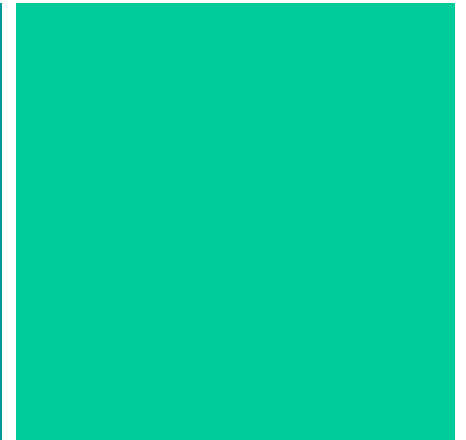
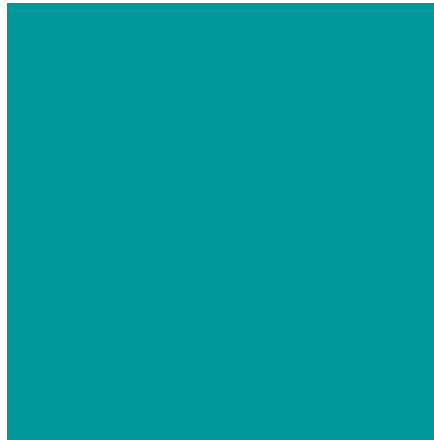


I T E R



PV PROJECTS IN SENEGAL

***Institute of Technology and Renewable Energies
Tenerife Island
Spain***

www.iter.es

The Institute of Technology and Renewable Energies has been dedicated to the development and research of Renewable Energies for 20 years.

✓ Founded by the Cabildo Insular de Tenerife in 1990, since then has been actively involved in European Programs with over **200 Projects**.



✓ In the last years, ITER has extended its action lines towards rural areas in **North Africa** and **South America**.



Main Activities:

- Electricity generation from renewable energies
- R+D projects in the areas concerning Renewable Energies, Environment and Engineering

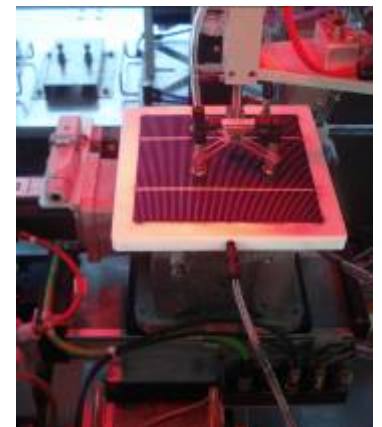


The Institute has a total installed power of **58,91 MW**,
both **Photovoltaic Plants and Wind Parks**



Photovoltaic Module Factory

- Placed in ITER's facilities
- 2.500 m²
- Annual Max. Production: 30 MW
- Capable to adapt the production to specific needs
- TÜV Certification (2009)



Installation of 600 Hybrid (PV-Wind) systems in remote areas in Latin-American countries



Program launched by the DG Europe Aid (European Commission)

OBJECTIVES:

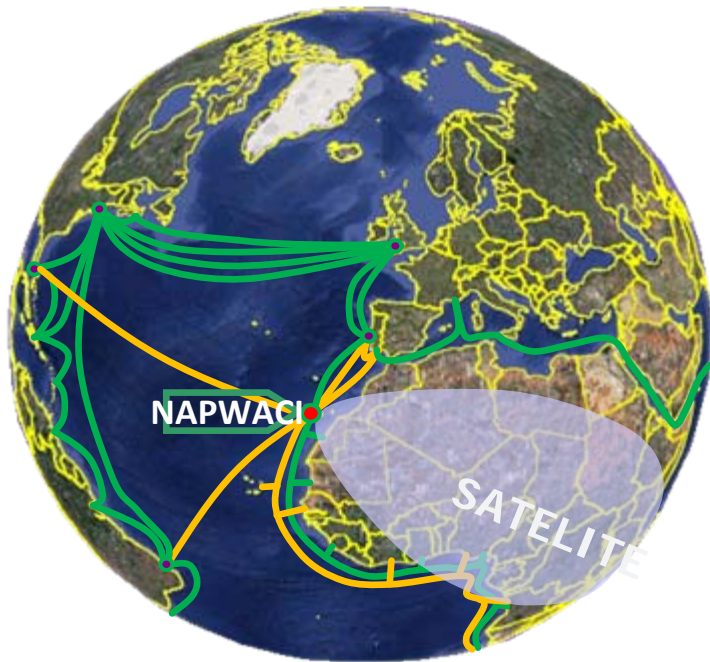
- Provide basic services (lighting, water purification, refrigeration)
- Provide access to Internet and computer equipment
- Increase the quality of life and the development expectative of the population in these remote areas

ITER's tasks:

- Development of system specifications
- Program follow-up once systems are implemented



The main objective of this initiative, launched by ITER and Cabildo de Tenerife, is to create infrastructures for the development of a **high tech industry** based on **ICT's**



Creation of a high availability datacentre (NAP)

1350 m² Technical space for servers

High degree of redundancy (2N+1) of power sources and cooling systems

1500 W/m² energy availability

24x7 O&M scheme

Improvement of the island's connectivity

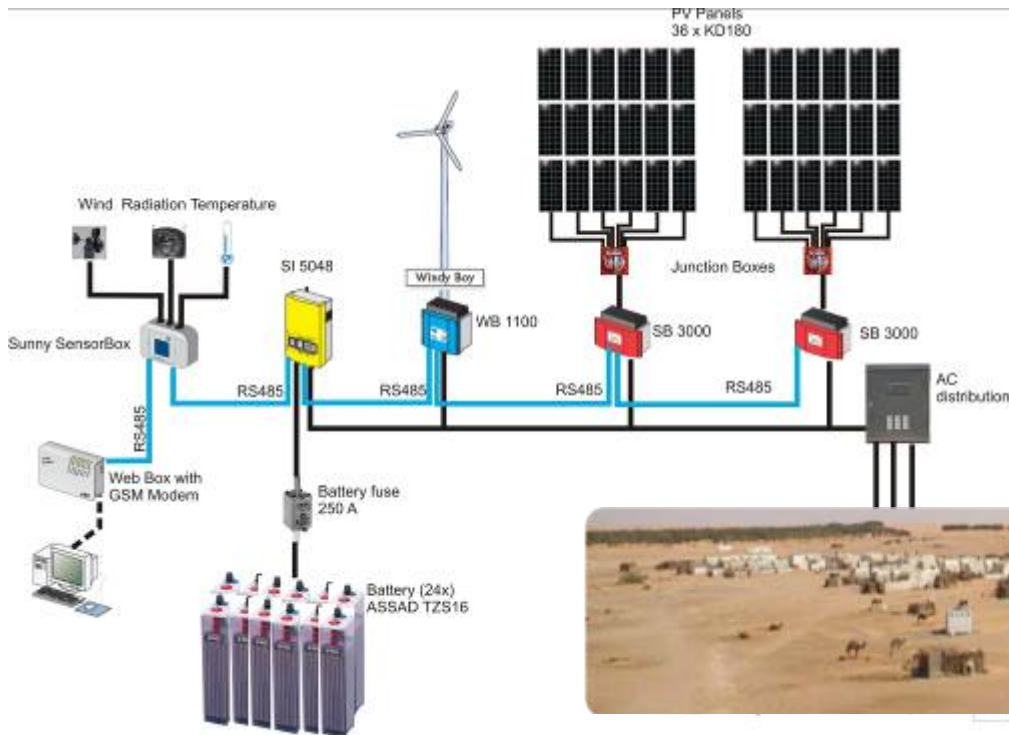
New submarine cables to Europe and West Africa

GEANT2 landing node (Red Iris)

Submarine cables to Gran Canaria and La Palma

HYRESS Project

Within the frame of this project, ITER in collaboration with ANME (Túnez), has designed and installed a **pilot RE plant** in the Ksar Ghilène village, **in Tunisia**. This village has around 50 homes and several common facilities: mosque, school, public lavatory and a health boxes centre.



ITER MAIN PV PROJECTS IN SENEGAL



**- RURAL ELECTRIFICATION
(Ranerou project)**



**- PV FOR ELECTRICITY SUPPLY
(MACSEN-PV project)**

INSTALLATION OF A RENEWABLE ENERGY AND NEW TECHNOLOGIES SYSTEM. SENEGAL



Ranerou project

Where?

The village of Fordou - Raneoru Region - North of Senegal



- With a high level of isolation
- Without access to electricity supply
- Old educational and sanitary infrastructures
- Scarce training and job opportunities (Livestock and subsistence farming)



Ranerou project

Who?

✓ *Gouvernement du Sénégal*



✓ *Cabildo de Tenerife*



✓ *ITER*



✓ *Agence Sénégalaise d'Électrification Rurale (ASER)*



✓ *Agencia Insular de Energía de Tenerife (AIET)*



✓ *Fordou community*



- ✓ Within the frame of the Cabildo de Tenerife cooperation program:
“Tenerife con Senegal”
- ✓ **Objective:** contribute to the development of the village of Fordou, guaranteeing the access to electricity supply through PV solar energy.
- ✓ **“Development Focal Point”:** the school and the health centre will be supplied and new community services will be provided, such as a basic communication system and street lighting.
- ✓ **Added Value:** reducing isolation, educational use, diversification of job opportunities, training of local technicians and replicability.

Added Value: ASER is closely related to the project (design, set off and validation phases). This fact guarantees:



- ✓ adapting the system to the real needs (local approach)
- ✓ the maintenance of the installation
- ✓ its replicability (ASER manages several projects related to rural electrification in Senegal)

Ranerou project

What? - Project Axes

- ✓ Training Program for local technicians (ASER)
- ✓ Construction of a new classroom for the school
- ✓ 1.150 W Photovoltaic Installation
- ✓ Electrical wiring in the village
- ✓ Provision of a communications system
- ✓ Electricity supply for community uses



Ranerou project

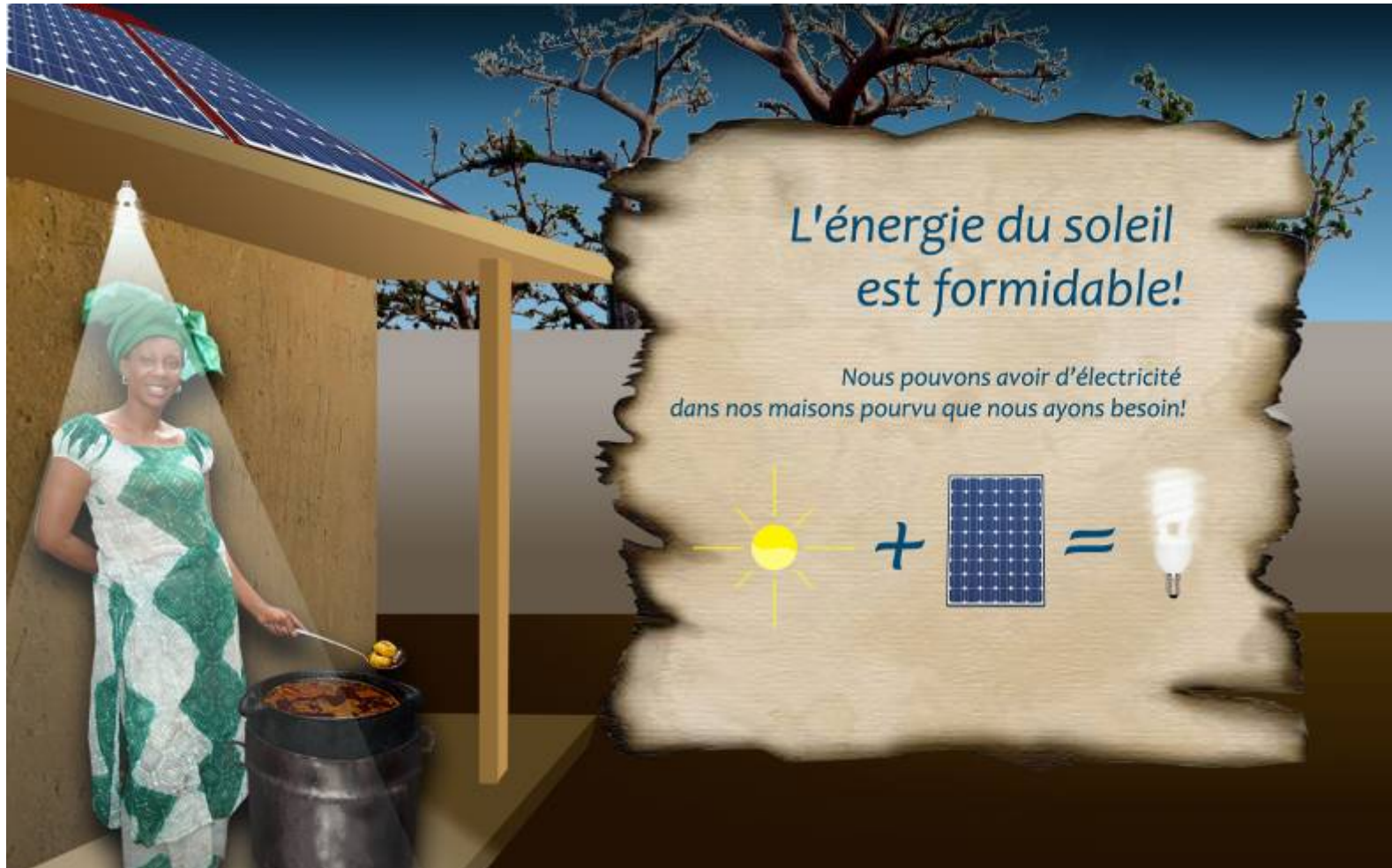
Phases: 1 - Design

- ✓ For the conception and design of the installation, ITER's technicians carried out various technical visits to Fordou in order to:
 - present the project to the community and its leaders and obtain their opinion on their main needs or desires
 - define the most appropriate design for the installation, regarding technical aspects, location of the system, uses, etc.



Ranerou project

Phases: 1 – Design (working with the population)



Ranerou project

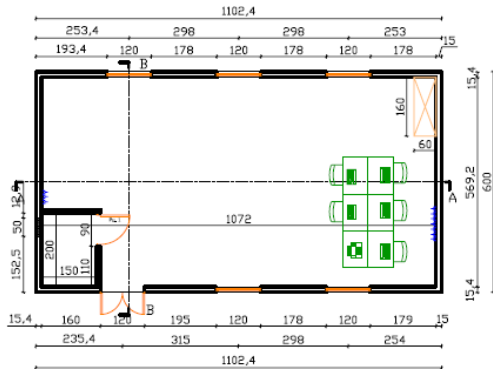
Phases: 2 – Local Technician Training Program

- ✓ ASER technicians participated in a training program at ITER's facilities during the month of October 2009.
- ✓ The training program included an organization session of the subsequent phases of the project and to define the system's definitive design. ASER will supervise the installation and validation works, in collaboration with ITER.

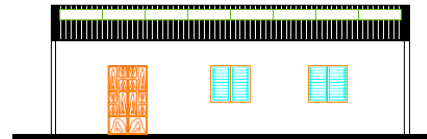


Ranerou project

Ongoing Phase : 3 - Installation



VUE EN PLAN



FACADE PRINCIPALE

✓ The new classroom for the Fordou school has been built

✓ And now, a Senegalese company is installing the PV generating system designed by ITER, under ASER supervision

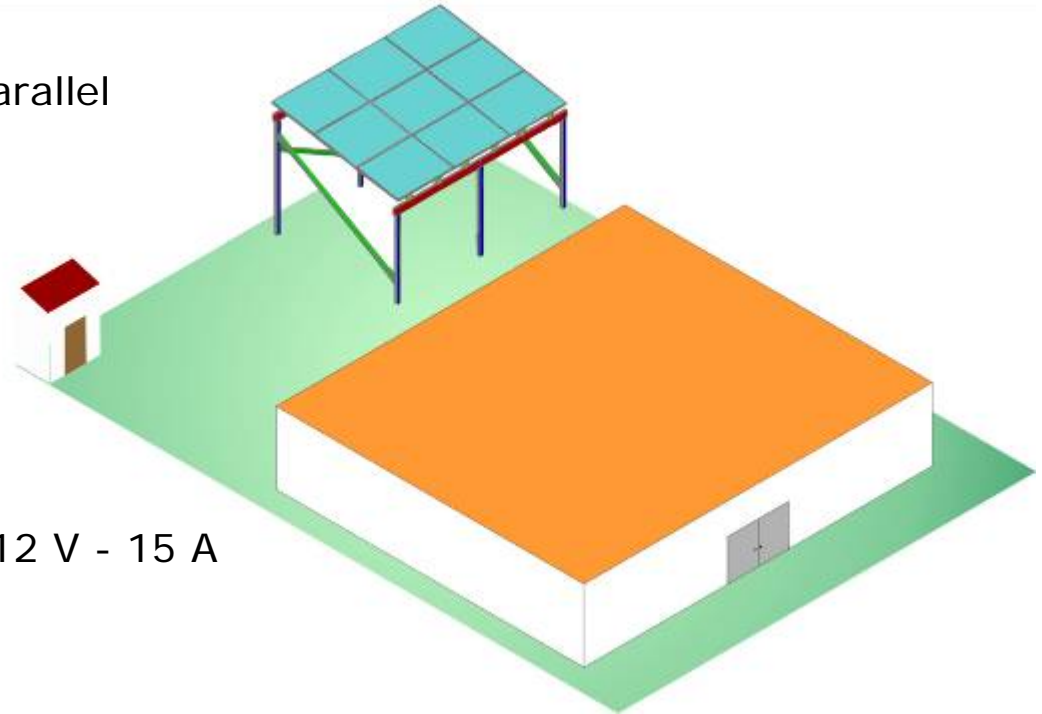


Ranerou project

Ongoing Phase : 3 - Installation

Technical Features

- ✓ 9 PV modules (**130 W**) wired in parallel with a 10° inclination
- ✓ Aluminum structure
- ✓ Voltage: 18 V (36 cells) (specific for isolated systems)
- ✓ Total System Power: 1150 W
- ✓ Batteries: 12 V - 730 Ah, switch: 12 V - 15 A
- ✓ Inverter: 1000 W – transf. DC/AC
- ✓ Satellite communications – System Supervision



ITER has manufactured specifically both panels and structures, in order to fit the system's needs

Promotion of the implementation of renewable energy systems (PV) for electricity supply in Tenerife and Senegal



PROGRAMA
MAC 2007 - 2013
Cooperación Transnacional



MACSEN-PV Project



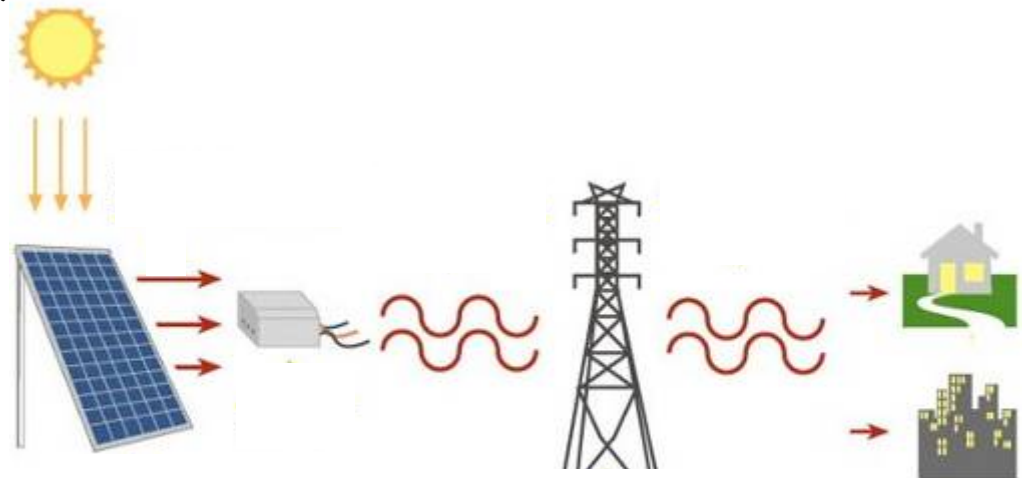
INSTITUTO TECNOLÓGICO
Y DE ENERGÍAS RENOVABLES

Study of alternatives and know-how/technology transfer for the implementation of renewable energies as part of the power supply in Tenerife and Senegal, along with the installation of a pilot PV plant connected to the grid in Dakar

✓ Project approved within the frame of the European Call **PCT MAC 2007 – 2013**
(Cooperation with Third Countries)

When:

from **October 2010**
to **September 2012**
(24 months)



MACSEN-PV Project

Who?



INSTITUTO TECNOLÓGICO
Y DE ENERGÍAS RENOVABLES

Partners:

- ✓ **Instituto Tecnológico y de Energías Renovables (ITER)**. Tenerife
- ✓ **Agencia Insular de Energía de Tenerife (AIET)**. Tenerife
- ✓ **Agence Sénégalaise d'Électrification Rurale (ASER)**. Senegal
- ✓ **Centre d'Etudes et de Recherches sur les Energies Renouvelables (CERER)**. Senegal



MACSEN-PV Project

Why?



INSTITUTO TECNOLÓGICO
Y DE ENERGÍAS RENOVABLES

Main Objective:

✓ Improve the capacity of **public authorities** and **local technicians** to support the implementation of renewable energies as part of the power supply in the Canary Islands and Senegal, reducing its dependence on foreign energy and contributing to its sustainable development.



MACSEN-PV Project

Why?



Expected Results:

- ✓ Changes in the legislation and the energy planning (socio-economic development, reducing the dependence on foreign energy and fossil fuels, strengthening their power grids)
- ✓ Training of local human resources to supply, design, install and maintain these installations
- ✓ Be an example for neighboring regions (replicability)



MACSEN-PV Project

What?



INSTITUTO TECNOLÓGICO
Y DE ENERGÍAS RENOVABLES

✓ Development of **Reports** – environment analysis for Tenerife/Senegal



- Energy market and implementation of renewable energies as part of power supply
- Training Programs and Job Opportunities in the field
- Good Practices, Models and Initiatives
- State of the Art of Renewable Energies implementation as part of power supply in Tenerife and Senegal and recommendations in the short and medium term

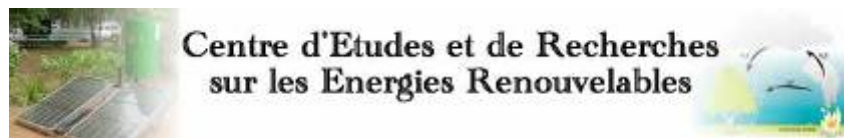
MACSEN-PV Project

What?



INSTITUTO TECNOLÓGICO
Y DE ENERGÍAS RENOVABLES

- ✓ **Training and Advising** actions addressed to Public Managers and High School and University Teachers in Tenerife and Senegal (Handbooks, Workshops, Professional Forums, etc.)
- ✓ Effective **Dissemination** of all the materials elaborated within the frame of the project and others useful tools (Project Web page; Facebook; Data Bases; Conferences and et.)



- ✓ Installation of a **PV system connected to the grid** (3 kWp) in CERER's facilities (Dakar):
 - Local technician training
 - Testing ground of different operational conditions depending on the grid's quality
 - Element for technology transfer and demonstration

MACSEN-PV Project

JOIN US AND PARTICIPATE IN THE PROJECT!



INSTITUTO TECNOLÓGICO
Y DE ENERGÍAS RENOVABLES



Participate in the Workshops; Web Page; distribution lists; or send us your requests or suggestions to:

macesenpv@iter.es

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mpaz@iter.es

✓ AIET. Ms. Mónica ALONSO
malonso@agenergia.org

✓ ASER. Mr. Cheikh WADE
aser@aser.sn

✓ CERER. Mr. Issakha YOUM
issakha.youm@ucad.edu.sn

Regional Forum on the ECOWAS Solar Energy Initiative (ESEI). Dakar. 20th October 2010



***THANK YOU
GRACIAS***



***MERCÍ
JEREJEF***

ITER

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