National Forum
Next steps in Renewable Energy regulation
Case Study on Net- Metering

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Speaker CONREPP

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Which support can RE generate ?

- **Energy consumer**

  Invest in RE Plants to reduce energy cost in long term.

- **RE-plant suppliers**

  Develop marketing of RE-Plants

  Suply competent Engineering

  Install and operate reliable quality

The Gambia –the new Eldorado for RE in West Afrika??

yes and no!!

In 2012 we had the following workshops and conferences about the development of RE In The Gambia

January : Regulatory of Green Energy USAID/ PURA
February : GEF/UNIDO workshop for RE projects
April : Green Africa Workshop Renewable Energy in The Gambia
July –Dec: RE-Readiness Assessment (RRA) ECOWAS 3 workshops
July : Workshop RE Strategy EUEI-PDF
Nov. : Workshop IRENA-ADFD investment in to RE Projects
Dec. : Workshop Renewable Energy Law EUEI-PDF/GIZ AF-Mercados

Results??

Looking at the visuable results(installed RE-Power) concern to all this workshops and conferences the outcome is nearly zero

- **BUT!!**

  All governmental authorities including NAWEC are now fully aware that The Gambias energy future has to be based with a high percentage on the countries potential of RE-Recources

  – Which are:

    - » **Sun Power**
    - » **Wind Power**

What have they done?

1. **A draft of a Renewable Energy law has been developed and presented to the Government.**
2. **NAWEC has allowed to connect Solar Systems to their grid with a net metering system**

RE-Law Basic Points

- **Re-plant investors are protected for 15 years under the law**
- **The Feed-In Tariff (FIT) will be guaranteed for RE-Power Plants op to 1.5 MW**
- **Net Metering is allowed**
- **Any RE has priority in the Grid**
- **NAWEC is obliged to buy any RE**
- **Rules for Grid connections are fixed**
- **Standard PPA`S are fixed**
- **Time frames for Gov.approvals are fixed**

RE-Potentials in The Gambia

- **The Solar Power with net of approx**

  1.5 kWh/Wp and year is the largest potential of the country
- **Wind Power is a second potential but compared to Europe or other countries very low (5.5 m/s at 30 m in ev. of the year)**

Where are our chances?

- **Consumer**

  Invest in to Solar ore Wind Power Systems either Grid Connected without batteries or as Island Systems with batteries.

- **Business**

  Offer competetive and well planned PV-Systems to the consumers on a high quality standard.

  Each Electric Energy Consumer is now a potential customer!!!

Existing RE-Plants Grid Connected

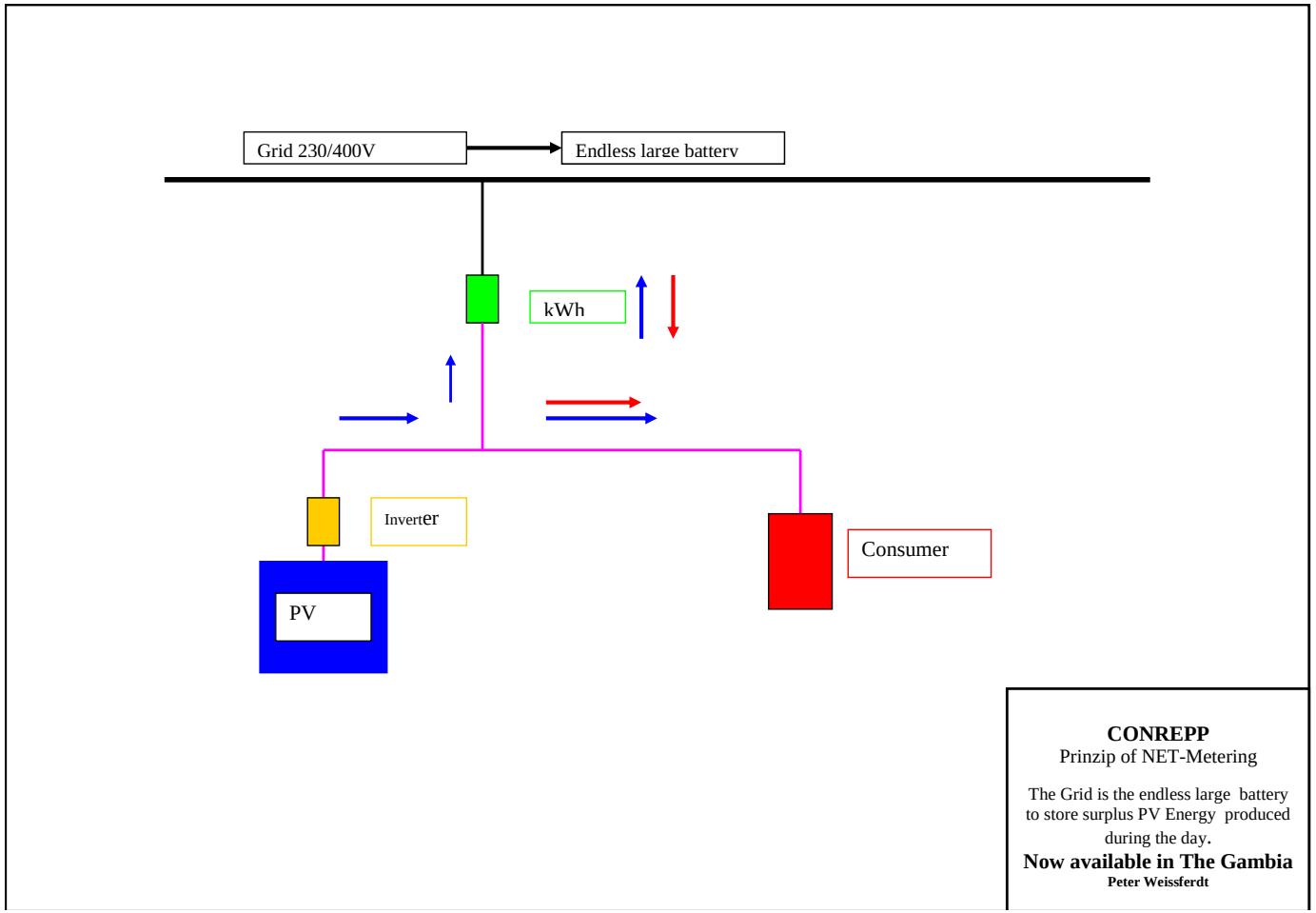
- **Batokunku Windpower 150 kVA Wind Turbine 100.000 kWh/y**
- **GAMWIND Tanjeh 2x450 kVA Wind Turbines 800.000 kWh/y**
- **LEO`S Hotel Brufut 20 kWp Solar Plant 25.000 kWh/y**

Total 1.068 MW 925.000 kWh/y

Future Projects 3x450 kVA 1x 150 kVA Wind Power

NET-Metering System, The Gambia`s key for a fast growth of Solar Power

Net-metering diagram



Advantages of a Net-Metering System

- **Net-Metering Systems are normally used in cases where a grid connected consumer of electric energy is producing less energy with his generating facility then his own consumption in a time period will be. Net-Metering Systems are predominantly used for the connection of Solar (PV) plants.**
- **Advantages :**
- **Technical aspects**
  - **The consumer can reduce his days grid consumption (7-18 hours)**
  - **The utility can reduce its production at the same time or use the saved energy to supply more consumer.**
  - **The voltage level in LV-networks with long distances will be supported (decentral injection) and thermal losses are reduced.**
  - **No batteries required,the grid is an endless large battery. Lower investment.**

Advantages of Net- Metering System

- **Commercial aspects**:
  - **Lower investment compared to systems with battery**
  - **Minimized maintenace costs for 20years or longer**
  - **Return of capital on Gambian retail price base within 5 years.**
  - **After return of capital more then 15 years of saving energy costs.**
  - **If supply and consumption price is different utility makes profit.**

Advantages of a Net-Metering System

- **Administrative aspects:**
  - **A PPA is not required, since the utility does not buy any energy**
  - **If there is no official supply, a production license is not required**
  - **Therefore easy applicable for everybody.**
  - **No additional administrative work for the utility**
  - **Simple contracts between utility and producer**

Measurements

- **Different Measurments are available**

  Single or 3-phase:

  1.) Bidirectional Ferraris kWh-meter,reads forward and backwards ,tariff in both directions is the same(Leo`s Hotel)

  2.) Bidirectional prepaid kWh-meter reads in both direction with different tariffs.(best solution)

  3.) Two Kwh-meter system ,each for one direction and tariff. (Batokunku)

Net- Metering limits

- **General there is no technical and commercial reason to limit installed RE-capacities in the net metering modus as long as the consumption of the consumer is almost higher then what he can produce with his RE-plant**
- **Energy credits supplied to the Utility must be stored unlimited since the Utility has sold this energy at the moment when receiving it.**

  It`s an interest free credit.

One drip water in a glass is not much
but thousands can quench on`s thirst

Multi grid connected PV`s
=
a virtuel low loss powerplant

The DESERTEC Foundation has developed and signed a Memorandum of Understanding with The Gambian Government to develope a Hybrid Solar Power Plant (CSP)

(Concentrated Solar Power)

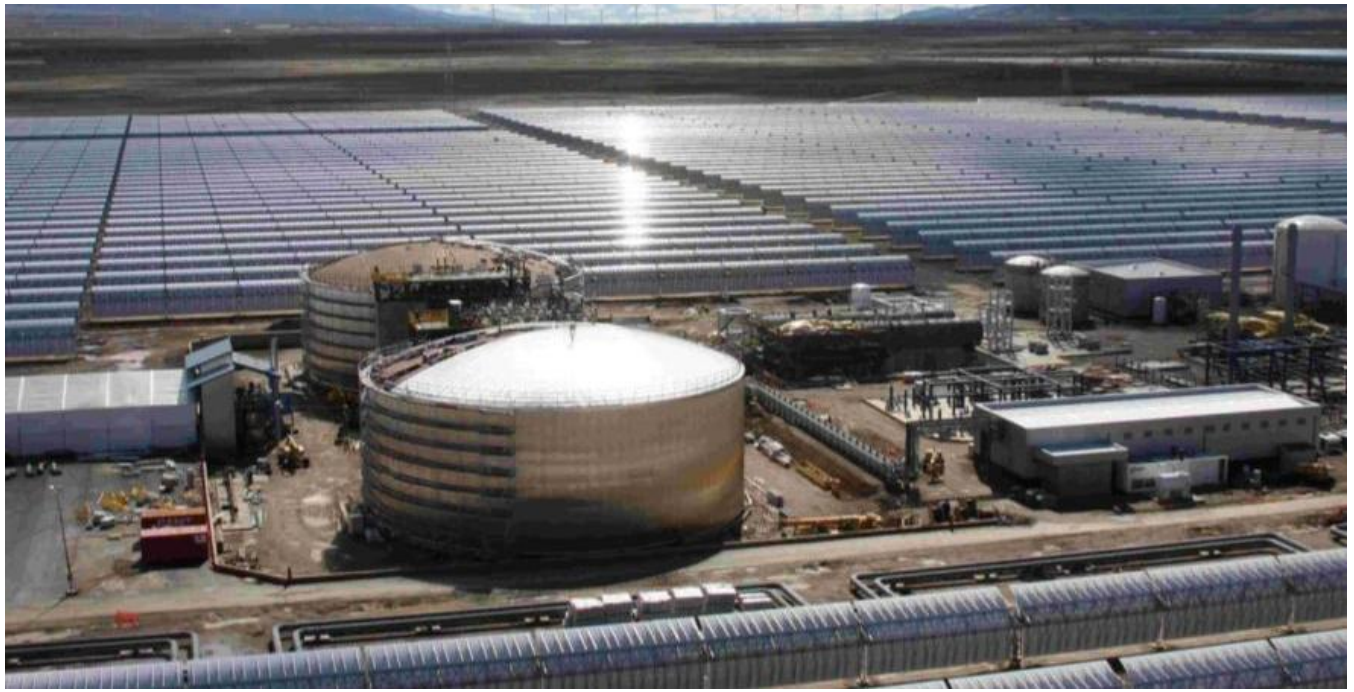
in connection wit PV, looking for a capacity up to 50MW.

This kind of RE- Power Plants can supply Electric Energy by day and night

With such a plant nearly 75% of the countries energy demand can be covered

Solar-Thermal Power Plants
Through heat storage, solar power day and night according to demand

- In contrast to electricity, heat energy can be stored cost effectively in large amounts with low losses
- Therefore solar-thermal power plants are baseloadable and dispatchable
- They can balance out the fluctuations of photovoltaics and windpower



Source: Solar Millennium

Solar-Thermal Power Plants

Operating in the Mojave-desert since the 80´s

- After 25 years, the original mirrors are still working effectively
- They have survived hail- and sandstorms as well as cyclones
- Due to improved methods of operation and maintainance, efficiency rates have been improved since operations started

source: Siemens

Batokunku Windpower

In Batokunku a used150 kVA Wind Turbine was installed in January 2009 and since now it is suplying every year between 90.000 and 100.000 kWh

With this cheep energy the price per kWh for 90% of the people in Batokunku (1000) is only 2 Dalasi/kWh

LEO`S Hotel PV Plant

GAMWIND Windfarm at Tanjeh-Solifor Point

GAMWIND Site at Solifor Point
33 kV Grid Connection

Wind Energy Potential in The Gambia

The Gambia`s coastal potential wind areas have a very low wind speed compared to European coastal areas (less then 40%)

Limiting Facts

- **low Wind Speed approx 5,5m/s at 30m**

  limits commercial interest of Investors.
- **Limited Crane Facility max 25 tons/35m**

  allows the installation of Turbines up to 500 kVA and 35m Tower.
- **Limited Coastal Areas for Wind Turbines due to close cultivation and also environmental aspects.**
- **Limited Price per kWh for Energy sold to NAWEC**

  max 5-6 D/kWh (12,5-15 €C) does not allow return of capital within 10 years.
- **Long Process of Approvals and license**
- **Limited Grid capacity (approx 13 MVA)**

But it can be done!

- **Installation of used retrofitted Wind Turbines**
- **Prices are approx 25% of new ones**
- **Find Sponsors (GEF-UNDP-EUEI-World Bank-USAid-ECREEE…..others)**
- **Find Investors.. Hotels,Communities,Companies (GAMWIND)**
- **Find Promotors (CONREPP-GREC-MoE)**
- **The installation of Used Wind Turbines and the energy price available allows capital to return within 5 years.**

Potential Windareas

RE is a Chance and a Must for the Country

- **Lets make it even if it is not easy**

Thank you

CONREPP

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