Even as the market for transmission poles continues to expand in East Africa, there is a shortage of suitable trees. This photograph was taken at the Kenya Power yard in Eldoret. (Photo: BGF)

The status of the poles sector

Production, processing and trade in transmission posts in East Africa

BY JOSHUA K. CHEBOIWO

Within the forest sector, the demand for transmission poles has witnessed one of the fastest growths in the last 10 years. As a result, hundreds of farmers and a number of companies have invested heavily in pole production in Kenya.

There have been fears that the growth in the treatment capacity may result in oversupply and loss of fortunes. The Kenya Forestry Research Institute (KEFRI) thus decided to carry out studies to evaluate the potential demand for transmission poles in Kenya and trade opportunities in the East African Community.

The results of the study indicate that the processing capacity of the transmission poles sector grew from eight plants in 2008 to 17 by 2011. The installed capacity expanded from 480,000 poles to over 1,000,000 in the same period. The combined annual demand for transmission poles by Kenya Power and Lighting Company (KPLC, now Kenya Power – KP) and the Rural Electrification Authority (REA) in 2010 was 480,000.

According to Kenya Power projections, energy demand is expected to grow by 25 per cent per year. However, due to limited investment in electricity generation, the annual demand for poles by Kenya Power and REA is likely to expand by less than 10 per cent, to 720,000 by 2015. This may not be sufficient to absorb the expanded production capacity in the treatment sector.

By 2011, Tanzania had seven treatment plants in operation, with an annual capacity to treat 345,000 poles, the surplus being exported to Kenya. Uganda has five treatment plants with an annual production capacity of 250,000 pieces, sufficient for the domestic market but also looking at export opportunities in Kenya.

Export opportunities in the East Africa region are low due to stagnation in electricity production, which is unlikely to change in the short-term, and to the shortage of raw poles to match installed capacities. However, there are vast opportunities in diversified market niches that include products mixes such as fencing poles, timber seasoning and exploration of emerging markets such as South Sudan.

Methods and materials

The study involved collection of data on production, processing and consumption of transmission poles in East Africa. The data was collected from Kenya Forest Service (KFS), KPLC, REA, Kenya Bureau of Statistics (KBS), Kenya Plant Health Inspectorate Service (KEPHIS), Timsales Ltd, Comply Ltd, and 12 treatment plants.

Electricity generation

Kenya

Electricity generation and distribution in Kenya is vested in three institutions: KP, Kenya Electricity Transmission Company (Ketraco) and Kenya Energy Generation Company (Kengen). Table 1 (overleaf) shows the power generation capacity estimates between 2000 and 2008, which was projected to grow from 4,178 MW to 6,460 MW (GOK, 2009).

However, the power generation growth was far below the official growth projection of 2,282 MW, as the installed capacity was only 1,412MW (www.kengen, 2011). The dominant sources of power were hydropower (50 per cent), oil (33 per cent) and geothermal (16 per cent). By 2011, according to KPLC, 39 per cent of total households were connected with electricity. The demand for electricity is expected to grow by 10 per cent, according to Vision 2030 projections.

The country has almost exhausted its hydropower potential and is now putting more hope on the geothermal sector. The Geothermal Development Corporation (GDC) has outlined ambitious plans for an estimated potential capacity of between 4,000-7,000 MW in the Rift Valley region. The current annual investments in the sector are projected to add between 5 - 50 MW per year.

GDC projects that it will need Ksh 88 billion (US$ 1.02 billion) to realise its target of 4,000 MW by 2030. This is unlikely to be achieved, given that the 2,000 MW projected for 2014 was not realised.

Kenya has also started to position itself by investing Ksh 3.7 billion

Table1: Projected power generation capacity (MW) and available power distributed in Kenya (2000-2008)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	Mean
Generation capacity	4,178	4,451	4,685	4,851	5,194	5,547	5,894	6,324	6,460	
% change	-	6.5	5.2	3.5	7.0	6.8	6.2	7.3	2.2	5.6
Electricity generated	3,366	3,091	3,498	3,654	3,940	4,200	4,407	4,771	5,036	
% change	-	-0.8	13.2	4.5	7.8	6.6	4.9	13.6	5.5	6.9

Source: GOK (2009). Statistical Abstract, National Bureau of Statistics and KPLC www.kplc.co.ke, 2011

in the construction of power transmission stations and lines to tap into regional power markets. These include the Ethiopian Gibe I-V, whose total capacity is expected to be 3,902 MW. Given that Ethiopian power generation capacity in 2007 was only 840 MW, definitely there will be surplus for sale to power-hungry EAC countries like Kenya.

The demand for transmission poles is highly correlated to the power transmission expansion, which depends on the availability of funds to finance power generation and the distribution infrastructure in the country; and as seen above, the power generation in Kenya is highly constrained. The population factor may not influence power distribution directly - a higher population will only lead to increasing unmet demand for power. Based on all this, the growth in the demand for power transmission poles might range from seven to 10 per cent, inclusive of replacements, within the next 10 years.

Uganda

The Ugandan scenario is similar to the Kenyan one. However, Uganda's critical problem has been stagnant electricity generation that has translated into regular power outages and rationing. Uganda has only been able to connect 10 per cent of households. Studies have shown that the country needs to generate up to 2,000 MW by 2025 to meet its projected demand for electricity against a current installed capacity of 300 MW.

Based on the existing scenario, the growth in electricity connections in Uganda will remain modest within the next five to ten years. However, Uganda is endowed with water resources and is currently undertaking various hydropower generation projects. These may generate extra power for distribution within the next 10 years. Another factor to consider is the likely influence of oil deposit exploitation and the possibility of enhanced oil-related electricity generation that will have a knock-on effect on demand for distribution infrastructure.

Tanzania

Tanzanian electricity power generation is dominantly hydropower-based, but relatively low at 367 MW by 1998. It is projected to expand by 8 per cent annually to 2,312 by 2025 on condition of sufficient funding (Mwinava et al, 2003). However, the funding for such ambitious expansion has not been realised. This is attested by the fact that by 2011, the Tanzania Electricity Supply Company (Tanesco) could only guarantee 347 MW against a demand of 550 MW, and imports from Uganda and Zambia were required to fill the deficit.

Tanzania, like Uganda and Kenya, faces the same problems of high power demand against inadequate generation capacity. Therefore, it is our assumption that within the next five to ten years, the power transmission growth in Tanzania is likely to be modest, translating into low growth of distribution infrastructure and thus low demand for power transmission poles.

Dynamics in pole production and processing in East Africa

Kenya

In 2004, there were only two treatment plants - Timber Treatment International (TTI), formerly East African Tannin Extraction Company (EATEC) at Eldoret, and Gilgil Telecommunications Industries (GTI) at Gilgil. The treatment capacity of the two plants was 160,000 power transmission poles per year. By 2005, there were five treatment facilities capable of producing 250,000 treated poles per year (Cheboiwo and Langat, 2006). By 2009, there were eight treatment plants capable of producing 450,000 treated poles per year (Cheboiwo, 2010).

However, by January 2011, there were already 17 registered commercial treatment plants in the country (see Table 2). The sector has been undergoing some rapid expansion, fuelled by the high demand for transmission poles by KPLC and REA. Despite such massive expansion of processing capacity, a study in 2010 revealed that most of the plants operated below installed capacity due to a shortage of semi-processed poles and sometimes, delays in delivery of chemicals.

Table 2: Treatment plants for transmission poles, location and capacities in Kenya

Company	Location	Installed capacity per year
TTI-EATEC	Eldoret	50,000
TTI-EATEC	Londiani	40,000
TELKOM-GTI	Gilgil	72,000
Timsales Ltd	Elburgon	84,000
Comply Ltd	Nakuru	36,000
E A Cabro	Elmenteita	90,000
Typsy Timber Treatment Ltd	Eldoret	72,000
Muringa Holdings Ltd	Limuru	50,000
KUZA Ltd	Kitale	40,000
Central Imenti Cooperative Society	Meru	40,000
Murendat Timber Treatment Ltd	Nakuru	40,000
Kakuzi Ltd	Thika	40,000
Makuyu Timber Treatment Ltd	Maragua	40,000
Rosoga Enterprises Ltd	Molo	75,000
Keystone Treatment Services	Lessos	25,000
TOTAL		794,000

Source: Cheboiwo (2012)

Uganda

Uganda has been a net importer of treated poles for power transmission from South Africa and South America for a long time. However, within the last 10 years, the country has become self-sufficient and is currently exploring export markets. Given the projected low expansion of power generation in Uganda, it will remain a net exporter of treated transmission poles within the next 10 years and its expansion will be constrained by competition in key regional markets, specifically Kenya.

Table 3: Treatment plants for transmission poles, location and capacities in Uganda

Company	Location	Capacity per year
New Forests Company	Mityama-Fort Portal	120,000
Busoga Forest Company	Masese-Jinja	50,000
Nile Ply Pole Treatment Plant	Kakoge-Nakasongola	100,000
Ferdsult Ltd	Mukono-Kampala	20,000
Uganda Electricity Distribution Company	Kampala	50,000
TOTAL		340,000

Source: Cheboiwo (2012)

Tanzania

With seven pole treatments plants, (Table 4), the country produces treated poles in excess of the existing domestic demand. This explains why Tanzania has remained an exporter of transmission poles to Kenya. Tanzania exports have locked out South Africa from the Kenyan market.

The development of the pole sector in Tanzania has been largely due to private sector investment in plantations in southern Tanzania, mostly in the Iringa area. Tanzania will most likely remain a net exporter of treated transmission poles within the next 10 years, mostly to Kenya, but will face competition from both Kenyan and Ugandan plants.

Analysis of the transmission pole market chain in Kenya

Studies done by Cheboiwo (2012) in Western Kenya show that the pole treatment sector has attracted many investors in processing plants, financing, transportation, procurement and marketing. The services provided by the investors (including logging, treatment, financing and marketing) take 86-77 per cent of the transmission pole delivery prices to a KPLC yard, leaving tree growers with 14-23 per cent.

The entry of many players into the treatment plant business has increased competition in the supply of treated transmission poles. This development is likely to drive prices down by some 40 per cent in the coming years from an average of Ksh 12,000 (US$ 150) to Ksh 7,200 (US$ 90). The price fall can only be checked by the continued shortage of semi-processed poles, availability of export markets and better bargains by tree-growers.

Trends in semi-processed pole prices

Chasupply of semi-processed poles (that is, poles cut to size but not yet treated) from plantations and farms in Kenya has been on the increase in the last 10 years due to the expanded growing of eucalyptus in the country.

Studies by Cheboiwo (2012) show that the farm gate prices for semi-processed poles increased by 366 per cent from Ksh 750 in 1999 to Ksh 3,500 per piece by 2012.

Table 4: Treatment plants for transmission poles, location and capacities in Tanzania

Company	Location	Installed capacity per year
Sheda	Mafinga, Iringa	15,000
Ihembe	Mafinga, Iringa	15,000
Sao Hill Industries	Mafinga, Iringa	160,000
Tanwat	Njombe, Iringa	40,000
Lesheyal	Mufindi, Iringa	30,000
MWPT	Mufindi, Iringa	70,000
Mwijage	Makambako, Iringa	15,000
TOTAL		345,000

Source: Cheboiwo (2011)

A woodlot of improved Eucalyptus grandis in Zephaniah Kurgat's farm in Malel Village, Uasin Gishu County, Kenya. This is one of the many woodlots being established for the burgeoning pole market. (Photo: BGF)

The prices have motivated hundreds of farmers and tea estates to invest in commercial growing of *Eucalyptus grandis* and *E. saligna* mostly in the Rift Valley, Central and Western Kenya (Cheboiwo, 2012).

Challenges in the sector

Challenges range from high cost of material inputs (raw poles and chemicals) to competition from concrete pylons and the large number of treatment plants. The plants and processing capacity have been expanding fast, translating into excess capacity and severe shortage of the raw poles. The increase in *E. grandis* plantations in the last 10 years will ease that shortage in the next few years.

The treatment plants complain of high prices of imported treatment chemicals due to the falling value of the Kenya shilling against the US dollar. High pole prices at farm level have led to harvesting of immature of from fast-growing trees that lack sufficient strength for the intended purpose.

Another factor is the entry into the market of concrete pylons, with greater strength and durability. Although the initial production capacity of the concrete pylons stand at less than 6 per cent of the current annual demand for transmission poles, it will squeeze wooden poles out of the market share of the larger sizes as used for intercity transfer grids.

Projected demand for transmission poles in Kenya

There are only two major consumers of treated transmission poles in the country, Kenya Power and the Rural Electrification Authority (REA), after TELKOM-Kenya ceased expansion of telegraphic wiring in favour of wireless. The demand for treated poles in 2007/2008 was 700,000, which had fallen to 310,000 pieces for 2008/2009, and started to rise with the entry of REA, pushing the demand to 520,000 pieces in 2010. The fall had been due to clearing of the backlog connection and concentration on new projects and replacements.

KPLC consumption and projections are shown in Table 5 overleaf.

REA procured from local sources 60,000 pieces in 2008, 67,000 in 2009, some 83,000 in 2010 and projected 113,000 for 2011. REA projected to expand its coverage to at least 4,200 kilometres at an average of 20 poles per kilometre, translating into 84,000 poles in 2012 and expected to increase its coverage by 10 per cent per year within the next five years.

Despite the projected fall in transmission pole imports to zero by 2012, imports from Tanzania and Uganda have continued to enter the Kenyan market throughout 2013 for various reasons, notably a government decision to open up the sector for regional competition.

Fencing posts are also a growing market. The photograph shows part of the fence of Nairobi National Park. (Photo: BGF)

Table 5: KPLC consumption and projected demand for transmission poles 2008-2012

Year	Requirements (poles)	Value in Ksh (billions)	Local supplies	% total	Imports (poles)	% total
2008	300,000	3.45	210,000	70	90,000	30
2009	330,000	4.312	280,500	85	49500	15
2010	363,000	4.960	326,700	90	36,300	10
2011	400,000	5.703	400,00	100	0	0
2012	440,000	6.560	440,000	100	0	0

Table 6: Tender prices for treated poles purchased by KPLC in April 2006 per piece

Company/ Size	9m		10m		11m	
	US$	Ksh	US$	Ksh	US$	Ksh
TTI - Kenya	-	10,800	160	11,520	180	12960
Sao Hill -Tanzania	150	10,800	160	11,520	180	12960
TTP - SA	127.5	9,180	147.2	10,598	170.1	12,247

Source: Ministry of Energy, 2006

Imports of transmission poles in Kenya

The dependence of Kenya on imports has been on the decline due to increased local processing capacities. For example, Kenya in 2006 had a deficit of 200,000 transmission poles, valued at Ksh 2 billion (US$ 25 million) that necessitated importation from various countries (Cheboiwo, 2010). To fill the gap, Kenya imported 47,000 pieces estimated at about Ksh 520 million, from a consortium of Tanzanian suppliers lead by Sao Hill. Again in 2007, Kenya imported 150,000 treated transmission poles from Tanzania, South Africa, Brazil and Finland. Similarly, in 2008 Kenya imported 65,316 transmission poles from Tanzania, Uganda and Chile.

Table 6 shows the market prices ranging from both local processing plants and imports (Cheboiwo, 2010).

The demand for imports into the country will depend on the shortage of raw poles from plantations and farms. There may not be a complete halt in imports but there will be a rapid decline in the next few years.

The large pole treatment capacity in the Kenyan market has exceeded the domestic demand and many treatment plants are already exploring export opportunities within the COMESA region. This is because Kenya Power has reduced backlogs in connections. In addition, there might be a shortfall in power generation if the planned investment to increase power generation by 25 per cent per year is not realised.

Conclusions and recommendations

The East African countries are facing acute shortages of power generation that cannot meet a fast-growing demand for electricity. Under such conditions, the demand for transmission poles will remain modest at between 7 – 10 per cent per year in the next five to 10 years, despite increased investments in the treatment capacities in the region.

Unless the Kenyan geothermal and the Ethiopian Gibe III projects come to fruition, the growth in power generation in the region will remain dismal and be the major constraint to power distribution and demand for treated transmission poles. There has been remarkable investment in commercial eucalyptus plantations in East Africa by both the private and the public sector, targeting production of semi-processed poles. This is likely to ease the current supply shortage in the next 10 years.

The trade in treated poles between the EAC countries will reduce drastically given the expanded treatment capacities within each of the member countries. The EAC countries thus need to diversify market opportunities into the wider COMESA region.

Unlike other forest products like timber, treated transmission poles have not attracted policy and legal barriers and therefore have greater potential to evolve into competitive marketing systems. Kenya stands to benefit through open trade within EAC countries given its huge existing and projected power generation capacity and installed treatment capacity.

(References available on demand)

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