Towards Sustainable Energy

RENEWABLE ENERGY IN THE SERVICE OF HUMANITY

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OUTLINE

• Background : West Africa
• Overview Of ECREEE and Priority Activities
• Solar RE Resources and Electricity Potentials
• ECOWAS ACTIVITIES
• Enabling Factors
• Conclusion
THE ECOWAS REGION

- 15 countries with a land area of 5 million m²
- Climate from semi-arid to humid tropical
- Population of over 300 million people
- 60% of population live in rural areas
- 11 of the 15 countries are LDCs
- Almost 176 million people have no access to electricity (52%)
ENERGY SITUATION IN WEST AFRICA

• **Interrelated challenges of energy poverty, energy security and climate change mitigation and adaptation**

• **Low Access to modern energy service**
  ✓ One of the lowest energy consumption rates in the world;
  ✓ The poor spend more of their income on low quality energy services;
  ✓ Rural areas rely mainly on traditional biomass to meet their energy requirements;
  ✓ Household access to electricity services is only around 20% (40% in urban and 6-8% in rural areas);

• **Energy security concerns**
  ✓ High vulnerability to fossil fuel price volatility (60% of electricity generation from oil)
  ✓ Gap between rising urban energy demand, available generation capacities and limited investment capital;
  ✓ High losses in the energy systems (e.g. high energy intensity and low demand and supply side efficiency);

• **Climate changes concerns**
  ✓ Increasing energy related GHG emissions (new investments determine GHGs for the next 20 - 30 years)
  ✓ Climate change impacts vulnerable West African energy systems (e.g. water flows, extreme weather events)
RE & EE play an important role in simultaneously addressing the energy challenges in West Africa

RE potentials so far unexploited

✓ 23,000 MW of feasible large and small hydropower potential (16% exploited);
✓ Huge potential for all forms of bioenergy (e.g. biomass, biogas, biofuel);
✓ Average solar radiation of 5-6 kWh/m² per day throughout the year;
✓ Considerable wind power potential in some countries;
✓ RETs are particularly effective in combination with EE measures;

EE potentials so far unexploited

✓ Wide range of options to improve supply and demand side efficiency (including energy saving)
✓ e.g. Equipment labeling and building standards;
✓ e.g. Cleaner production in industry (e.g. process heat);
✓ e.g. Technical and commercial losses in the electricity system;

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**Financial/Economics:**
- Although significant cost reductions have been achieved, a variety of renewable energy technologies (RETs) still tend to be more expensive than their conventional competitors;
- Lack of large scale projects at regional level to take advantage of RE resource endowments and economies of scale;
- Lack of innovative financing mechanisms.

**Policy and Institutional Issues:**
- Absence of political targets for RE in many countries;
- Non-existent or weak policy measures for level playing field in many countries;
- Weak national agencies with unclear responsibility for RE in many countries.

**Capacity Building & Technology Transfer**
- Inadequate skilled technical manpower in many countries.
- Limited or no local manufacturing due to small national markets.
- Limited R&D with little or no linkages to entrepreneurial/ manufacturing sector.

ECOWAS agency with the mandate to promote RE&EE markets

Secretariat is based in Praia, Cape Verde

National Focal Institutions (NFIs) among all ECOWAS countries

Initial support of Austria, Spain and UNIDO

Official Inauguration of the Centre on 6th July 2010

Governance Structure: Executive Board/Technical Committee

ECREEE Business Plan with long-term vision by 2016

Annual work plans: 2013 edition under execution
ECREEE OBJECTIVE: CREATION OF AN ENABLING ENVIRONMENT FOR REGIONAL RE&EE MARKETS BY MITIGATING EXISTING BARRIERS

TO ENABLE

SOFTWARE
- Short-term training
- Long-term training
- Regional seminars
- Demonstration Programs
- Seminars
- Study Tours

HARDWARE
- Databases
- Resource maps
- Research
- Advocacy

POLICY SUPPORT
- Conferences
- Policy dialogue
- Policy Evaluation

INVESTMENT & BUSINESS PROMOTION
- Project preparation
  - Financing
  - Market Analysis
  - Investment Forums
  - Grants

CAPACITY DEVELOPMENT
- Knowledge Management

KNOWLEDGE MANAGEMENT
- Investment

SOFTWARE TO HARDWARE
Supported by the EC and the EUEI-PDF, ECOWAS has adopted RE & EE Policies

**Regional Policies And Targets:** The ECOWAS Renewable Energy Policy (EREP), aims to increase the share of renewable energy in the region’s overall electricity mix to 10% in 2020 and 19% in 2030.

Solar energy is projected to account for 686 MW and 1,156 MW by 2020 and 2030 respectively.

- Adopted by the ECOWAS Council of Ministers, June 2013, Abidjan
- Adopted by the ECOWAS Authority of Heads of State and Government, July 2013, Abuja
- Development of national RE&EE action plans on-going
# ECOWAS RE Policy Targets by 2020/2030

## Grid-Connected RE Targets

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<th>2020</th>
<th>2030</th>
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<tr>
<td>RE share in total ECOWAS electricity mix (incl. large hydro)</td>
<td>35%</td>
<td>48%</td>
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<tr>
<td>RE share in total ECOWAS generation capacity (excl. large hydro)</td>
<td>10% 2.425 MW</td>
<td>19% 7.606 MW</td>
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## Rural RE Targets

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<th>2020</th>
<th>2030</th>
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<tr>
<td>Rural population supplied by mini-grids and stand-alone system</td>
<td>22%</td>
<td>25%</td>
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<tr>
<td>Mini-Grids to be installed</td>
<td>60,000 3,600 MW</td>
<td>128,000 7,680 MW</td>
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<tr>
<td>Population served with improved stoves</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Population with access to LPG</td>
<td>17%</td>
<td>32%</td>
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GRID-CONNECTED RE SCENARIO OF ECOWAS BY 2020/2030 (excluding large hydro)

Individual countries decide on RE mix!

Installed RE Capacity 2020 2,424 MW

- Wind: 26% (634 MW)
- Solar PV: 13% (318 MW)
- Solar CSP: 28% (686 MW)
- Mini/hydro: 33% (787 MW)
- Biomass: 26% (634 MW)

Installed RE Capacity 2030 - 2,424 MW

- Wind: 27% (2,008 MW)
- Solar PV: 13% (993 MW)
- Solar CSP: 32% (2,449 MW)
- Mini/hydro: 15% (1,156 MW)
- Biomass: 13% (1,000 MW)

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**National policies and targets:** National country policy and targets for renewable energy are being developed.

- **Cape Verde** Target of 50% of RE penetration by 2020 (mainly wind and solar)
- **Ghana** Target of 10% of RE penetration by 2015
- **Senegal** Target of 15% of RE penetration by 2020
- **Liberia** Target 20% of RE penetration by 2015

- **Policy incentives:** Existing Feed-in-tariffs and tax schemes already operating in Ghana, Gambia, Nigeria, Mali and Senegal also developing REFITS. Tax exemptions have also been introduced in most countries for the import of PV Panels or RE equipment in general (Cape Verde, Benin, Burkina Faso, Gambia, Mali, Niger, Senegal, and Togo). Net metering and standard PPA in Cape Verde.
PRIORITY ACTION 2: ECOWAS OBSERVATORY FOR RE&EE

Executed under the GEF Strategic Program for West Africa (SPWA)

- RE&EE market data for investors and developers
- GIS Maps on RE potentials, and other planning data (e.g. lines, roads, existing and planned stations and systems)
- Ongoing Initiatives (e.g. GEF, ACP-EU Facility, ECREEE)
- Country profiles and statistics
- Document library (e.g. studies, policies, project documents) http://www.ecowrex.org

Austrian Development Cooperation

www.ecreee.org
• Vast potentials of solar energy resources are present in all West African countries but more abundant in the northern regions (Niger, Burkina Faso, Niger and the northern part of Cote d’Ivoire, Ghana and Nigeria). Senegal, The Gambia, Guinea Bissau and Guinea are also endowed with a relatively homogenous solar irradiation.

• The entire region receives abundant solar resources all year round with a global horizontal irradiation (GHI) of 5.1 to 7.2 kWh/m²/d.

• Direct Normal Irradiation (DNI) ranging from 1616 to 3142 kWh/m²/d.

• Solar radiation in West Africa is higher than in Europe: around 85% of the territory has higher solar irradiation level than in Southern Spain. Almost all countries are part of the Sun Belt.
ECOWAS OBSERVATORY FOR RE&EE

Executed under the GEF Strategic Program for West Africa (SPWA)

WIND RESOURCE POTENTIAL

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Executed under the GEF Strategic Program for West Africa (SPWA)

SOLAR RESOURCE POTENTIAL

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• Aims to facilitate investment for grid-connected RE projects by addressing the main issues related to RE investment in West Africa;

• ECREEE provides coordination and facilitation services and acts as an honest broker between the ECOWAS Energy Ministries, the WAPP and financiers to develop a renewable energy investment project pipeline;

• Annual Investment Forums with the participation of local and international financiers (e.g. AfDB, KFW, EIB);

• Over 90 participants at the first edition of the RE Investment Forum, September 2012, Dakar, Senegal;

• Current implementing partners: AfDB, CTI-PFAN, UNFCCC, RCC;
PRIORITY ACTION 3: ECOWAS RE BUSINESS AND INVESTMENT INITIATIVE

Pipeline of medium to large scale RE projects

- PV
- CSP
- Wind
- Small Hydro
- Biomass

Countries:
- Benin
- Burkina Faso
- Cape Verde
- Côte d’Ivoire
- Gambia
- Ghana
- Guinea
- Guinea Bissau
- Liberia
- Mali
- Niger
- Nigeria
- Senegal
- Sierra Leone
- Togo
ENABLING FACTORS: FIRST RE & EE PROJECTS IMPLEMENTED

RE Large Scale Projects completed 2010-2013

Cape Verde:
7.5 MW Solar PV Commissioned 2010

Ghana:
2.5MW PV park Commissioned 2013
10MW PV Park Under Development

Burkina Faso:
40 MW PV Park Under Development

Mali:
45MW PV Park under development

Senegal:
30 MW PV Park under development
ENABLING FACTORS: FIRST RE & EE PROJECTS IMPLEMENTED

RE Projects completed in 2010

2.5 MW Solar PV
Sal, Cape Verde, Commissioned October 1, 2010

5 MW Solar PV
Praia, Cape Verde Commissioned November 2, 2010

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ENABLING FACTORS: FIRST RE & EE PROJECTS IMPLEMENTED

25.5 MW of Wind Power Cabeólica – PPP between AFC, Finnfund, InfraCo, Electra and the National Government of Cape Verde

2.5 MW Wind Farm
Boavista, Cape Verde, Under construction

8 MW Wind Farm
Sal, Cape Verde, Under construction

6 MW Wind Farm
Sao Vicente, Cape Verde Commissioned November, 2011

10 MW Wind Farm
Santiago, Cape Verde Commissioned November, 2011

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Opportunities:

- **Off-grid** (Solar home systems, battery & phone charging stations, water pumping, telecoms and social services – education, health, etc). Granted Projects under implementation within EREF (Benin, Cape Verde, Cote d’Ivoire, Togo).

- **Micro grid** systems for isolated communities. EREF second call for proposals to be launched in 2014 will focus on mini-grids.

- **Grid-Connected** systems (Requires additional regulatory and financing framework). Solar grid-connected systems operational in Cape Verde and Ghana
ENABLING FACTORS: FIRST RE & EE PROJECTS IMPLEMENTED

RE Small Scale Projects completed in 2010

- ECREEE rooftop PV plant in Cape Verde: 10KW
- Demonstration and Self-consumption
- First experience of net metering in urban area
- The PV system is grid connected, with a back-up battery bank of sufficient capacity to ensure reliable supply of electricity to the office facilities for a minimum period of ten (10) hours

Other projects
- United nations building Cape Verde: 25KW
Cost of electricity: The high costs of electricity and end-user tariffs in some West-African countries making PV cost-competitive. The average consumer tariff lies at 13.6 c€/kWh. In Cape Verde the consumer tariff is 28 euro/cents per kWh.

Investment promotion: An ECREEE initiative aimed at mitigating financial barriers to investments in medium and large-scale renewable energy projects in the ECOWAS region by providing support to countries for the development of technical and economic feasibility studies of projects that can attract the interest of possible investors and financiers.

ECOWAS solar energy initiative (ESEI): The adoption of the RE and EE policies by the Authority has demonstrated the highest Political Support for these technologies and is expected to translate into an increased investment in these technologies.

Sources: ECOWAS RE policy baseline report 2012
Thank You! Merci! Obrigado!

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SUSTAINABLE ENERGY FOR ALL
IN WEST AFRICA

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