payments, subject to obtaining the prior approval of the Regulatory Commission for the Electricity Industry.

ARTICLE 32. - REPORTS

The Senegalese Rural Electrification Administration shall prepare and submit no later than 30 June of each year, a report on its loans and grants made during the preceding fiscal year. The report shall also discuss any difficulties encountered, especially loan defaults, which occurred during the period. It will also note any progress with respect to rural electrification.

This report shall be submitted to the Minister of Energy, the Minister of Finance, and the Chairman of the Regulatory Commission for the Electricity Industry.

CHAPTER VI: MISCELLANEOUS PROVISIONS

ARTICLE 33. - ENCUMBRANCES ON PRIVATE PROPERTY

Holders of concessions for transmission and distribution of electric power shall have the right to excavate trenches or build support towers for power lines throughout the national territory.

No payment shall be due to the owner, occupant, or user of such property, unless the conditions set forth in Articles 31 and 38 of Decree n° 64-573 of 30 July 1964 are met.

The holder of a concession to transmit or distribute electric power shall benefit from the right to occupy property which is in the public or private domain of the State.

The holder of a concession to transmit or distribute electric power shall have the right to perform all construction work on public roads and adjacent property necessary to install and maintain facilities and equipment, in conformity with regulations relating to public transport and zoning and urban planning, and applicable orders relating to safety, police, and oversight of facilities for electricity distribution.

In co-operation with operators responsible for telecommunications, the support facilities and equipment shall be used in common for electrical and telecommunications installations, subject to safety considerations.

Whenever changes in the course or direction of public roads, or opening of new roads, required to meet traffic needs, lead to a change in public distribution facilities, the costs resulting from such changes shall be borne by the owner of the concession for electric power transmission.

With respect to construction work for any other purpose, whether public or private, the related costs shall be borne by the party concerned with the construction.

The holder of a concession for the transmission or distribution of electric power shall have the right:

- to install supports or foundations for power lines and cables, either on the outside of walls or façades of buildings facing public streets, or on roofs or terraces of buildings, on the condition that they be accessible from the outside and subject to compliance with traffic and zoning and urban planning regulations. Implementing decrees shall be issued jointly by the Minister of Energy and the Minister of Urban Planning setting forth the technical requirements to be observed to ensure the safety and comfort of persons and buildings;
- suspend power lines above privately owned property, on the same terms and conditions as provided in the immediately preceding paragraph hereinabove;
- construct underground trenches or supports for towers on unimproved private property which are not enclosed by walls or equivalent forms of enclosure; and
- trim tree branches which, because of their proximity to overhead power lines, could, by their movements or by falling, cause short-circuits or damage to facilities.

The performance of any construction described in the paragraphs marked by the 1st and 4th dashes hereabove must be preceded by direct notice to any interested parties.

Such construction shall not imply any taking. The placement of a support on walls or façades may not impede the right of the owner to demolish, repair, or rebuild. The placement of power lines or supports on open, unimproved land shall not impede the owner's right to enclose and improve it. Such rights must be exercised in a legitimate manner. In such cases however, an easement shall remain in effect allowing the holder of the concession to maintain the facilities.

The owner shall, three months prior to commencing any demolition, repair, rebuilding, enclosure, or construction work send a notice thereof to the holder of the distribution concession by registered letter sent to the latter's domicile.

No compensation shall be due to owners, because of any easement or encumbrance for a right of way for maintenance purposes.

The recognition of any easement shall, except in cases of immediate necessity or consent of the parties, be preceded by the aforementioned notice and an inspection report on the site, prepared by the government agency responsible for government property, which inspection shall be conducted in the presence of the interested owners, whenever a change to the property may occur which does not involve a significant taking of the improvements which are subject to it, or an impairment of their possible utilization, but which gives rise to actual, direct, certain, and material damage.

The appraisal procedure for such damage shall follow the procedure used in cases of expropriation.

Whenever it is likely to cause a change in the premises involving a permanent taking of the improvements which are subject thereto, or impairing their possible use and resulting in actual, direct, material, and certain damage, the recognition of such encumbrance shall be conditioned on a declaration that it is in the public interest and to compensation to the owners of rights with respect to registered improvements and to occupants of government property which have been actually shown.

A declaration of taking in the public interest shall be made, and the compensation due to owners of rights with respect to registered improvements shall be set and paid as in cases of expropriation for public purposes.

Proposals to lay out rights of way for transmission and distribution of electric power, power lines and poles established by the holders of concessions shall be approved by the Minister for Energy and the Minister for Urban Planning, following investigation.

Such investigation shall be conducted by the appropriate staff departments of the Minister for Energy at the request of the holder of the concession. Such request shall include a plat map showing the properties or parcels to be affected by the encumbrances, indicating the names of the owners, concession holders of such properties, or legitimate occupants thereof, and setting forth appropriate information regarding the character and extent of the encumbrances to be recognized.

After direct notice to the affected owners or their assigns or legitimate holders of any rights in respect of such property, of the proposed construction project, an investigation shall be conducted through official channels which shall be open for eight days, inclusive. A special investigator shall collect any comments and prepare a report.

Such report shall be sent to the holder of the concession, for comment or possible change in the right of way. In the latter case, if new parcels are affected, a second investigation

Law relating to electricity

shall be conducted.

Approval of the right of way shall constitute recognition of the encumbrances, which shall be recorded.

ARTICLE 34. - PENALTIES

Any officer, legally or *de facto*, of a company who, without previously obtaining the appropriate license or concession, engages in the business of transmitting, distributing, or selling, at wholesale or retail, electric power shall be subject to punishment by imprisonment for a term ranging from one to three years, or to a fine of between five to twenty million FCFA, indexed to the general level of prices, or both.

Any officer, legally or *de facto*, of a company who violates any provision of any license or concession, or the related terms and conditions, by which it is bound, shall be subject to the same penalties.

ARTICLE 35. - REPEALED PROVISIONS

Any provision of law inconsistent with this Law is hereby repealed and specifically Law n° 65-59 of 19 July 1965 relating to the production, storage, transmission, and distribution of water and electrical power, insofar as its provisions relating to electric power are concerned, as well as Decree n° 84-1128 of 4 October 1984 regulating production, transmission, and distribution of electric power.

For transitional purposes, Decree n° 84-1129 of 4 October 1984 approving the General Terms and Conditions for the provision of electric power as a public service shall remain in effect until the issuance of new terms and conditions applicable to SENELEC.

Dakar, April 14th, 1998.

By the President of the Republic :

Abdou DIOUF.

The Prime Minister,

Habib THIAM.

DEVIS ESTIMATIF

KIT DE 50Wc

LIBELLE	UNITE	QTE	P.U. HT/HD	P.U. TTC	TOTAL HT/HD	TOTAL TTC
A. FOURNITURE						
Module PWX500, 49Wc unitaire	U	01	165 000	175 000	165 000	175 000
Régulateur de charge et décharge TR10/12	U	01	45 500	48 000	45 500	48 000
Batterie solaire TUDOR TE 85, 88AH en 12V chargée sèche avec électrolyte séparé	U	01	57 000	60 950	57 000	60 950
Coffre batteries TE 85	U	01	28 000	30 000	28 000	30 000
Structure support pour 1 module PWX500	U	01	25 000	27 000	25 000	27 000
Réglette fluorescente 12V/13W	U	04	16 000	17 000	64 000	68 000
Réglette fluorescente 12V/8W	U	01	14 000	15 000	14 000	15 000
Kit d'assemblage générateur	Lot	01	15 000	15 900	15 000	15 900
Accessoire de mise à la terre	Lot		22 500	24 000	22 500	24 000
- Câble 1 x 25mm ² cuivre nu terre						
- Barrette de coupure						
- Piquet de terre en acier galvanisé						
Prise avec détrompeur femelle	U	01	2 500	2 650	2 500	2 650
Prise avec détrompeur mâle	U	01	2 200	2 350	2 200	2 350
Câble et accessoires de câblage bâtiment	Lot	01	90 000	95 400	90 000	95 400
B. INSTALLATION ET MISE EN SERVICE						
	Forfait		120 000	144 000	120 000	144 000
PRIX TOTAL DU SYSTEME INSTALLE					650 700	708 250

En option : * Pour téléviseur noir et blanc → adaptateur 12V/9 - 7,5 - 6 - 4,5 - 3V → 19 000 F CFA (HT)
 * Pour téléviseur couleur → convertisseur 12V/220V - 150VA → 145 000 F CFA (HT)
 * Contrôleur enregistreur de données SUNPAC → 670 700 F CFA (HT) → 741 123 F CFA (TTC)
 (+ régulateur TR15)

TOTAL-ENERGIE AFRIQUE DE L'OUEST
 Tél: 32.39.44 - Fax: 32.39.45
 Immeuble TOTAL SENEGAL

Km 3 Boulevard de la Commune Dakar
 BP. 286 - DAKAR



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BUHAN & TEISSEIRE

SUN TECHNO

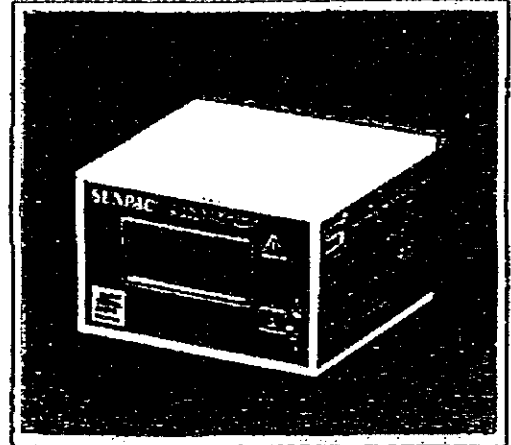
Projet 150 Solar Home Systems

ITEM	SPECIFICATION	AMOUNT	UNIT PRICE HT-HD	TOTAL PRICE HT-HD
Solar panel	Poly cristalline	150	248 732	37 309 800
Support structure	Galvanize pipe - wall mounting	150	19 980	2 997 000
Charge controller	5A solar current - 5A charge	150	23 996	3 599 400
Battery	Solar batt. 105Ah C100 - 12V	150	100 472	15 070 800
Battery box	Polyéthylène box - local made	150	15 301	2 295 150
Lamp	Fluo lamp 8W-12 Vdc	450	19 648	8 841 600
Cable panel-controller	HO7RNF - 2x4mm ²	1000	1 488	1 488 000
Cable for distribution	H05VVF - 2x4mm ²	5000	635	3 175 000
Breaker	10 A with box for wall mounting	150	7 569	1 135 350
Switch	10A - for wall mounting	500	2 421	1 210 500
Plug	12V undeceived + and - terminal	150	8 904	1 335 600
Accessories	4 junction box, pegs, screw, ...	150	12 867	1 930 050
Cable holder	peg with nylon cable tie (each 0,25 m)	20000	233	4 660 000
Fluo bulb	8 watts - cool white	150	1 929	289 350
	Solar monitoring system	4	60 814	243 256
TOTAL MATERIALS				85 580 856
Installation	Solar home system 1 panel, 1 controller 1 battery, 3 lamps, 1 plug	150	43 704	6 555 600
Transport (km)	Fatick region	2000	150	300 000
TOTAL INSTALLATION				6 855 600
TOTAL				92 436 456

BUHAN & TEISSEIRE, Place Kermel - B.P. 119 - DAKAR (Sénégal) - Tél. (221) 823 39 41 - Fax (221) 823 71 18
 IMPORTATEUR DISTRIBUTEUR EN QUINCAILLERIE, PAPETERIE, HYDRAULIQUE, SOLAIRE, BUREAUTIQUE, INFORMATIQUE
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SUNPAC[®]

Controller and data logger for photovoltaic generators



The very high number of photovoltaic systems installed throughout the world have already demonstrated their excellent reliability and life span in every type of application, provided they are supported by a minimum amount of maintenance and follow-up. To facilitate the control of photovoltaic generators by users and follow-up by contractors, TOTAL

ERGIE has developed a Data Controller and Logger (SUNPAC : TRANSENERGIE patent) which can be integrated simply and easily into any photovoltaic system containing a battery. The use of this device simplifies the control and maintenance of photovoltaic generators for a token cost and enables user services to be guaranteed.

FUNCTIONS

- ◊ Continuous control of photovoltaic generators.
- ◊ Measurement and display of many of the parameters which are important for users.
- ◊ Display of the malfunction codes.
- ◊ Logging of all data over a one year period.

BENEFITS

- ◊ User assistance for generator management.
- ◊ Replacement of conventional measurement instruments (V, A, Ah, ...).
- ◊ Subsequent verification of initial system scaling.
- ◊ Prolongation of battery life.
- ◊ Simplified scheduled maintenance
- ◊ Malfunction alarm prior to installation failure.
- ◊ Compact.
- ◊ Connection is possible to any photovoltaic generator.

OPTIONS

- ◊ Pre-paid charges.
- ◊ Remote control.
- ◊ Remote monitoring

DESCRIPTION

The SUNPAC Controller/Data Logger continuously measures 4 parameters which describe the operation of photovoltaic generators : battery voltage, solar panel current, output, power consumption and battery temperature. Optionally, an output compatible with a TOTAL ENERGIE regulator enables control of the system in some applications.

As data is acquired in real time the following functions become possible :

Measurement and calculation in real time of 9 photovoltaic generator characteristics of interest to the user.

- Battery charge state (%) : S.O.C. calculated using the Ecole des Mines software pack.
- Battery voltage (V) : UB.
- Solar panel current output (A) : JA.
- Power consumption (A) : JL.
- Battery temperature (°C) : TB.
- Solar panel power potential (Ah) : per day (P) and cumulated (EP) without regulation.
- Power effectively supplied by the solar panel (Ah) : per day (A) and cumulated (EA) with regulation.
- Power consumption by the application (Ah) : per day (L) and cumulated (EL) .
- Balance of days logged or balance of pre-paid credit outstanding (option) (J).

04.10.93

Alarm

A malfunction alarm connected to the photovoltaic generator with a red flashing warning light on the front panel shows that energy is no longer being supplied and displays the nature of the malfunction :

- Battery state of charge (%) too weak.
- Regulator failure.
- Critical battery temperatures.
- Voltage supply outside tolerance.
- No current from the solar panel.
- End of the logging period or of the pre-paid operating credit (option).

Data Logging

At the end of each night the SUNPAC Controller/Data Logger records for a maximum period of one year, the different parameters of the installation for the preceding day, i.e. :

- Battery charge state (%) : S.O.C.
- Daily solar panel power potential (Ah) without regulation : P.
- Daily power effectively supplied by the solar panel (Ah) with regulation : A.
- Daily power consumption by the application (Ah) : L.
- Maximum battery voltage (V) : UB max.
- Minimum battery voltage (V) : UB min.
- Maximum solar panel current output (A) : JA max.
- Maximum power consumption (A) : JO max.
- Maximum battery temperature (°C) : TB max.
- Minimum battery temperature (°C) : TB min.
- Duration of usage of the receivers (h) : Ou.

Data analysis

The end of the data logging period on the site (maximum 1 year) is signalled by the red alarm which starts to flash and the display on the front panel. The data can be recovered from the logger either locally by connection to a portable micro-computer or by the Central Management Service by return of the pluggable unit.

Examination of the daily logs for all the installation parameters enables verification of the correct operation of the photovoltaic generator and of power consumption. These data are used to prepare a daily, monthly and annual power use review in compliance with the guidelines laid down by the E.E.C. (DGXVII) for monitoring photovoltaic installations under 5 kWp.

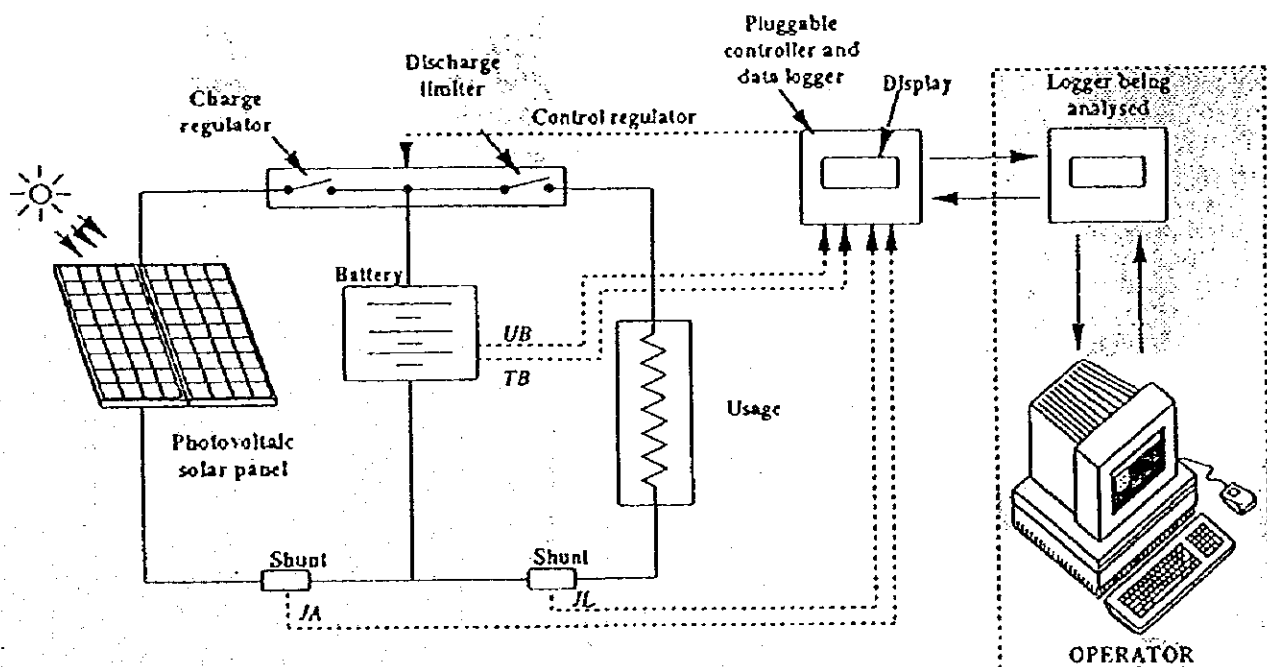
Pre-Paid Operating Credit (Option)

For some applications it is interesting to limit the use of the photovoltaic generator to a specific duration (example : authorisation granted to a user to operate the system for one year in return for receipt of a payment covering the expenses of a maintenance contract or a provision for battery renewal). The controller can be set for a number of days of operation (typically 365 days but this can be adjusted when placing the order) which deducts one unit per day as soon as the appliance is put into service.

Before the credit is fully used up (typically 30 days beforehand), a "credit" alarm warns the user by a flashing red light on the front panel.

When no credit remains the system no longer produces power (option : control of the regulator) and this condition is shown by a red light on the front panel. Replacing the pluggable SUNPAC unit by a new unit in which the credit counter has been recharged brings the photovoltaic generator back onto line.

Working principle



Optional Remote Control

Real time control of the photovoltaic installation can be implemented remotely by 3 communication modes :

- telephone line (commuted network)
- radio link
- satellite link

The remote control function is implemented via a PC and a temporary connection. It can execute 3 types of function :

- Controller programming (allocation of a new operating credit, for example)
- Instantaneous measurement of the installation parameters
- Data analysis remote from the logger

Remote Monitoring (Option)

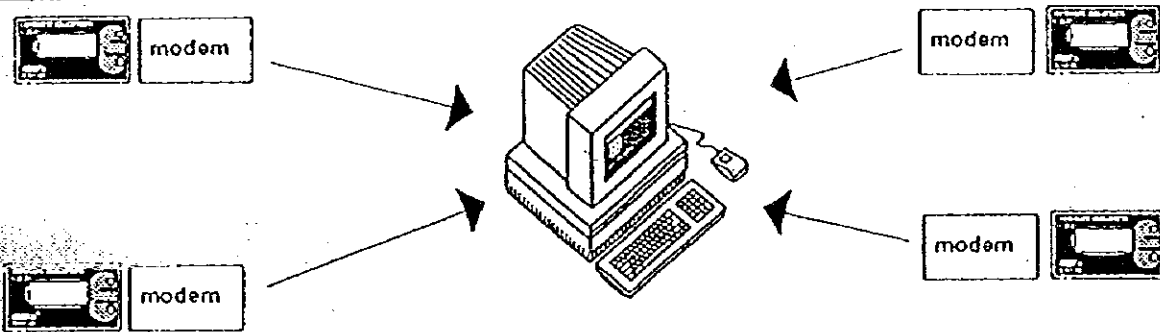
The photovoltaic installation can be monitored remotely by a central management service.

Remote monitoring is implemented as follows :

- periodic polling by the supervisor of the centre to verify that the connection is correct and that the photovoltaic system is operating satisfactorily
- whenever alarm messages are received from the SUNPAC unit with acknowledgement.

The remote analysis of a malfunction can initiate the Intervention of a technician (in the context of a maintenance contract, for example) even before the user has noticed the failure.

Principal

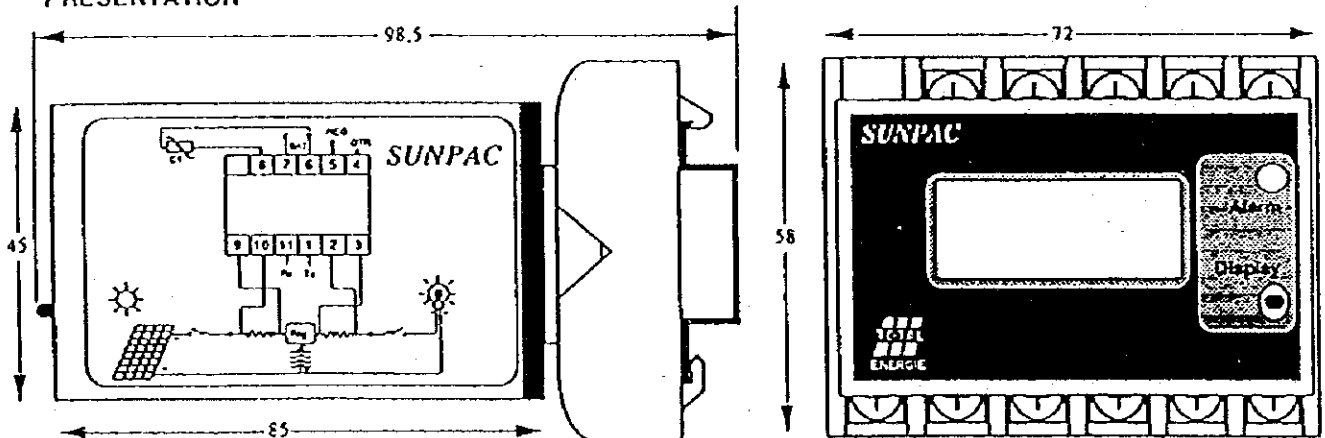


TECHNICAL SPECIFICATIONS

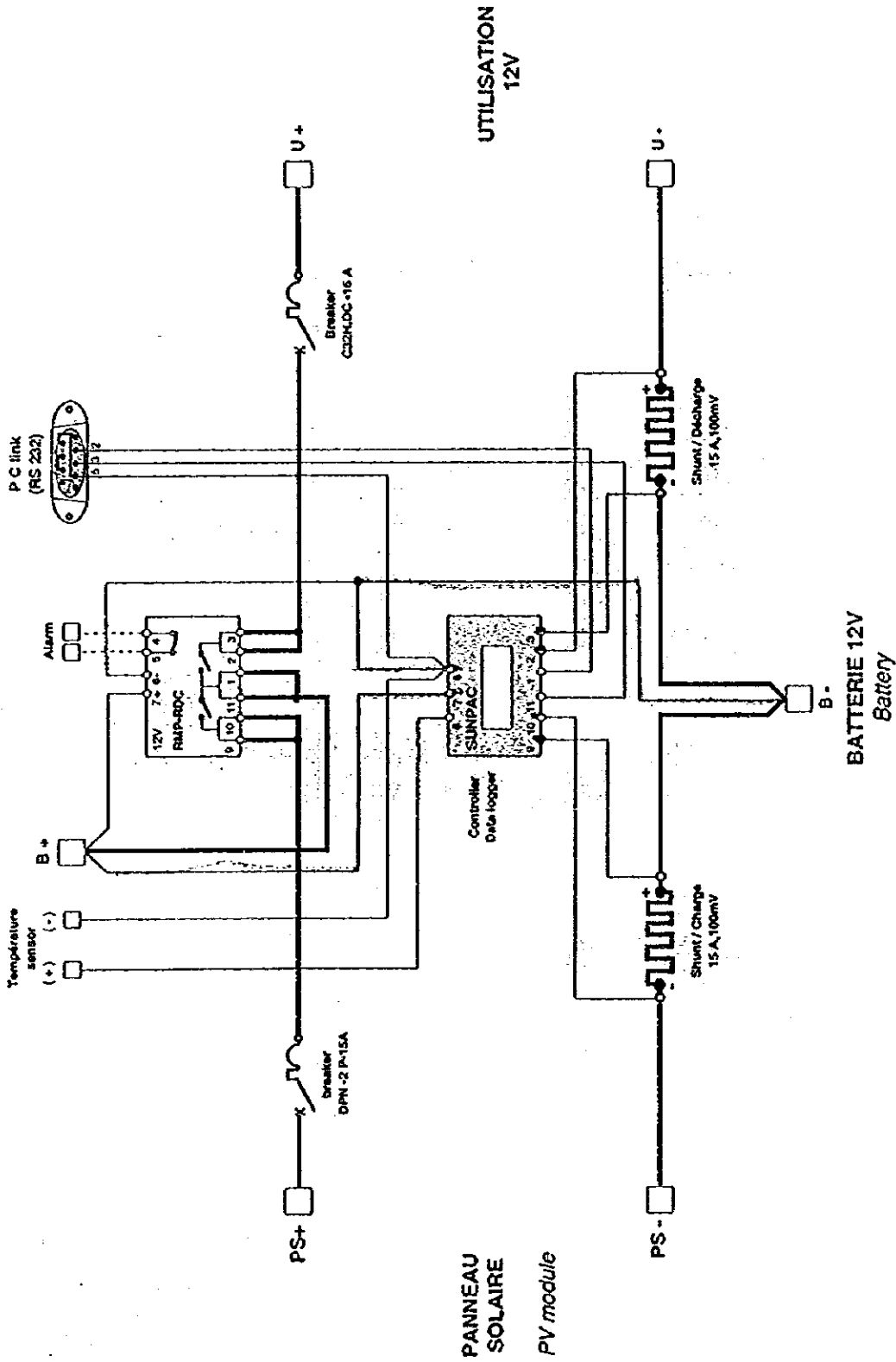
- ◊ Power supply : 12, 24 or 48V via a voltage selector
- ◊ Consumption :
 - in 12V : 30 mA
 - in 24V and 48V : < 20 mA
- ◊ Inputs : 4 Analog channels :
 - battery voltage
 - Solar panel current setting (shunt 100 mV)
 - Battery temperature (probe supplied)
- ◊ Outputs :
 - 1 analog port to control the regulator
 - 1 RS 232 C serial port link

- Display : 2 line 8 character alpha numeric LCD
 - 1st line : parameters
 - 2nd line : malfunction type
- ◊ Parameters can be scrolled by the key
- ◊ Data is acquired every second
- ◊ Flashing red light alarm
- ◊ Logging memory capacity 8 Kb
- ◊ Operating temperature : - 10°C to +50°C
- ◊ Overall box dimensions : 70 x 45 x 85 mm
- ◊ Overall box + base dimensions : 72 x 58 x 98 mm
- ◊ Weight : 0.35 kg
- ◊ Attachment : symmetrical DIN rail

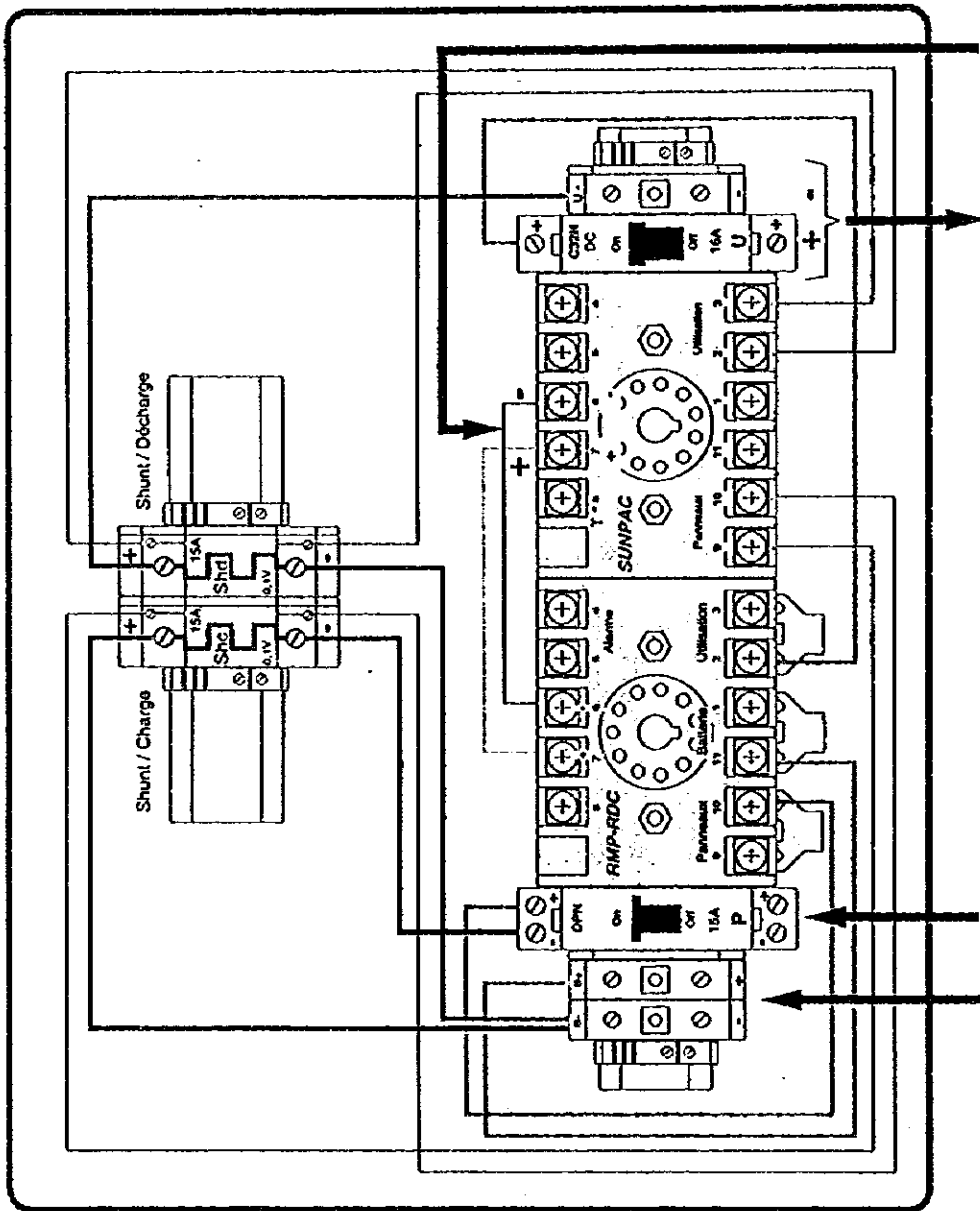
PRESENTATION



G4 16 93



DESSIN :	J.E.S.	SCHEMA	SCHEMA DE PRINCIPE
TYPE :	TR15-12-Sunpac		Wiring Diagram
CODE :		NOM	REGULATEUR 12V - 15A, Sunpac, protégé
DATE :	AVRIL 1993		Regulator with data logger SUNPAC



Alim. Mesure
24V (Batterie)
Mesure Alim.
24V (Battery)

PANNEAU
PANEL

BATTERIE
BATTERY

- Coffret GW, 1 étage, 12 mod.
- GW cabinet, 2 level, 12 mod.
- 3 presse-étoupes CM14 - PG16
- 3 cable glands, type CM14 - PG16
- 1 presse-étoupe CM10 - PG11
- 1 cable gland, type CM10 - PG11

Section des fils	
4mm ² rouge	1,5mm ² rouge
4mm ² bleu	1,5mm ² bleu



DESSIN: JES.	SCHEMA
TYPE: TR15-24 SUNP-MR	SCHEMA DE CABLAGE
CODE: (C06.3607)	NOM
DATE: DEC. 1994	REGULATEUR 24V - 15A, SUNPAC08, protégé, mesure rapportée

Projet Sénégal-Allemand
Energie Solaire Photovoltaïque

LISTE DE DOCUMENTS PUBLIES
(de 1987 à 1996)

N° réf.	PUBLICATIONS
	<p>1. Généralités</p> <p>1.1 Synthèse des rapports produits de 1987 à 1990 sur "l'Electrification rurale par voie solaire photovoltaïque - Aspects socio-économiques" (<i>Ibrahima Diop, sociologue & Masse Lô, environnementaliste - ENDA - Août 1990</i>)</p> <p>1.2 Influence de la poussière sur le gain énergétique relatif d'un panneau solaire (<i>Andreas Wagner - ITW - Juin 1991</i>)</p> <p>1.3 Notions de base sur la conversion photovoltaïque : contribution au séminaire de formation des techniciens des entreprises privées (<i>Zaccaria Koita - Dakar, Avril 1996</i>)</p>
	<p>2. Centrales photovoltaïques</p> <p>2.1 Rapport final "Aspects sociologiques, culturels, économiques et énergétiques à Niakhar et Diaoulé" (<i>ENDA - Décembre 1987</i>)</p> <p>2.2 Rapport de synthèse "Aspects sociologiques, culturels, économiques et énergétiques à Niakhar et Diaoulé" (<i>ENDA - Janvier 1988</i>)</p> <p>2.3 Rapport : "Choix de site pour une installation photovoltaïque centralisée" (<i>Programme Energie ENDA - Janvier 1989</i>)</p> <p>2.4 Rapport final : "Aspects socio-économiques et énergétiques de Ndiébel" (<i>Masse Lô - Juin 1990</i>)</p> <p>2.5 Rapport final : Centrale photovoltaïque de Diaoulé : Suivi des impacts socio-économiques" (<i>Masse Lô - Décembre 1990</i>)</p> <p>2.6 Coûts et rentabilité des centrales photovoltaïques villageoises au Sénégal (<i>Georg Schäfer - Janvier 1991</i>)</p> <p>2.7 Diaoulé and Ndiébel PV pilot plants in Senegal (<i>Zaccaria Koita - Dakar, Juillet 1994</i>)</p>

<p>2.8</p> <p>2.9</p> <p>2.10</p>	<p>Plan de maintenance des centrales villageoises (Zaccaria Koita, Amadou Niang Fall, Heiba Dieng, Mansour A. Dahouenon - Dakar, Avril 1995)</p> <p>Centrales photovoltaïques de Diaoulé et Ndiébel : assistance en matière d'organisation et de gestion des comités villageois (Sécou Sarr, Masse Lô - Dakar, Février 1996)</p> <p>Analyse du programme de mesure (à Diaoulé, Ndiébel et Fatick) (Klaus Haars, Christian WindelMRE - Königstein, Janvier 1995)</p>
	<p>3. Mini-centrales et Systèmes familiaux</p> <p>3.1 Etudes de prospection socio-économique - Programme sénégal-allemand d'électrification décentralisée dans les régions de Fatick et Kaolack (SEMIS - Avril 1988)</p> <p>3.2 Rapport final - Rapport préparé pour le Projet Energie Solaire Photovoltaïque (SINAES - Juin 1988)</p> <p>3.3 Rapport préparé pour le Projet Energie Solaire Photovoltaïque : Volume II : Discussions et éléments techniques (SINAES - Juin 1988)</p> <p>3.4 Rapport de synthèse : "Instruction du programme sénégal-allemand d'électrification décentralisée dans les régions de Fatick et Kaolack" (SINAES/SEMIS - Avril/Juin 1988)</p> <p>3.5 Rapport : "Expériences d'électrification rurale et relations avec les utilisateurs (ENDA - Juin 1988)</p> <p>3.6 Bilan du premier semestre de suivi des systèmes décentralisés réalisé par SEMIS/Projet Sénégal-Allemand Energie Solaire Photovoltaïque (SEMIS - Octobre 1989)</p> <p>3.7 Rapport final : "Diffusion de systèmes photovoltaïques décentralisés dans la communauté rurale de Diaoulé" (ENDA - Décembre 1989)</p> <p>3.8 Rapport final pour la première phase (Avril 1989 - Avril 1990) : Projet Sénégal-Allemand Energie Solaire Photovoltaïque - Suivi du volet électrification décentralisée" (SEMIS - Avril 1990)</p> <p>3.9 Rapport final : "Diffusion de systèmes photovoltaïques décentralisés dans la communauté rurale de Diaoulé" (Masse Lô - Décembre 1990)</p> <p>3.10 Suivi socio-économique du Projet Sénégal-Allemand Energie Solaire Photovoltaïque dans la région de Fatick (Sécou Sarr - Mémoire de fin d'études de second cycle universitaire en sciences économique, option : gestion des entreprises, Université Cheikh Anta Diop Dakar - 1990-1991)</p>

3.11	Etude technico-économique des mini-centrales photovoltaïques (Assani Mansour Dahouenon, Georg Schäfer - Dakar, Octobre 1992)
3.12	Manuel d'installation, d'entretien et de maintenance des systèmes photovoltaïques familiaux (Dakar, Octobre 1992)
3.13	Technische Bewertung von photovoltaischen Familiensystemen im Projet Sénégal-Allemand Energie Solaire Photovoltaïque (Hans-Gerhard Bloos / Ingenieurbüro für Regenerative Energiequellen (IRE) - Königstein, September 1994)
3.14	Appréciation technique des systèmes photovoltaïques familiaux du Projet Sénégal-Allemand Energie Solaire Photovoltaïque (Hans-Gerhard Bloos / IRE - Königstein, Septembre 1994)
3.15	Umweltbilanz von photovoltaischen Familiensystemen (Hans-Gerhard Bloos, Klaus Haars / IRE - Königstein, September 1994)
3.16	Bilan écologique des systèmes photovoltaïques familiaux (Hans-Gerhard Bloos, Klaus Haars / IRE - Königstein, Septembre 1994)
3.17	Guide pratique de l'utilisateur du système photovoltaïque familial (Armand Faye - Dakar, Octobre 1994, 2 ^{ème} édition)
3.18	Assistance aux partenaires du Projet dans la diffusion des systèmes photovoltaïques familiaux : suivi des activités des comités villageois des centrales photovoltaïques (Rapport final : Sécou Sarr, Masse Lô - Dakar, Décembre 1994)
3.19	Analyse du programme de mesure : 4 ^{ème} partie : Mini-centrale de Fatick (Klaus Haars, Christian Windel/IRE - Königstein, Janvier 1995)
3.20	Annuaire 1995 des entreprises privées et des associations & groupements ruraux de commercialisation des systèmes photovoltaïques familiaux (Armand Faye - Dakar, Juin 1995, 1 ^{ère} édition)
3.21	Actualisation des études économiques et financières et de l'étude de marché des systèmes photovoltaïques familiaux au Sénégal (Grishka Schmitz, Amadou Sow - Dakar, Juin 1995)
3.22	Diffusion des systèmes photovoltaïques familiaux : assistance aux associations et groupements partenaires du Projet (Rapport d'étape : Sécou Sarr, Masse Lô - Dakar, Juillet 1995)
3.23	Renforcement des capacités des associations et groupements : compte-rendu de la réunion du 22 décembre 1995 (Sécou Sarr, Masse Lô - Dakar, Janvier 1996)
3.24	Diffusion des systèmes photovoltaïques familiaux : renforcement des capacités des associations et groupements (Sécou Sarr, Masse Lô - Dakar, Février 1996)
3.25	Stratégies de financement des systèmes photovoltaïques familiaux en milieu rural (Pape Amadou Sow - Dakar, Février 1996)

<p>3.26</p> <p>3.27</p>	<p>FOTEP 1 - Systèmes photovoltaïques décentralisés : présentation, caractéristiques, installation et maintenance (Dakar, Avril 1996)</p> <p>Options techniques visant une réduction du prix du système photovoltaïque familial (Klaus Haars/IRE - Juillet 1996)</p>
	<p>4. Systèmes de pompage</p> <p>4.1 Pompage photovoltaïque - Choix de sites : quelques aspects socio-économiques (Masse L6, ENDA - Juin 1988)</p> <p>4.2 Rapport : "Pompage photovoltaïque - Choix de sites pour l'installation de pompes photovoltaïques : village de Bakhya, Diokhar, Gawane Djida, Médinatou Salam" (Masse L6 - Mai 1990)</p> <p>4.3 Systèmes de pompage photovoltaïque : bilan, performances, perspectives (Mars 1991)</p> <p>4.4 Les systèmes de pompage photovoltaïques : quelques considérations économiques sur la base des expériences du Projet Sénégal-Allemand Energie Solaire Photovoltaïque (Georg Schäfer - Mars 1991)</p> <p>4.5 Rapport final : "Pompe photovoltaïque de Ndamé : suivi socio-économique" (Masse L6, ENDA - Octobre 1991)</p> <p>4.6 Analyse et dimensionnement d'un système de pompage photovoltaïque (Markus Kornexl, Alassane Taïrou Ndiaye - Dakar, Avril 1992)</p> <p>4.7 Analysis and sizing of a photovoltaic pumping system (Markus Kornexl, Alassane Taïrou Ndiaye - Dakar, April 1992)</p>
	<p>5. Publications et communications des membres du Projet</p> <p>5.1 "Photovoltaische ländliche Stromversorgung im Senegal: Socio-ökonomische Bedingungen (rural electrification by photovoltaic systems in Senegal : socio-economic conditions)" (Benno Schmidt-Küntzel, S. 971-975 - Tagungsbericht/Proceedings Band/Volum 2-6. Internationales Sonnenforum 1988, 30 August-2. September/6th International Solar Forum, aug. 30th through sept. 2nd 1988)</p> <p>5.2 Photovoltaische ländliche Stromversorgung im Senegal (Benno Schmidt-Küntzel in F. Jäger/Räuber (Hrsg.) Photovoltaik : Strom aus der Sonne - Technologie, Wirtschaftlichkeit und Marktentwicklung, 2., völlig neubearbeitet und erweiterte Auflage, Verlag C. F. Müller Karlsruhe)</p> <p>5.3 Exposé : "Objectifs, activités et acquis du Projet Sénégal-Allemand Energie Solaire Photovoltaïque" (Benno Schmidt-Küntzel & Alassane Wade, Séminaire-Atelier, Novembre 1990)</p>

5.4	Exposé : "Projet pilote avec des associations paysannes au Sénégal" (Markus Komexl, Séminaire-Atelier, Novembre 1990)
5.5	Exposé : "Contexte socio-économique, coûts et rentabilité des systèmes" (Georg Schäfer, Séminaire-Atelier, Novembre 1990)
5.6	Exposé : "Présentation du système standard du Projet Sénégal-Allemand" (Assani Mansour Daouhenon, Séminaire-Atelier, Novembre 1990)
5.7	Exposé : "Le dimensionnement des systèmes photovoltaïques familiaux" (Andréas Wagner/ITW, Séminaire-Atelier, Novembre 1990)
5.8	Exposé : "La production locale des composants du système photovoltaïque familial" (Andréas Wagner/ITW, Séminaire-Atelier, Novembre 1990)
5.9	Exposé : "Diffusion des systèmes photovoltaïques familiaux au Sénégal : enjeux et options" (Souleymane Diallo/ENDA, Séminaire-Atelier, Novembre 1990)
5.10	Conclusions et recommandations du Projet Sénégal-Allemand Energie Solaire Photovoltaïque (Séminaire-Atelier, Novembre 1990)
5.11	Exposé : "Les objectifs et les acquis du Projet Energie Solaire Photovoltaïque (1987-1991)" (Benno Schmidt-Küntzel, Séminaire, Décembre 1991)
5.12	Exposé : "Centrales solaires villageoises : conception et expériences techniques" (Assani Mansour Dahouenon, Séminaire, Décembre 1991)
5.13	Exposé : "Rentabilité et perspectives économiques de l'électrification soiaire en milieu rural au Sénégal" (Georg Schäfer, Séminaire, Décembre 1991)
5.14	Exposé : "Approche socio-économique de la dissémination de technologies énergétiques en milieu rural au Sénégal" (Masse Lô, Séminaire, Décembre 1991)
5.15	Exposé : "Conception et expériences techniques des mini-centrales photovoltaïques" (Assani Mansour Dahouenon, Séminaire, Décembre 1991)
5.16	Exposé : "Conception et performances techniques des systèmes familiaux photovoltaïques" (Assani Mansour Dahouenon, Séminaire, Décembre 1991)
5.17	Exposé : "Stratégie et expériences de diffusion des systèmes familiaux" (Markus Komexl, Séminaire, Décembre 1991)
5.18	Exposé : "Pompes photovoltaïques : expériences et perspectives" (Alassane Taïrou Ndiaye, Séminaire, Décembre 1991)
5.19	Exposé : "Rentabilité et perspectives économiques des pompes photovoltaïques au Sénégal" (Georg Schäfer, Séminaire, Décembre 1991)

別添資料5 収集資料リスト

電力部門構造改革法（英文、全文）

電力規制改革委員会の組織と運営に関する政令（英文、全文）

電力部門構造改革について（フランス語）

セネガルにおける電力供給の課題（フランス語、1998/11、セミナーテキスト）

TOTAL社 SHS 見積もり

TOTAL社 太陽光設置実績

B&T社 SHS 見積り

B&T社 太陽光設置実績

B&T社 会社案内

EQIP PLUS社 SHS 見積り

EQIP PLUS社 太陽光設置実績

EQIP PLUS社 会社案内

SENEGAL-CONSULT 農村社会調査の見積り

Ngoly Savoir-Faire Ingenierie 会社案内

Ngoly Savoir-Faire Ingenierie コンサルタントの経歴

Ngoly Savoir-Faire Ingenierie 農村社会調査のT/R、見積り

ENDA (Environmental Development Action in the Third World)

組織の概要

ENDAが主催者の一員となっている地方自治体全国会議の招待状

GTZ太陽光発電プロジェクトの報告書リスト（1987～1996）

GTZ個別型太陽光発電システム事業の年次報告書（1997）

GTZ太陽光発電パイロットプロジェクトの概要

セネガル・日本職業訓練学校案内

Nouvelle Vague案内（パイロットプロジェクト候補島のホテルバンフレット）

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