

COUNTRY MAPPING

SENEGAL

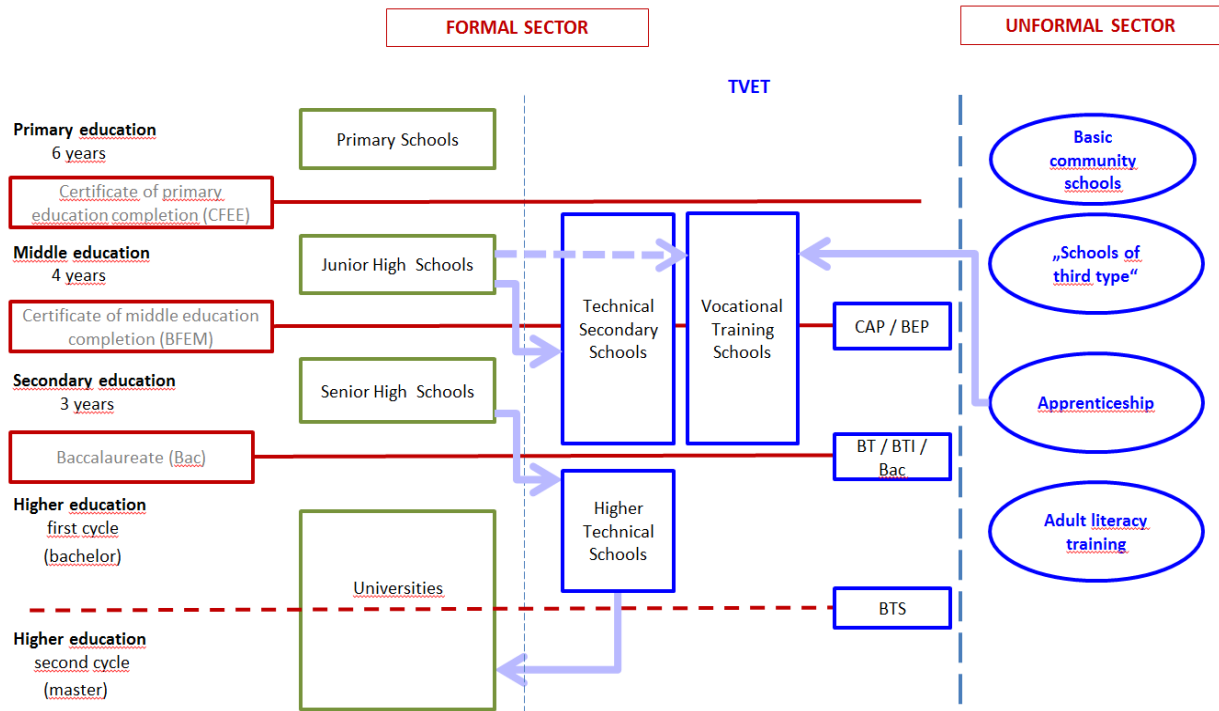
1 Facts & Figures

Surface	196,722 sq km ¹	Total literacy rate	49.7% ¹
Population	13,300,410 (2013) ¹	Educ. expenditure	5.6% of GDP (2010) ¹
Capital	Dakar, 2.78 mio. (2009) ¹	GDP per capita	\$2,100 (2012) ¹
Pop. growth rate	2.51% (2013) ¹	Inflation rate	1.4% (2012) ¹
Median age	18.2 years ¹	HDI	0.47 (2012) ²
Urban population	42.5% (2011) ¹		

2 Education system

2.1 Overview

Senegal's educational system is based on the French system and integrates TVET in the formal education sector.



¹ CIA World Factbook - www.cia.gov

² Human Development Reports - hdr.undp.org/en

Political framework and objectives

- ▶ Three ministries respectively in charge of
 - secondary education, regional university centres and universities
 - pre-school, elementary and middle school education
 - technical and vocational training
- ▶ The Ministry for Technical Education and Vocational Training (METFP) is working on a reform in order to adapt technical education and vocational training to the labour market
- ▶ Technical and financial support of the reform through: Luxembourg, AFD, GTZ, JICA, KOICA, CTB, APEFE, BAD, BID, BIT, PNUD, ONUDI, ACIDI, UNESCO, etc.
- ▶ On-going improvement of TVET system³:
 - Sectorial studies for identification of needs
 - Involvement of private (productive) sector
 - Training of trainers
 - Construction and rehabilitation of infrastructure
 - Development of new curricula.

2.2 Education & TVET system

- ▶ Estimated of number of apprentice: 400,000 – 600,000 (2011)³
- ▶ Integration of apprenticeship /non formal sector into educational system (10,000 per year)³
- ▶ 52% of TVET graduates found a job in 2010 compared to 7% in 2007 ³
- ▶ Experiment with Mobile Training Units (comprising trucks, tents, trainers, materials etc.) to provide short courses in disadvantaged areas (UNESCO)
- ▶ Work-linked training (alternate training) and distance learning.

TVET enrolment level

- ▶ Enrolment in secondary vocational system in 2012 was 37,516 (4.5% of total enrolment in secondary education).⁴

Gender

- ▶ Rate of female enrolled in formal secondary vocational training in 2012 was 51.44%.⁴

2.3 TVET institutions

- ▶ In 2010 there are 213 institutions for TVET, out of which 70 are public (33%) ³
 - 36 CRETF (Female Regional Center for Technical Education) and CETF (Female Center for Technical Education)

³ METFP 2012

⁴ www.indexmundi.com

- 9 technical colleges
- 25 vocational training centers
- ▶ 143 private institutions (67%)⁵
- ▶ Private trainings have fees two to three times higher than in mainstream education ⁵
- ▶ In 2010, 56% of TVET learners were in private institutions ⁵
- ▶ Only 5 institutions are located in rural areas (2%)⁶

2.4 TVET challenges

- ▶ High degree of instability and institutional inconsistencies ⁷
- ▶ Lack of institutions ⁷
- ▶ Lack of career opportunities ⁷
- ▶ Imbalance of the training offered (concentration around Dakar and Thiès, on BTS and BT certificates and on higher education level) ⁸
- ▶ Low diversification of programmes (51 training programmes compared to 120 in emerging countries). ⁸

3 Renewable energy market

3.1 Overview

- ▶ Electrification rate: 40% (2011) , only 22% in rural areas⁹
- ▶ Biomass: 57% of primary energy supply (2010)¹⁰
- ▶ RE installed capacity : 0.002 GW electricity capacity (2010)¹⁰
- ▶ RE electricity generation: 10.3% (2011)¹⁰
 - Solid biomass: 1.7%
 - Hydro: 8.3%
 - Solar PV: 0.2%
- ▶ RE goal for 2020: 15% of electricity supply¹¹
- ▶ Solar: 2.5 MW in 2010⁹

Political framework and objectives

- ▶ Special Programme for biofuels (2008)
- ▶ National Biogas Programme (2009)

⁵ METFP 2012

⁶ METFP 2012

⁷ AfriMap 2010 - www.afrimap.org/english/images/report/AfriMAP_Senegal_Education_Full_EN.pdf

⁸ www.afd.fr/webdav/shared/ELEMENTS_COMMUNS/seminaires/formation-28-06-06/Niang.pdf

⁹ Senegal Renewables Readiness Assessment 2012, IRENA

¹⁰ www.map.ren21.net/PDF/ProfilePDF.ashx?idcountry=151

¹¹ www.reegle.info/policy-and-regulatory-overviews/SN

- ▶ Renewable Energy Law (2010)
- ▶ Support scheme for renewable energy under the law: ¹¹
 - Especially for solar and wind plants
 - Tax break is available on the income and corporate income tax and the value-added tax for renewable energy investments
- ▶ National Strategy for Renewable Energy in development ¹²
 - Provides conditions of power purchase and remuneration of electricity generated by renewable energy plants and their connection to the grid
 - Provides conditions of power purchase of surplus renewable energy-based electricity from self-producers
 - Fix maximum intake of renewable energy sources
 - Electrification with a large emphasis to private sector investments (concessions)

3.2 Potential and main barriers

Renewables	Solar ¹³	Wind ¹³	Biogas ¹⁴	Hydro ¹⁵
Estimation of technical potential	75 MW in 2013 187 MW in 2020	100 MW in 2012 180 MW in 2020	1,769 GWh	1,400 MW

Main barriers ¹⁵

- ▶ Limited financial support mechanisms for the promotion of renewable energies
- ▶ There are many obstacles relating to the sector's regulation and overall governance
 - Important reforms are delayed and the delay in implementing proposals already engaged is particularly noticeable
 - Feed-in tariffs were proposed under the 2010 renewable energy law, but have not yet come into effect
 - Renewable energy electricity projects are held back due to the lack of dedicated regulatory framework. The implementation of the renewable energy law of 2010 is dedicated to improve the situation.

3.3 Private sector

- ▶ Senegal is home to the first Solar PV module manufacturing in West Africa (SPEC), with a yearly capacity of 25 MW ¹⁶
- ▶ Some domestic manufacturing capacity has grown up around Senegal significant experience in the deployment of certain renewable energy technologies (e.g., small-scale solar, wind for water pumping) ¹⁷

¹² Senegal Renewables Readiness Assessment 2012, IRENA

¹³ Study MVV decon GmbH 2010 - www.ecowrex.org

¹⁴ Société SAEB 2012

¹⁵ Senegal Renewables Readiness Assessment 2012, IRENA

¹⁶ IRENA News January 2013

- ▶ Several local enterprises distribute a large range of better-quality lighting products based on LEDs and typically powered by solar photovoltaic (PV) panels. These enterprises also distribute other solar PV products such as solar home systems (SHS) of various capacities.¹⁸

3.4 Main donors' activities

- ▶ GIZ / KfW - PERACOD Programme to promote rural electrification and a sustainable supply of domestic fuel (2003-2015)
- ▶ EU, AFD, GIZ, IRENA, World Bank – Africa EU Renewable Energy Cooperation Programme (RECP) 12/2012–02/2014 - Implementation of the renewable energy law (Tariffs, Scenarios, Tendering, and model PPAs)
 - World Bank and IFC - Lighting Africa Programme
 - Public-Private Infrastructure Advisory Facility (PPIAF) - multi-donor trust fund
 - Africa Renewable Energy Access program (AFREA).

4 (RE) Labour market

4.1 Actual situation

- ▶ The unemployment rate was estimated at around 48% in 2007, youth unemployment (15-24 years) was estimated at around 14.8%¹⁹
- ▶ Industry stands for 22.6% of GDP (2012 est.)²⁰
- ▶ Global competitiveness index Rank 113/148²¹
 - Higher education and training 3.1 (valued 1 to 7)
 - On-the-job training 3.01
 - Local supplier quality 4.8
- ▶ “Ease of doing business” Rank 178/189
- ▶ Working population 88% agriculture/livestock, 5% civil servants, 3% commerce, 2% handicrafts, 2% others

4.2 Planned RE or on-going projects

- ▶ Construction and operation of a grid-connected 15 MW bioenergy power plant, using typha and rice husks in the city of Diama (Northern Senegal)²²
 - Promoter: SGI

¹⁷ IRENA 2012

¹⁸ Senegal Policy Report Note, Lighting Africa 2012

¹⁹ www.indexmundi.com

²⁰ www.cia.gov

²¹ World Economic Forum - reports.weforum.org/the-global-competitiveness-report-2013-2014

²² EREI 2013

- CAPEX: EUR 38 mio
- OPEX: EUR 38/MWh
- LCOE: EUR 119/MWh
- ▶ Construction and operation of a 49.5 MW grid connected wind park in the coastal area of Senegal, in the city of Kebemer²⁴
 - CAPEX: USD 147.2 mio
 - OPEX: USD 4 mio (1st year)
 - LCOE: USD165/MWh
- ▶ Rural electrification project (PV - diesel hybrid systems) by the global company Isofoton - investment of Euro 16 million (EU financing) - creation of 10,000 800 KW systems in the regions of Kaolak and Fatick and 20,000 1.5 MW systems in the Kolda region over a period of three years²³
- ▶ Several rural electrification concessions.

5 Relevant vocational training activities

5.1 Main donors' activities

- ▶ In the Casamance region the local development association UDB developed and built together with Kinderhilfe Senegal e.V. a professional school with 7 handicrafts professions, forming 250 youth each year. Engineers without borders (Ingenieure ohne Grenzen e.V.) added the construction of solar school to this existing complex and starts training at the end of 2013 in the fields of solar energy and renewable energy. ²⁴
- ▶ PERACOD II funded by the EU Energy Facility, the DGIS and the French Development Cooperation to promote renewable energies, rural electrification and a sustainable supply of domestic fuel, 2004 to 2016
- ▶ Within the joint programme from IFC and World Bank "Lighting Africa" some training activities are occasionally conducted in cooperation with third parties.

5.2 Further vocational training activities

- ▶ Centre d'Études et de Recherches sur les Énergies Renouvelables (CERER) at the University Cheikh Anta Diop in Dakar - provides training for professionals, retraining and further training for researchers and technicians interested in the Center's activities

²³ Solar International July 2012 - www.solar-international.net/article/75672-Senegal-project-to-be-carried-out-by-Isofoton.php

²⁴ www.ingenieure-ohne-grenzen.org/de/Regionalgruppen/Regensburg/Projekte/Fachschule-fuer-Solartechnik-und-Erneuerbare-Energie-in-Senegal

- ▶ The Polytechnic School (ESP), as part of the University Cheikh Anta Diop in Dakar, has been integrating renewable energy content into its curriculum for a long time, but there is no dedicated programme²⁵
- ▶ Centre Sectoriel de Formation Professionnelle (CSFP), a PPP between government, local authorities and professional organisations, extends its curricula to professions of energy mastery²⁶
- ▶ The Senegalese private company Touba Energy Solutions Sarl is a service provider in the fields of renewables and also offers education and training services²⁷

5.3 Links of TVET to RE private sector

- ▶ TVET reform implemented which aims to better align education with employment needs through the development of links with the private sector
- ▶ Participation of the private sector in identification of programs, in occupational analysis and at the Forum
- ▶ 6 professional organizations from 3 sectors of activity covered by the project are participating in the development of programs to be developed are in the EFE change management committee
- ▶ 68 participants from the productive sector participated in the occupational analysis
- ▶ Private sector participated in the forum on “TVET institutions serving industry and business competitively”. Various employers’ associations did some publicity
- ▶ Senegalese professional organisations of BTP sectors (the professional association of building contractor and public works in Senegal – SPEBTPS – and the building and public works national association –SNBTP-) and the council managing the BTP sectorial centre are part of the PPP construction for the CSFP in the fields of renewable energy.²⁸
- ▶ At ESP each department has a liaison teacher to the private sector.²⁹

6 Suggestions for TVET RE activities by the EUEI PDF

6.1 Possible project ideas

Regarding the RE technologies in question on grid and micro grids seem to provide a potential as a function of the electrification, especially within the concessions awarded.

Solar energy and the use of biomass should be subjects of TVET; the potential development of wind energy needs to be seen given limited wind speeds of 3.8-4.1 m/s.

²⁵ Senegal Renewables Readiness Assessment 2012, IRENA

²⁶ CSFP, Moustapha LOUM 2012

²⁷ energy.sourceguides.com/businesses/byB/serv/edu/byGeo/byC/Senegal/Senegal.shtml

²⁸ CSFP, Moustapha LOUM 2012

²⁹ Senegal Renewables Readiness Assessment 2012, IRENA

Given the large number of stakeholders on the training and on the implementation of TVET a national TVET RE or HRD RE platform should be established. This platform should as first steps:

- a) Take an inventory of all existing training offers
- b) Work with the stakeholders, especially from the privates sector, on a needs' and skills gap assessment
- c) Coordinate further development of TVET for RE.

In this respect the TVET and the academic/university level education could be integrated as there are a large number of common stakeholders.

Training of trainers and upgrading of facilities should be a second axis of activities. The choice of the training institutions to be funded (e.g. training equipment) could be undertaken by means of a competition for which the linkages to the private sector, training concepts, etc. should be decisive in order to encourage those.

A third line of activities could be developed on further education and training and the raising of quality standards. The linkage of investment in RE and TVET should be strengthened by using future concessions and public subsidies to leverage investment in (further) education and training by the firms. This means that contractors would be required a certification for which they would have to pass certain training as it is done in Tunisia for solar water heaters and in Kenya for PV.

6.2 Possible main partners

- ▶ The Polytechnic School (ESP)
- ▶ Centre Sectoriel de Formation Professionnelle (CSFP)
- ▶ The private owners of concessions, as they should be interested to facilitate the use of renewable energy
- ▶ Technical school for solar energy and renewables in Baila, Casamance.

7 Main stakeholders

- ▶ Ministry of Professional Training, Apprenticeship and Handicraft - www.mfpaa.gouv.sn
- ▶ Ministry of Youth, of Employment and of the Promotion of Civic Values - www.jeunesse.gouv.sn
- ▶ Ministry of Energy (MoE)
- ▶ National Agency for Renewable Energies (ANER)
- ▶ Ministry of Renewable Energy (MER)
- ▶ Inter-Ministerial Committee on Renewable Energy

- ▶ University Cheikh Anta Diop in Dakar and its subsidiaries - www.cies-uni.org/en/senegal
 - Center for Studies and Research on Renewable Energy (CERER) - <http://196.1.95.4/cerer>
 - École Supérieure Polytechnique (ESP) - www.esp.sn