

# **Trade in Environmental Goods & Services**

## **Solar Energy in Kenya**

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WTO Workshop, Geneva, Switzerland

September 23 – 25, 2009



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# Introduction

- Presentation looks at Tariff and non-tariff barriers to trade in solar energy goods and services in Kenya
- Although the country is well endowed with solar energy, only 5% of rural and 51% of urban areas have electricity
- Thus, great potential for solar energy contribution
- But, more supportive policies and incentives are required

# 1. Global Solar Energy Industry

- Global Solar energy industry accounts for only 0.1% of energy demand
- However, over the past 15 years, global production of solar PV cells has grown at annual average of 25%.
- Germany has limited solar insolation but is the global Solar PV market leader; with installed capacity of over 5,337 MW in 2008
- Leading players in solar thermal power: US, Spain, China, France, Italy, Australia, Egypt, Morocco, South Africa, Mexico
- Manufacturing of solar PV cells is dominated by 5 companies: Sharp Electronics Corporation, Kyocera Solar, BP Solar, Shell Solar Industries, and Sanyo Electric Company.

# Global Solar Energy Industry

- Japan accounts for 50% of the world's solar-cell production and exports, followed by the USA and the EU;
- World market for PV modules and systems is currently heavily influenced by government policies, mainly subsidies, exports as aid, directed credit
- Tied aid distorts competition in favour of the exporter whose products are given preference (OECD, 2005).

## 2. Overview of Energy Sector in Kenya

- Energy consumption more or less equal to production from all sources.
- Characterized by heavy reliance on biomass, frequent power outage, low access to modern energy, over-reliance on hydroelectricity and high dependence on imported oil.
- Renewable energy (RE) considered one of the potential sources.
- Located astride the Equator, Kenya is endowed with vast RE such as solar, wind, biomass, bio-fuel, geothermal and hydropower among others.
- Large potential of RE but limited utilization.
- However, interest growing due to unmet electricity demand, increasing global oil and gas prices & environmental pressure.

# Overview of Energy Sector in Kenya

- Modern energy consumption/capita: 84 KgoE
- Electricity consumption/capita: 128 kWh
- National electrification level: 9%
- Rural electrification level: 5%
- Current Total Electricity Production (Hydro, Thermal, Geothermal, Wind, Solar, Biomass (co-generation): 1245.65 MW
- Distribution of electricity installed capacity: hydro 57.6%; thermal 31.5%; geothermal 10.9%.
- Share of RE in total electricity consumption: 70.31%
- Share of solar energy in total electricity consumption: 0.32%

# Overview of Energy Sector in Kenya

- The GoK is promoting RE technologies through a number of policies and programmes (Sessional Paper No. 4 on Energy of 2004 and the Energy Act 2006).
- Meeting Kenya's future energy needs requires a clear, long-term policy framework which provides incentives.

## *Technical Potential for Renewable Energy Technologies in Kenya, 2003*

Energy Source	Potential	Installations
Wind	3 - 10m/s (wind speeds)	300 - 360 Units (0.55MW)
Solar	4 - 6 kWh/m <sup>2</sup> /day (solar insolation)	3600 kWp
Biomass	38.1 million Tons	38MW
Small hydro	1000 – 1200 MW	28 MW
Geothermal	3000 MW	128 MW



# 3. Solar Energy in Kenya

- Kenya has the largest private sector dominated solar PV home systems in a developing nation, with annual growth rates of 10-20% in recent years
- Country is the driver of regional trade in solar energy goods
- There are 25 - 40 players (of which 5 are main players) in trade in solar energy goods and service
- Main products in the market: Solar PV modules; Solar batteries; solar charge controllers; solar lighting kits (d.c. filament and fluorescent lights, torches, rechargeable lanterns); solar powered mobile phones; Solar-powered pumps (d.c. powered submersible water pumps); Solar-powered fridges; solar cooking ovens
- 200,000 to 300,000 Solar PV home systems currently in use; Majority are 14-20 Watts panels for domestic usage
- Comprise an installed capacity of 4MW and generates 9GWh of electricity annually

# Solar Energy in Kenya

- Demand for electricity generated from home-based PV systems is projected to reach 22GWh annually by 2020
- Number of solar water heating units currently in use estimated at over 140,000 units (equivalent to 19,000 ToE annually)
- Projected demand for solar water heating to grow to 400,000 units by 2020 equivalent to 150,000 ToE.
- Kenya has been able to expand access to poor rural households through unsubsidized, market-based sales.
- Solar energy is underutilized due to a number of factors – relative cost of systems; lack of standards

# 4. Trade & Production

## Main Imports and Exports:

- Solar PV modules; Solar batteries; solar charge controllers; solar lighting kits; Solar-powered water pumps; d.c.-a.c. power converters; Solar cooking ovens

## Import Sources:

- Main sources: mainly, India, Taiwan, China, Australia;
- Others: France, Germany, Hongkong
- 5 leading importers and distributors of solar energy equipment

## Export Destinations:

- Main destinations: The greater East and Central African countries including Southern Sudan, Uganda, Tanzania, Rwanda, Burundi, Malawi; minimal exports to Somalia due to insecurity.

# Trade & Production

*Mean (2004 – 2008)*

Short Description	Units	Imports	Production	Exports	Consumption
Instantaneous or storage water heaters, Non-electric - other [e.g. Solar Water Heaters]	Number	2,813	-	1,321	1,492
Reciprocating positive displacement pumps, n.e.s. [d.c. powered water pumps]	Number	54,421	-	4,585	49,836
Centrifugal displacement pumps, n.e.s. [d.c. powered submersible water pumps]	Number	64,117	-	1,003	63,114
Static converters [e.g. rectifiers and inductors and inverters for converting dc power to ac power]	Number	305,995	-	305	305,690
Photovoltaic system controller [charge controller for voltage not exceeding 1000V]	Number	185,171	-	71,058	114,113
Photovoltaic cells, Modules & Panels	Number	118,322	-	5,414	112,908
Other lead-acid accumulators [Deep Discharge (solar) Battery]	Number	173,740	>50,000	111,725	112,015

# Trade & Production

## Manufacturing:

- Solar PV modules – not being produced locally yet, due to the high technology and raw materials required
- Solar water heaters: 3 companies producing for domestic and regional market
- Solar batteries: mainly produced by one company –which also produces an average of 350,000 lead-acid batteries for motor vehicle usage
- Charge controllers – produced by a few small and medium enterprises
- Solar d.c. – a.c. power Inverters: – produced by a few small and medium enterprises
- Lighting kits – Assembled by a few small and medium enterprises
- The Kenya Bureau of Standards has put in place policy guidelines to enhance quality standards In the sector

## *Import Sources and Export Destinations*

Solar Energy Product	Key Import Sources	Key Export Destinations
Instantaneous or storage water heaters, Non-electric – other [e.g., <i>Solar water heaters</i> ]	Australia; China; Germany; India; Israel; South Africa; USA; China; France; Japan	Rwanda; Tanzania; Uganda; Burundi
Reciprocating positive displacement pumps, n.e.s. [ <i>d.c. powered water pumps</i> ]	China; Germany; India; Italy; Japan; Thailand; UAE; UK; USA	Sudan; Tanzania; Uganda
Centrifugal displacement pumps, n.e.s. [ <i>d.c. powered submersible water pumps</i> ]	China; Denmark; Germany; India; Italy; Japan; Malaysia; Netherlands; South Africa; Taiwan; Thailand; UAE; UK; USA	Sudan; Tanzania; Uganda
Static converters [e.g. rectifiers and inductors <i>and inverters for converting d.c power to a.c power</i> ]	Australia; Belgium; Canada; China; France; Hong Kong; India; Indonesia; Ireland; Italy; Japan; Netherlands; Norway; Singapore; South Africa; Taiwan; Thailand; UAE; UK; USA	Rwanda; Somalia; Sudan; Tanzania; Uganda; UAE; Burundi
Photovoltaic system controller [ <i>charge controller for voltage not exceeding 1000V</i> ]	Australia; Belgium; Canada; China; Egypt; France; Germany; India; Israel; Italy; Japan; Korea; Malaysia; Netherlands; Taiwan	Rwanda; Somalia; Sudan; Tanzania; Uganda
Photovoltaic cells, Modules & Panels	Australia; China; Egypt; France; Germany; Hongkong; India; Israel; Italy; Japan; Korea; Malaysia; Netherlands; Singapore; South Africa; Taiwan; UAE; UK; USA	Rwanda; Somalia; Tanzania; Uganda; Sudan
Other lead-acid accumulators [ <i>Deep Discharge (solar) Battery</i> ]	Belgium; China; Germany; France; Hong Kong; India; Italy; Japan; Korea; Netherlands; South Africa; UAE; UK; USA	Somalia; Sudan; Tanzania; Uganda; UAE; Malawi; Burundi

## 5. Tariff and Non-Tariff Barriers

- In Kenya, Solar PV panels, solar water heaters and solar pumps are zero-rated (0% import duty) but attract a 16% Value Added Tax (VAT)

*Kenya Revenue Authority: Import Duties as at June 2009*

HS Code	Solar Energy Product	Applicable Tariffs
84.19	Instantaneous or storage water heaters, Non-electric - other [e.g. Solar Water Heaters]	0% Import Duty; 16% VAT
84.13.50.00	Reciprocating positive displacement pumps, n.e.s. [d.c. powered water pumps]	0% Import Duty; 16% VAT
84.13.70.00	Centrifugal displacement pumps, n.e.s. [d.c. powered submersible water pumps]	0% Import Duty; 16% VAT
85.04.40.00	Static converters [e.g. rectifiers and inductors and inverters for converting dc power to ac power]	0% Import Duty; 16% VAT
85.37.10.00	Photovoltaic system controller [charge controller for voltage not exceeding 1000V]	10% Import Duty; 16% VAT
85.41.40.10	Photovoltaic cells, Modules & Panels	0% Import Duty; 16% VAT
85.07.20.00	Other lead-acid accumulators [Deep Discharge (solar) Battery]	25% Import Duty; 16% VAT

## *Non-Tariff Barriers*

- Lengthy procedures related to valuation of goods at customs
- Quality of inspection procedures: poor quality solar energy equipments find their way into the market
- Transiting procedures
- Business licensing and registration
- Immigration procedures:- Obstacles to exporting labour/services to the region – requires work permit; requirement to hire/subcontract local persons/labour force (e.g., in Uganda); Remuneration for services offered in the countries in the region is subject to taxes in that country; Bureaucracy at point of entry into the country
- Red-tape



## *Institutional, Policy and Regulatory Challenges*

- Inadequate legislative and planning frameworks governing energy sub-sectors
  - No specific law to regulate the management of renewable energy sub-sectors; specifically solar energy
  - The Energy Regulatory Commission is still young and is not yet functioning well
  - Inadequate credit and financing mechanisms to facilitate acquisition of solar technology
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## 6. Policy Recommendations

- Introduction of a feed-in tariff (FIT) for Solar Energy; Section 103 of Energy Act No.12 of 2006 provides FIT for Wind, Biomass & Small-hydro generated Electricity only.
- Elimination of tariffs on PV cells and modules and other solar energy goods; (is in place but NTBs exist).
- Incentives like reduced VAT.
- Developed countries could offer financial assistance to purchase renewable energy equipment and to also carry out R&D.
- Enhancing quality control for imported goods and services
- As part of the fight against pollution, developed countries could transfer solar technology to countries like Kenya. Double dividend: fight against poverty.

*Asante Sana*

**Thank You**

