

# COUNTRY MAPPING

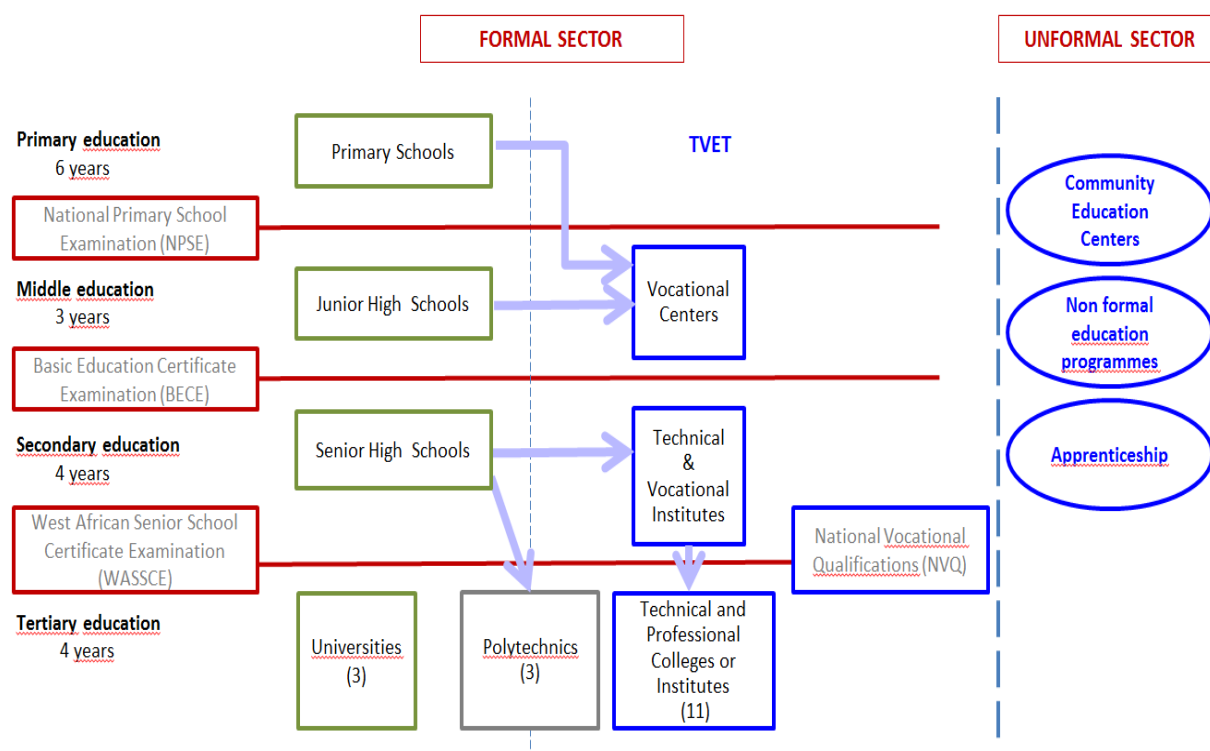
## SIERRA LEONE

### 1 Facts & Figures

|                  |  |                     |                             |
|------------------|--|---------------------|-----------------------------|
| Surface          | 71,740 sq km <sup>1</sup>              | Total literacy rate | 43.3% <sup>1</sup>          |
| Population       | 5,612,685 (2013) <sup>1</sup>          | Educ. Expend.       | 3.6% of GDP <sup>1</sup>    |
| Capital          | Freetown, 0.95 mio (2004) <sup>1</sup> | GDP per capita      | \$1,400 (2012) <sup>1</sup> |
| Pop. growth rate | 2.3% (2013) <sup>1</sup>               | Inflation rate      | 12.9% (2012) <sup>1</sup>   |
| Median age       | 19 years <sup>1</sup>                  | HDI                 | 0.359 (2012) <sup>2</sup>   |
| Urban pop.       | 39.2% (2011) <sup>1</sup>              |                     |                             |

### 2 Education system

#### 2.1 Overview<sup>3</sup>



<sup>1</sup>[www.cia.gov/library/publications/the-world-factbook/](http://www.cia.gov/library/publications/the-world-factbook/)

<sup>2</sup>[hdr.undp.org/en/data/profiles/](http://hdr.undp.org/en/data/profiles/)

<sup>3</sup>[education.stateuniversity.com/pages/1334/Sierra-Leone-EDUCATIONAL-SYSTEM-OVERVIEW.html](http://education.stateuniversity.com/pages/1334/Sierra-Leone-EDUCATIONAL-SYSTEM-OVERVIEW.html)

## Political framework and objectives

- ▶ New Education Policy 1995
- ▶ National Education Master Plan 1997–2006; emphasis of the 6-3-3-4 system education on technical and vocational skills training<sup>4</sup>
- ▶ Education for All National Action Plan 2004
- ▶ Education Act of 2004
- ▶ Sierra Leone Education Sector Plan 2007-2015<sup>5</sup>

## 2.2 Education and TVET system

- ▶ In 2010 one out of four children between 6 and 11 did not go to school <sup>6</sup>
- ▶ Only 32% of the children leaving primary education enter secondary education<sup>7</sup>
- ▶ According to the Minister of Education 40% of teachers are unqualified and do not want to go through the formal system of training<sup>8</sup>
- ▶ Given that 2/3 of the adult population is involved in subsistence agriculture, vocational education concentrates on agricultural skills and related proficiencies such as mechanics, carpentry and bricklaying<sup>9</sup>
- ▶ The London based City and Guilds is the main external accreditation and certification body for the middle and lower level TVET qualifications <sup>10</sup>
- ▶ Links between the various institutions are weak<sup>11</sup>
- ▶ Introduction of distance learning.<sup>4</sup>

### TVET enrolment level and gender

| Type of school                            | Years   | Nr. of schools | Total enrolment | % females | Qualifying exam |
|---|---------|----------------|-----------------|-----------|-----------------|
| Junior Secondary                          | 12-14   | 354            | 175,867         | 41.1%     | BECE            |
| Junior Technical Secondary                | 12-14   | 70             | 2,050           | 30%       | BECE            |
| Senior Secondary                          | 15-17/8 | 112            | 51,794          | 36.2%     | WASSCE          |
| Senior Secondary Technical and Vocational | 15-17/8 | 42             | 9,868           | 66.6%     | NVQE            |

<sup>4</sup> [www.col.org/SiteCollectionDocuments/05SierraLeone\\_EnviroScan.pdf](http://www.col.org/SiteCollectionDocuments/05SierraLeone_EnviroScan.pdf)

<sup>5</sup> [planipolis.iiep.unesco.org/upload/Sierra%20Leone/Sierra\\_Leone\\_ESP.pdf](http://planipolis.iiep.unesco.org/upload/Sierra%20Leone/Sierra_Leone_ESP.pdf)

<sup>6</sup> UNESCO June 2013 - [unesdoc.unesco.org/images/0022/002217/221758f.pdf](http://unesdoc.unesco.org/images/0022/002217/221758f.pdf)

<sup>7</sup> [parrainezuninstituteur.over-blog.com/pages/Le\\_systeme\\_scolaire\\_en\\_Sierra\\_Leone-3668906.html](http://parrainezuninstituteur.over-blog.com/pages/Le_systeme_scolaire_en_Sierra_Leone-3668906.html)

<sup>8</sup> AYV Jan. 2013 - [africayoungvoices.com/2013/01/the-people-of-sierra-leone-are-stifling-the-system-of-education-dr-minkailu-bah/](http://africayoungvoices.com/2013/01/the-people-of-sierra-leone-are-stifling-the-system-of-education-dr-minkailu-bah/)

<sup>9</sup> [www.classbase.com/Countries/Sierra-Leone/Education-System](http://www.classbase.com/Countries/Sierra-Leone/Education-System)

<sup>10</sup> [www.theigc.org/sites/default/files/christian\\_kingombe\\_paper.pdf](http://www.theigc.org/sites/default/files/christian_kingombe_paper.pdf)

<sup>11</sup> [World Bank 2013 - Republic of sierra Leone Higher and Tertiary Education sector Policy Note 2013](http://World Bank 2013 - Republic of sierra Leone Higher and Tertiary Education sector Policy Note 2013)

Enrolment rates grew for junior secondary schools from 14 % to 32 % between 2004 and 2010 and from 43 % to 62 % for senior secondary schools. During the same period enrolment rates for TVET passed from 16% in 2004 to 8% in 2011.<sup>12</sup>

## 2.3 TVET institutions

- ▶ Several Community Education Centers (CEC), Vocational Centres (VC), Technical and Vocational Institutes (TVI)
- ▶ Many private institutions, mostly regulated by the National Council for Technical, Vocational and Other Academic Awards (NCTVA)<sup>13</sup>
- ▶ Three polytechnics offering academic courses as well as technical and vocational courses and programmes <sup>14</sup>
- ▶ Opportunities Industrialization Centers (OIC) International is managing and financing 4 vocational centers in Sierra Leone.<sup>15</sup>

## 2.4 TVET challenges

Even though the government in its Education Sector Capacity Development Strategy (2010/11) clearly identifies the need for a demand-led TVET-system that meets international standards, its budgetary priorities lie within primary education. The country spends less than 5% of its educational budget on TVET. Subsequently, there is a lack of qualified teachers and the infrastructure and equipment of TVET facilities is often poor.

Further challenges:

- ▶ TVET delivery has poor linkages with labour market and is subject to poor quality infrastructure, equipment, material and staffing<sup>14</sup>
- ▶ Lack of alignment between labour market needs and curricula<sup>12</sup>
- ▶ Lack of strategic coherence between existing Government initiatives and development partners' projects<sup>12</sup>
- ▶ A national harmonized policy for TVET<sup>14</sup>
- ▶ A national accreditation system for all TVET centres and institutions.<sup>14</sup>

# 3 Renewable energy market

## 3.1 Overview

- ▶ A national accreditation system for all TVET centres and institutions.<sup>14</sup>
- ▶ Electrification rate: < 10%<sup>16</sup>

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<sup>12</sup> UNESCO June 2013 - [unesdoc.unesco.org/images/0022/002217/221758f.pdf](https://unesdoc.unesco.org/images/0022/002217/221758f.pdf)

<sup>13</sup> [www.col.org/SiteCollectionDocuments/05SierraLeone\\_EnviroScan.pdf](http://www.col.org/SiteCollectionDocuments/05SierraLeone_EnviroScan.pdf)

<sup>14</sup> [www.theigc.org/sites/default/files/christian\\_kingombe\\_paper.pdf](http://www.theigc.org/sites/default/files/christian_kingombe_paper.pdf)

<sup>15</sup> [www.oici.org/about-us/](http://www.oici.org/about-us/)

- ▶ Total installed electricity capacity (2011): 477 MW<sup>17</sup>
  - Hydro 89.9%
  - Thermal 10.1%
- ▶ RE installed capacity: 0.1 GW (2010)<sup>18</sup>
- ▶ RE goal for 2020: 2% of power generation (140 GWh/a)<sup>19</sup>
- ▶ Hydro capacity: 429 MW (2011) <sup>20</sup>
- ▶ Solar capacity: 0.025 MW (2010) <sup>21</sup>

### Political framework and objectives

- ▶ NPA Act (1982), defines the responsibilities of the NPA, and the development of hydroelectric projects
- ▶ National Energy Policy and Strategic Plan (2009):<sup>19</sup>
  - Focus on hydro-potential
  - Solar PV: Small decentralized solar PV installations in towns and rural areas in existence to feature for remote locations in rural electrification programme
  - Ethanol project expected to provide some 50 MW electricity
  - Setting up Mechanisms to exploit Climate Initiatives to assess and package renewable energy projects
  - Seeks national and international cooperation to support the development and management of RE
  - Support RETs training in tertiary and other learning institutions
  - Establishment of codes of practice, guidelines and standards for RE
- ▶ National Energy Implementation Strategy (2012)
- ▶ To reach the SEFA goals and improve the country's energy sector by 2030, it is estimated that Sierra Leone will require investment and/or financial support of approximately \$7.8 billion over 18 years.
- ▶ As part of the implementation of the ECOWAS white paper on energy access, the need to integrate energy access into national and regional poverty reduction strategies has been recognised. As stated above, the Poverty Reduction Strategy Paper (PRSP 2008-2012) for Sierra Leone recognized the need to provide electricity as one of the key priorities.

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<sup>16</sup> [www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/IIAP%20Short%20%28En%29%20Int%C3%A9rieur.pdf](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/IIAP%20Short%20%28En%29%20Int%C3%A9rieur.pdf)

<sup>17</sup> Afribiz Dec. 2013 - [www.afribiz.info/content/renewable-energy-potential-in-seychelles-2](http://www.afribiz.info/content/renewable-energy-potential-in-seychelles-2)

<sup>18</sup> [www.map.ren21.net/PDF/ProfilePDF.aspx?idcountry=160](http://www.map.ren21.net/PDF/ProfilePDF.aspx?idcountry=160)

<sup>19</sup> [www.mewr.gov.sl/pdf/energy%20policy%20&%20strategic%20plan.pdf](http://www.mewr.gov.sl/pdf/energy%20policy%20&%20strategic%20plan.pdf)

<sup>20</sup> [www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/IIAP%20Short%20%28En%29%20Int%C3%A9rieur.pdf](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/IIAP%20Short%20%28En%29%20Int%C3%A9rieur.pdf)

<sup>21</sup> Afribiz Dec. 2013 - [www.afribiz.info/content/renewable-energy-potential-in-seychelles-2](http://www.afribiz.info/content/renewable-energy-potential-in-seychelles-2)

### 3.2 Potential and main barriers

| Renewables            | Solar | Wind | Biomass                 | Hydro                  |
|-----------------------|-------|------|-------------------------|------------------------|
| Exploitable potential | -     | -    | 2,706 GWh <sup>21</sup> | 1,513 MW <sup>21</sup> |

#### Main barriers

- ▶ Lack of a determined energy sector policy as well as a legal and regulatory framework is a barrier to private sector entry in the electricity supply chain.<sup>22</sup>
- ▶ Lack of an energy sector policy as well as a legal and regulatory framework is a barrier to private sector entry in the electricity supply chain<sup>23</sup>
- ▶ Lack of qualified technicians, capable of installing, maintaining and repairing solar PV systems<sup>24</sup>
- ▶ There is neither the appropriate technology nor the indigenous capacity to design, manufacture, market, distribute, install and maintain renewable energy technologies (RETs).<sup>25</sup>

### 3.3 Private sector

- ▶ The role of the private sector in the Sierra Leone economy is weak: Industry, mining, energy, and manufacturing account for 8% of the GDP only in 2010 and 2011<sup>26</sup>
- ▶ Small-scale business enterprises have cashed-in on electricity provided by solar panels to provide services to private individuals in areas of the country with irregular or non-existent power supply<sup>27</sup>
- ▶ Private companies are also involved in production and supply of renewable energy solutions to the public<sup>27</sup>
- ▶ There is a dearth of both dealers of solar products and availability of qualified solar technicians to install and manage the technology<sup>27</sup>
- ▶ Sierra Leone requires huge investment support in the energy sector to meet the SEFA goals by 2030. Successful execution relative to the goals would mean increasing access to electricity to about 100%, increasing energy efficiency to a level of 12-15% and increasing renewable energy level to about 7,000 ktoe. Importantly, these stated objectives of the Government of Sierra Leone (GoSL) align completely with the goals of the Sustainable Energy for All (SEFA) Initiative.

<sup>22</sup> [www.reegle.info/policy-and-regulatory-overviews/SL](http://www.reegle.info/policy-and-regulatory-overviews/SL)

<sup>23</sup> Regional energies in East Africa, country chapter Sierra Leone, GIZ 2009

<sup>24</sup> [www.undp.org/content/dam/sierraleone/docs/focusareadocs/undp\\_sle\\_energyprofile.pdf](http://www.undp.org/content/dam/sierraleone/docs/focusareadocs/undp_sle_energyprofile.pdf)

<sup>25</sup> [www.mewr.gov.sl/pdf/energy%20policy%20&%20strategic%20plan.pdf](http://www.mewr.gov.sl/pdf/energy%20policy%20&%20strategic%20plan.pdf)

<sup>26</sup> Ministry of Finance and Economic Development, Bank of Sierra Leone and Statistics Sierra Leone. May, 2012

<sup>27</sup> African Renewable Energy Dialogue Oct. 2013 - [www.area-net.org/fileadmin/user\\_upload/AREA/AREA\\_downloads/AREA\\_Conference\\_13/Bai-Kurr\\_Renewable-Energy\\_Sierra-Leone.pdf](http://www.area-net.org/fileadmin/user_upload/AREA/AREA_downloads/AREA_Conference_13/Bai-Kurr_Renewable-Energy_Sierra-Leone.pdf)

### 3.4 Main donors' activities

- ▶ The Environmental Foundation for Africa (EFA), in conjunction with the Ministry of Energy, Government Technical Institute, Environmental Resources Management Foundation and Njala University with funding from Climate and Development Knowledge Network (CDKN), is in the process of assembling all relevant information about the actual and potential use of renewable energy for the development of Sierra Leone <sup>28</sup>
- ▶ World Bank - Sierra Leone Energy Access Project
- ▶ UNIDO supports the hydropower development together with the Chinese government. <sup>29</sup>
- ▶ The European Investment Bank (EIB) has disclosed plans to collaborate with other donor partners namely: the World Bank, African Development Bank (AfDB) and Kreditanstalt für Wiederaufbau (KfW) in the area of Sierra Leone's energy sector, through the West Africa Power Pool (WAPP)

## 4 (RE) Labour market

### 4.1 Actual situation

- ▶ In 2011 Approximately 70% of youth are underemployed or unemployed <sup>30</sup>
- ▶ Industry stands for 14.9% of GDP (2012 est.)<sup>31</sup>
- ▶ Global competitiveness index Rank 144/148 <sup>32</sup>
  - Higher education and training 2.4 (valued 1to 7 (best))
  - On-the-job training 3.29
  - Local supplier quality 4.0
- ▶ "Ease of doing business" Rank 142/189 <sup>33</sup>

### 4.2 Planned RE or on-going projects

- ▶ Mujimoto Sierra Leone, in partnership with state-owned China National Electric Engineering Company (CNEEC) and renewables company New Generation Energy, plans to develop solar-thermal facilities with a capacity of up to 500 megawatts<sup>34</sup>
- ▶ Germany's privately owned BC Bangert is eyeing solar plants with an output of 100 megawatts<sup>34</sup>

<sup>28</sup> Awareness Times May 2013 - [news.sl/drwebsite/publish/article\\_200522872.shtml](http://news.sl/drwebsite/publish/article_200522872.shtml)

<sup>29</sup> SEM, April 2012 - [www.sierraexpressmedia.com/archives/38039](http://www.sierraexpressmedia.com/archives/38039)

<sup>30</sup> [www.undp.org/content/sierraleone/en/home/countryinfo/](http://www.undp.org/content/sierraleone/en/home/countryinfo/)

<sup>31</sup> [www.cia.gov](http://www.cia.gov)

<sup>32</sup> World Economic Forum - [reports.weforum.org/the-global-competitiveness-report-2013-2014/](http://reports.weforum.org/the-global-competitiveness-report-2013-2014/)

<sup>33</sup> [www.doingbusiness.org/data/exploreconomies/sierraleone](http://www.doingbusiness.org/data/exploreconomies/sierraleone)

<sup>34</sup> Mail Guardian July 2013 - [mg.co.za/article/2013-07-20-sierra-leone-needs-35bn-investment-to-restore-power-sector](http://mg.co.za/article/2013-07-20-sierra-leone-needs-35bn-investment-to-restore-power-sector)

- ▶ Makeni project of Addax Bioenergy is the first sugarcane-based power generation project for ethanol production to be registered under the CDM in Africa (capacity of up to 15 MW). Financing and equity partners are: AfDB, the Emerging Africa Infrastructure Fund (EAIF), the Netherlands Development Finance Company (FMO), the German DEG, the South African Industrial Development Corporation (IDC), the Belgian Development Bank (BIO), ICF Debt Pool, the Swedish Development Fund (Swedfund) and FMO. Exploitation will start in 2014.<sup>35</sup>
- ▶ UNIDO is funding 13 turn-key solar photovoltaic power plants – twelve 5-kilowatt peak plants and one 16 kWp plant. Sunlabob Renewable Energy, a Laos-based social enterprise, has been awarded two contracts for the design, supply, installation and local training of these projects for which completion they will work with local partners.<sup>36</sup>

## 5 Relevant vocational training activities

### 5.1 Main donors' activities

- ▶ Environmental Foundation for Africa (EFA) built the Biodiversity Conservation & Renewable Energy Learning Center, funded by the Critical Ecosystem Partnership Fund (CEPF), with supplementary financial and in-kind contributions from other partners, including the Environmental Protection Agency of Sierra Leone, WAPFR project, Ministry of Agriculture, Forestry and Food Security-Forestry Division, Architects Without Borders (Denmark – building design)<sup>37</sup>

### 5.2 Further vocational training activities

- ▶ The Ministry of Education, Science and Technology (MEST) encourages the development of RETs curriculum in schools and other institutions of learning<sup>38</sup>
- ▶ Government has established a training institute called the Barefoot Women Solar Training Center in Konta Line village, Port Loko district, with support from the Government of India to train both literate and illiterate solar technicians<sup>39</sup>
- ▶ The local NGO Safer Future Youth Development Project tackles the country's 60% youth unemployment, training people in vocational skills, including solar.<sup>40</sup> A Competence Centre for Renewable Energies (CCRE) has been established.

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<sup>35</sup> Thomson Reuters Foundation Oct. 2013 - [www.trust.org/item/20131004162131-1pnux/](http://www.trust.org/item/20131004162131-1pnux/)

<sup>36</sup> EcoSeed Feb. 2013 - [www.ecoseed.org/renewables/solar/16118-sierra-leone-to-be-lit-up-by-13-off-grid-solar-projects](http://www.ecoseed.org/renewables/solar/16118-sierra-leone-to-be-lit-up-by-13-off-grid-solar-projects)

<sup>37</sup> [www.iucn.org/news\\_homepage/news\\_by\\_date/?9204/Biodiversity-Conservation-and-Renewable-Energy-Learning-Centre](http://www.iucn.org/news_homepage/news_by_date/?9204/Biodiversity-Conservation-and-Renewable-Energy-Learning-Centre)

<sup>38</sup> [www.mewr.gov.sl/downloads/FINAL\\_ENERGY\\_POLICY\\_13\\_AUGUST\[1\]-final.pdf](http://www.mewr.gov.sl/downloads/FINAL_ENERGY_POLICY_13_AUGUST[1]-final.pdf)

<sup>39</sup> African Renewable Energy Dialogue Oct. 2013 - [www.area-net.org/fileadmin/user\\_upload/AREA/AREA\\_downloads/AREA\\_Conference\\_13/Bai-Kurr\\_Renewable-Energy\\_Sierra-Leone.pdf](http://www.area-net.org/fileadmin/user_upload/AREA/AREA_downloads/AREA_Conference_13/Bai-Kurr_Renewable-Energy_Sierra-Leone.pdf)

<sup>40</sup> [www.saferfuture.org/joomla/content/blogcategory/75/87/lang,en/](http://www.saferfuture.org/joomla/content/blogcategory/75/87/lang,en/)

- ▶ Establishment of the Biodiversity Conservation & Renewable Energy Learning Center at the outskirts of Freetown (see 5.1)
- ▶ Possibly World Bank Youth Employment Support.

### **5.3 Links of TVET to RE private sector**

None is known.

## **6 Suggestions for future activities by the EUEI PDF**

As hydropower currently seems to be taken care of and biomass and gas don't seem mature, the solar sector should be selected. Given the low electrification rate, off grid solutions will need to strive and should be focussed on.

It is suggested to develop a comprehensive solar PV training programme which should aim at:

- ▶ Facilitating the development of PV solutions (mainly off grid electrification solutions) by providing skilled labour to contractors
- ▶ Introducing solar PV into the TVET system
- ▶ Supporting the development of local PV entrepreneurship.

This includes the following components:

- ▶ Immediate action programme offering short term courses for practitioners, TVET graduates and teachers including practical exposure with contractors if possible
- ▶ Introduction of PV in the TVET system, taking up the experience of the German Education and Employment Promotion Programme support project
  - Development of modules / curricula – assessing existing curricula for electrical / electronic trades
  - Training of trainers of the TVET system
- ▶ Developing courses for solar entrepreneurs including issues such as:
  - Basics of PV
  - Sizing of systems
  - Maintenance and spare parts
  - Sales and distribution
  - Entrepreneurship incl. accounting
  - (micro)finance

Possible points of energy and partners for this approach are:

- ▶ Sunlabob, a German owned contractor building twelve 5-kilowatt peak plants and one 16 kWp plant in Sierra Leone in 2013 – who has already built solar power facilities in rural areas of Liberia, Mozambique, Ethiopia, Eritrea and Guinea Bissau, and is currently working to light up over 60 schools throughout Uganda in partnership with the World Bank



- ▶ Environmental Foundation for Africa (EFA) already active in training activities
- ▶ NGO Safer Future Youth Development Project with the Competence Centre for Renewable Energies (CCRE)
- ▶ St. Joseph Training School given their experience in catering for TVET needs of the mining sector.

The possible roles and contribution of the a.m. institutions need to be determined in the project development phase. The most adequate institution should be equipped with the necessary training material. This should include panels to be installed.

The challenge for this approach is seen in the development of the solar sector given the low electrification rate on one hand and the absence of government policies or programmes to promote PV on the other hand.

## 7 Main stakeholders

- ▶ Ministry of Education, Science and Technology (MEST)
- ▶ Ministry of Energy and Water Resources - [www.mewr.gov.sl](http://www.mewr.gov.sl)
- ▶ Njala University (offering bachelor degree in energy studies <sup>41</sup> - [njalauniversity.edu.sl](http://njalauniversity.edu.sl)
- ▶ St Joseph's Vocational Institute (associated to GIZ project "From mines to minds") – [www.giz.de/fachexpertise/downloads/giz2013-en-ppsp-sierra-leone-london-mining.pdf](http://www.giz.de/fachexpertise/downloads/giz2013-en-ppsp-sierra-leone-london-mining.pdf)
- ▶ Sierra Leone Opportunities Industrialization Centers (SLOIC) - [www.oici.org/where-we-work/sierra-leone](http://www.oici.org/where-we-work/sierra-leone)
- ▶ Sierra Leone Business Forum (SLBF) - [www.slbfsi.org](http://www.slbfsi.org)
- ▶ The Sierra Leone Chamber of commerce - [www.chamberofcommerce.sl](http://www.chamberofcommerce.sl)
- ▶ Environmental Foundation for Africa (EFA) - <http://efasl.org.uk/wp-content/uploads/Combined-EFA-SBP-V206.pdf>
- ▶ Competence Centre for renewable energy (CCRE) - <http://www.saferfuture.org/joomla/content/view/64/86/lang,en>
- ▶ Sunlabob - [www.sunlabob.com](http://www.sunlabob.com)

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<sup>41</sup> World Bank July 2013 - [www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/09/26/000333037\\_20130926124018/Rendered/PDF/ACS43930PNT0P10x0379833B00PUBLIC00.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/09/26/000333037_20130926124018/Rendered/PDF/ACS43930PNT0P10x0379833B00PUBLIC00.pdf)