COUNTRY MAPPING
GHANA

1 Facts & Figures

<table>
<thead>
<tr>
<th>Fact</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>238,533 sq km¹</td>
</tr>
<tr>
<td>Population</td>
<td>25,199,609 (2013 est.)¹</td>
</tr>
<tr>
<td>Capital</td>
<td>Accra, 2.27 mio¹</td>
</tr>
<tr>
<td>Pop. growth rate</td>
<td>2.19% (2013 est.)¹</td>
</tr>
<tr>
<td>Median age</td>
<td>20.7 years¹</td>
</tr>
<tr>
<td>Urban population</td>
<td>51.9% (2011)¹</td>
</tr>
<tr>
<td>Total literacy rate</td>
<td>71.5%¹</td>
</tr>
<tr>
<td>Educ. Expenditure</td>
<td>8.2% of GDP (2011)¹</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>US$ 3,400 (2012 est.)¹</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>9.2% (2012 est.)¹</td>
</tr>
<tr>
<td>HDI</td>
<td>0.558³</td>
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</tbody>
</table>

2 Education system and TVET

2.1 Overview

Ghana’s educational System is highly centralized. The Ministry of Education and its agencies are responsible for the entire educational system in the country.³

¹ [www.cia.org](http://www.cia.org)
² [hdr.undp.org](http://hdr.undp.org)
³ [www.teachinghana.org/education-system](http://www.teachinghana.org/education-system)
Political framework and objectives

- National TVET Qualifications Framework Policy

  The objectives of the Policy are to integrate all of its TVET qualifications in terms of content and complexity so as to facilitate comparison of qualifications, to confer national recognition of all qualifications that are registered on the framework, and to facilitate the subjection of all qualifications through a process of quality assurance before they are registered.

- Ghanaian Government’s intention is to increase informal sector workers’ skills, particularly in the context of the traditional apprenticeship system.

- The Ministry of Education aims to secure 50% female enrolment in TVET by 2015.

2.2 Education and TVET system

- In the formal sector there is a parallel system for vocational technical institutions alongside the senior high school system.

- Employment rates of TVET graduates in Ghana are low, which leads to suggest that TVET has been too supply-driven and focuses on training which has a low market demand.

- According to OECD, 60% of junior secondary school leavers (not continuing school) enter apprenticeships. Apprenticeships are training programmes in a designated trade under which an apprentice receives formal instruction and on the job training.

- 19% of the working age population has previously undertaken an apprenticeship and 7% are currently apprentices; this compares to 8% who have undertaken any other vocational or technical training.

- Presently, non-formal apprenticeship training accounts for 80-90% of all skills training in Ghana, compared with 5-10% from public training institutes, and 10-15% from NGOs.

- Teacher shortages in TVET, combined with a lack of learning resources necessary to deliver a practical curriculum, have led to reductions in the quality of provision and reduced students’ interest.

- Most teachers have no specialized training at all in technical education. Traineeships of trainers to obtain new knowledge on technology applications and needs in the practical world have been started but are not practiced broadly enough.

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7 Monk, C., Sandefur, J. and Teal, F., 2008

8 Krystyna Sonnenberg, Global Partnership for Education, 2012
TVET enrolment level

- Enrolment in secondary vocational system in 2012 was 79,986 students (3.6% of total enrolment in secondary education).  

Gender

- Female enrolment rate in formal secondary vocational training in 2012 was 37.4%.  

2.3 TVET institutions

- TVET delivered through public and private schools, vocational training institutes and informal institutes
- Ministry of Education records 129 public TVET institutions and 151 private ones in 2010; estimations of the OECD are much higher (440 and 500)  
- According to the Ministry of Education, 27% of the TVET institutions are Integrated Community Centres for Employable Skills, 21% are Ghana Education Service (GES) Technical Institutes, 19% are National Vocational Training Institute Centres, 16% are Community Development Centres, 10% are Social Welfare Centres, 6% are Leadership Training Institutes, 1% are Opportunities Industrialisation Centres and 1% are Agricultural Training Institutes.  
- The Catholic Church is the largest private provider of TVET in Ghana
- Industry groups such as the Association of Ghana Industries and the Ghana Employers’ Association are becoming active in the TVET sector. They now are engaged in negotiations and in the piloting of more structured industrial attachment with tertiary TVET institutions.  

2.4 TVET challenges

- Lack of facilities and materials for training students
- Inadequate technical teachers or facilitators/trainers
- Limited number of training institutions for technical teachers
- Difficulty in career progression of trainers/teachers
- Negative public attitudes and perceptions towards technical and vocational education and training
- Mismatch between acquired skills and market needs.
- Weak link with private sector to facilitate on-job training and employment opportunities for trainees.

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9 www.indexmundi.com  
10 TVET Sector Mapping 2008  
Limited budget for TVET from the government despite it is a high budget demanding sector

3 Renewable energy market

3.1 Overview

- Electrification rate 72% (2011)
- Total installed capacity 2,011 MW (2010)
  Of which 60% hydropower and 40% thermal generation
- RE without hydro Below 1% of total power generation
- Electricity demand 1,400 MW (2010), growing at about 10% per annum
- Solar energy Almost 10,000 solar panels installed in communities that do not have access to the national power grid (2012)

The Strategic National Energy Plan (SNEP - 2006-2020) presents 10 Key Policy Objectives, amongst which are the following:

- Accelerate the development and utilization of renewable energy and energy efficiency technologies so as to achieve 10% penetration of national electricity and petroleum demand mix respectively by 2020
- Strengthen institutional and human resource capacity in energy development.

Main focus of Ghana’s National Energy Policy on:

- Support of mini-hydro installations
- Biofuel generation projects
- Increased support of the national solar manufacturing sector.

Renewable Energy Act 2011 (Act 832) provides the necessary fiscal incentives for renewable energy development by the private sector (IPP). Furthermore, it establishes a regulatory framework for grid-connected renewable energy power generation.

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14 Association of Ghana Solar Industries
3.2 Potentials and main barriers

Renewable Energy Potentials

<table>
<thead>
<tr>
<th>Scale</th>
<th>Solar</th>
<th>Wind</th>
<th>Modern biomass; waste to energy</th>
<th>Medium / small hydro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploitable Potential</td>
<td>20 MW</td>
<td>200 – 300 MW</td>
<td>90 MW</td>
<td>150 MW</td>
</tr>
<tr>
<td>Remarks</td>
<td>Average solar irradiation is 3.5-4.5 kWh/m2/day</td>
<td>Strongest wind regime occurs along the Ghana/Togo border(9-9.9 m/s)</td>
<td>Suitable climate for Jatropha for production of diesel and 2 million tons/a(95MW) of municipal waste for energy generation</td>
<td>68 sites were identified for constructing mini or micro hydropower plants</td>
</tr>
</tbody>
</table>

Main barriers

- Low level of awareness and in addition capacity constraints in project management and regulation.
- Less emphasis on mainstreaming energy in the education system, resulting in lack of adequate energy experts and technicians.
- Lack of coordination among stakeholders engaged in the energy sector.
- Need for improved support policies for the private sector's involvement to foster sustainable and efficient energy generation.
- Lack of specific bioenergy policies or regulatory frameworks to monitor and supervise investment projects in the biofuel sector.
- Import duties of 5% to 20% on solar systems.
- Difficulties raising funds from local financial institutions to undertake investments in low carbon technologies for RE developers and end-users.

3.3 Private sector

- The Private Enterprise Foundation (PEF) was founded on the initiative of four major business associations namely, Association of Ghana Industries (AGI), Ghana National Chamber of Commerce, Ghana Employers Association (GEA) and the Federation of

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Associations of Ghanaian Exporters (FAGE). These business associations felt the need to come together to exert greater influence on policy initiatives for the creation of an enabling environment in which private sector businesses could thrive as partners in economic development of the country.\textsuperscript{19}

\begin{itemize}
  \item The PEF plays a key role on development partnerships with the private sector (DPPs) in Ghana through combining business interests with development objectives and intensifies public private activities in Ghana.
  \item The mining community is increasingly aware of the need for vocational training and community development and the companies will address the issues through the establishment of an accredited vocational training school and introduce a quota to assure local employment.
  \item The Association of Ghana Industries (AGI), established in 2006, is a voluntary business association of over 1,200 members.
  \item Manufacturing solar devices until now not very successful.
\end{itemize}

3.4 Main donors’ activities

A number of donors are providing financial and technical support to the Government of Ghana through their implementing agencies. These include the World Bank (IDA), the African Development Bank (AfDB), the Global Environmental Fund (GEF), the Swiss Agency for Economic Affairs (SECO), Japan International Cooperation Agency, the Swedish International Development Cooperation Agency (SIDA), as well as France, Spain, India, Denmark and China with their respective implementing agencies. The biggest energy sector project which is running currently is the Ghana Energy Access and Development Project (GEDAP) which consolidates funding from Multilateral, Bilateral and Government.

Coordination of donor support takes place within the framework of the Donor Sector Group, established under the Multi Donor Budget Support (MDBS) framework.\textsuperscript{20}

Main relevant activities are:

\begin{itemize}
  \item EU-UNDP Low Emission Capacity Building Programme (LECBP) – 2011-2016
    Technical assistance also in form of training workshops
  \item UNEP Green Economy Advisory Services in partnership with GIZ
    Supporting Centres of Excellence, enhancing local knowledge and building capacity
  \item ECOWAS
    Renewable Energy Investment Initiative (EREI)
    Renewable Energy Facility (EREF)
\end{itemize}

\textsuperscript{19} \url{http://www.gaccgh.org/private-enterprise-foundation-pef}
\textsuperscript{20} \url{energypedia.info/wiki/Ghana_Energy_Situation}
GIZ Project Development Programme (PDP) for renewable energies promotion of German-Ghanaian renewable energy business partnerships


USAID - “Power Africa Initiative”, a $7 billion investment.

4 Labour market (RE)

4.1 Actual situation

- Present unemployment rate estimated at around 13-15%, youth unemployment about twice as high (15-24 years) (students Industrial Attachment Programme)
- Informal economy sector generates 80-90% of employment
- Global competitiveness index Rank 114/148
- Higher education and training 3.4 (valued 1 to 7 (best))
- On-the-job training 3.9
- Local supplier quality 4.2
- “Ease of doing business” Rank 67/189
- GDP per person employed amounts to 4,448 $ for 2009-2013 in constant 1990 PPP, an increase of 10% compared to the previous period
- In 2010 the manufacturing sector employed 1.12 million persons, out of which about 60% female employees.
- The agricultural sector employed 56% of the labour force and generated 34.3% of GDP in 2007, where energy plays a vital role in irrigation, harvesting, processing, transporting etc.
- The industrial sector employed 15% of the labour force and generated 26% of GDP in 2007

21 GBN 21.05.2013 - www.ghanabusinessnews.com/2013/05/21/ghanas-seng-becomes-first-country-affiliate-of-un-led-energy-network/
24 www.doingbusiness.org/data/exploreeconomies/ghana/
25 data.worldbank.org/indicator/SL.GDP.PCAP.EM.KD
26 LO/FTF Council 2012
4.2 Planned or on-going RE projects

- Construction of 2 MW ground-mounted solar park (Volta River Authority) with 22.8 million Euro KfW support

- 6-8 MW PV installations - Volta River Authority

- Construction of the country’s first grid-connected solar farm is due to start in the first quarter of 2014 on a 155 MW PV project in Nzema, in Ghana’s Western Region, said to be Africa’s largest PV power plant to date - Mere Power Nzema, subsidiary of the British Blue Energy’s

- The German company EnD-I AG and the British one Blue Skies are developing a concept and a detailed business plan for a biogas plant. DEG already financed the feasibility study.

- Volta River Authority (VRA’s) Wind Power Development Programme
  Estimated capacity: 150 MW
  Number of sites to be used: 8
  Tentative start of wind measurement: The end of the third quarter of 2012
  Expected duration for wind measurement: 1 year
  Tentative date for commissioning wind farm: Within the second half of the year, 2014

- Construction and operation of a grid connected wind farm (50 MW) in the city of Prampram (Promoter: NEK Ghana Ltd., CAPEX: €73.7mio, OPEX: €1.9 mio)

- Construction and operation of a waste to energy unit (20 MW) for electricity supply and heating in the city of Tema

- Pilot biogas project from the Energy Center (TEC) together with UNIDO, Ministry of Trade, Industry and Energy (MOTIE) of Korea, the Korea Institute of Energy, Technology Evaluation and Planning (KETEP) and the Ministry of Trade and Industry (MoTI)

- Clenergen Ghana Limited is entered in to an Agreement to install a 2 MW/h gasification Biomass power plant on-site in order to provide a direct supply of carbon negative renewable electricity. The project will incorporate a direct supply of feedstock cultivated using 400 acres of land under lease by Ghana Manganese Company Limited.

- Denham Capital Management and three of its portfolio companies - Endeavor Energy Holdings, BioTherm Energy, and Fotowatio Renewable Ventures (FRV) plan an investment of over $1.0 billion in 1,000MW of power generation in West Africa with a special focus on Ghana, including wind power generation, solar power generation and...
thermal power generation. Endeavor seeks to provide as much as 800MW of thermal power generation in Ghana representing a total investment of over $0.8 billion.\textsuperscript{36}

- GG Energy Holdings intends to invest $150 million over the next five years to enable the installation of nearly 75 MW of solar PV and bio-mass power plants to power industrial and mining production facilities in Ghana, Kenya and Tanzania.\textsuperscript{36}
- KMR Infrastructure aims to develop 15 MW of biomass installations in Ghana.\textsuperscript{36}
- NextGen Solar plans to set-up 30MW of generation capacity via solar power plants in Ghana.\textsuperscript{34}

5 Relevant Vocational training activities

5.1 Main donors’ activities

- Ghana Skills Development Initiative (GSDI) – GIZ, 01/2012 – 06/2014 - Supports the offer of demand-oriented further training for small enterprise owners (Master Craftspersons) and apprentices in the informal sector
- UNEVOC Network activities
- IFAD Rural Enterprises Programme – including self-employment training and vocational training

5.2 Further vocational training activities

- The Energy Center (TEC) at the Kwame Nkrumah University of Science and Technology (KNUST) was established to provide the necessary training and research especially in renewable energy. Many short courses were already organized in areas like Solar Thermal Power, Solar PV Systems Design and Installation, Small Wind Turbines Manufacturing, Bioenergy/Biogas/Biofuels and Energy Policy and Planning with an introduction to Long-range Energy Alternatives Planning (LEAP) and RETScreen software packages. TEC is firmly embedded within the university’s energy-related institutional framework.\textsuperscript{37}
- TEC has been established as regional center for West Africa and is already involved in ECOWAS activities.
- DSTC (DENG Solar Training Center), founded in April 2005, is an internationally certified training facility offering training courses in the design, installation and maintenance of solar systems, as well as Solar Water Pumping training courses in technical collaboration with Global Sustainable Energy Solutions (GSES) of Australia, and the Department of Mechanical Engineering and Agriculture of Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi. Initial co-financing was

\textsuperscript{36} \url{www.usaid.gov/powerafrica/partners/private-sector}
\textsuperscript{37} \url{www.energycenter.knust.edu.gh/pages/sections.php?sid=41}
secured from Deutsche Investitions- und Entwicklungsgesellschaft mbH Germany (DEG).

- The Association of Ghana Solar Industries has training among its “main objectives”.

### 5.3 Links of TVET to RE private sector

- Very few links between the private sector and the TVET sector are recognizable so far.
- The contribution of the private sector is requested in many instances, i.e. with the offer of internships, especially for the training of trainers.
- The Ghana Green Skills Development Initiative works with crafts associations to fill this gap.
- Industrial and private sector linkages with TVET on RE in general are weak.

### 6 Suggestions for TVET RE activities by the EUEI PDF

Based on the potentials of renewable energies and current initiatives, the main areas of relevancy for TVET in Ghana seem to be mini-hydro and biofuels/biogas as well as solar PV. Connections to donor programmes should be sought so as to leverage the RECP effort.

#### 6.1 Possible project ideas

- Development of a national “TVET for RE platform” to co-ordinate all relevant activities between the private sector and public institutions from TVET and energy sector.
- Training for mini-hydro
  - The roles of the Volta River Authority (VRA) and the private sector need to be clarified in a needs analysis. Operation and maintenance shall present an important part of this training.
- Solar PV
  - Demand seems to be given for both on and off-grid; maintenance of the large system shall be included.
- Biofuels and biogas
  - A needs analysis through the entire value and supply chain shall be a starting point.

For all of the above, the short term needs and further education should be catered for in cooperation with ongoing donor projects and/or the VRA. At the same time it may be worthwhile to integrate the a.m. RE subjects to the primary TVET activities. This could include:

- Development of courses and course material and upgrading for new curricula with the TVET system.
- Train-the-trainers activities.
6.2 Possible main partners

The main partners representing the demand for skilled labour to cooperate with are:

- Volta River Authority (VRA)
  With their training centre(s) and the VRA Schools, located at Akosombo and Akuse in the Eastern Region and the Western Region of Ghana

- Association of Ghana Solar Industries
  Should be enabled to take up a role in TVET by defining and advocating needs and resources, assuring the development of further education and training; entrepreneurial training should be included.

Main partners to be strengthened for the delivery of training could be:

- TEC
- DSTC
- VRA Training facilities
- Official TVET institutions

Training of trainers should incorporate as many training providers as possible.

7 Main stakeholders

For TVET RE project development

- DSTC Deng Solar Training Centre - [www.deng-ghana.com](http://www.deng-ghana.com)
- The Energy Center (TEC) of the Kwame Nkrumah University of Science and Technology (KNUST) - [energycenter.knust.edu.gh](http://energycenter.knust.edu.gh)
- Volta River Authority
- Council for Technical and Vocational Education and Training (COTVET) - [www.cotvet.org](http://www.cotvet.org)
- National Apprentice Training Board (NATB) - under COTVET
- National Technical and Vocational Education and Training Qualifications Committee (NTVETQC) – under COTVET
- Industrial Training Advisory Committee (ITAC) - under COTVET
- Training Qualify Assurance Committee (TQAC) - under COTVET
- Ghana Skills Development Initiative (GSDI) - under COTVET
- Skills Development Fund Committee - under COTVET
- Ghana National Chamber of Commerce and Industries - [www.ghanachamber.org/website](http://www.ghanachamber.org/website)
- Association of Ghana Industries - [www.agighana.org](http://www.agighana.org)

Further Stakeholders
- National Coordinating Committee for TVET (NACVET)
- National Vocational Training Institute - [www.nvtighana.org](http://www.nvtighana.org)
- National Education Reform Implementation Committee
- Environmental Protection Agency - [www.epa.gov.gh](http://www.epa.gov.gh)
- Ghana National Chamber of Commerce and Industries - [www.ghanachamber.org/website](http://www.ghanachamber.org/website)
- Ghana Employers Association - [www.ghanaemployers.com](http://www.ghanaemployers.com)
- Energy Foundation Ghana - [www.ghanafoundation.org](http://www.ghanafoundation.org)
- Sustainable Energy Network of Ghana (SENG) – see details under 3.4.