

THE 20TH ECONOMIC SYMPOSIUM



ENERGY INFRASTRUCTURE AS AN ECONOMIC ENABLER IN A DEVOLVED GOVERNMENT

**A PRESENTATION AT THE 20TH ECONOMIC
SYMPOSIUM AT THE HILTON HOTEL, NAIROBI**

BY

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BIODATA-1

- Graduated from the University College, London with a B.Sc. Degree in Electrical and Electronics Engineering in June 1973
- Started working with KPLC in 1973 as a Graduate Apprentice
- Rose through the grades up to the position of Deputy Managing Director in 2002.
- Retired after attaining age 55 in 2005.
- Joined the Ministry of Energy as an Engineering Advisor to the Permanent Secretary.

BIODATA-2

- Resigned from the MoE in 2008 and joined Tsavo Power Company as Chief Executive Officer
- I am a Registered Consulting Engineer, Fellow of the Institution of Engineers of Kenya and its 1st vice-Chairman; Member of the Engineers Registration Board; Chairman of JKUAT Council.
- In addition, I am a Chartered Engineer of United Kingdom.
- I am a father of 5 adults.

Presentation Outline

- **Introduction**
- **Devolved Government**
- **Resources in Counties**
- **Kenya's Vision 2030**
- **National Development**
- **Role of Energy in economic development**
- **Electricity-Sources and Demand**
- **Funding the projected expansion**
- **Conclusion**

INTRODUCTION

- Effective development of our country should be anchored on the development of the counties.
- Currently everybody looks at the National Government to develop their areas
- In the past years, the construction of a road or the installation of electricity was being used for political patronage.
- Devolution will now allow counties to take care of their development needs

DEVOLVED GOVERNMENT

- The Constitution has provided for 47 Counties
- The legislative authority of a county has been vested in, and exercised by, its county assembly (Article 185(1))
- The county assembly may receive and approve plans and policies for:-
 - the management and exploitation of the county's resources; and
 - the development and management of its infrastructure and institutions. (Article 185 (4))

RESOURCES IN THE COUNTIES-

1

- Kenya is well known in the region as an agricultural country.
- The country has significant unexploited mineral deposits-Gold in western and Nyanza; iron-ore in Eastern and Coast Province, precious stones in Taita; coal in Eastern and Coast; oil in Northern Kenya and Lamu(?); etc.
- Kenya has a large potential of geothermal energy in the Rift Valley-currently estimated at between 7,000 and 10,000 MW

RESOURCES IN THE COUNTIES-

2

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RESOURCES IN THE COUNTIES-

3

- Kenya's touristic sites are some of the best in the world
- The country has a number of mini-hydro sites estimated to have a potential of 3,000 MW.
- The wind energy potential of Kenya is quite high and is estimated to be in thousands of Megawatts.
- The solar energy potential is extremely large as the country lies on the equator.

RESOURCES IN THE COUNTIES-

4

- The fishing industry is still under-developed
- **THEREFORE, KENYA'S POTENTIAL FOR ECONOMIC DEVELOPMENT IS QUITE HIGH.**

KENYA'S VISION 2030-1

- This vision aims at making Kenya a newly industrializing, middle income country providing high quality life for all its citizens by the year 2030.
- The vision is based on three pillars namely:-
 - Economic
 - Social
 - Political

KENYA'S VISION 2030-2

- The economic pillar aims at providing prosperity of all Kenyans through an economic development programme aimed at achieving an average Gross Domestic Product (GDP) growth rate 10% per annum over the next 18years.
- The key drivers under this pillar are:-
 - Tourism**
 - Increasing value in Agriculture**
 - Better and more inclusive wholesale and retail trade sector**
 - Financial services**

KENYA'S VISION 2030-3

- Energy is one of the enabler for Kenya Vision 2030

NATIONAL DEVELOPMENT

- The new constitution vests the development of resources and infrastructure in the counties
- There will be no longer the “**blame game**” between National and County Governments
- The counties will be expected to take full responsibility in the development of their counties

ROLE OF ENERGY IN ECONOMIC DEVELOPMENT-1

- Energy is the prime mover of any economy
- Countries that have higher per capita per person energy consumption have stronger economies
- The Countries must attract industries and high level commercial operations in the counties to spur economic development and increase the incomes of their people.

ROLE OF ENERGY IN ECONOMIC DEVELOPMENT-2

- Value addition to our agricultural products will form the main activity in our counties especially those in farming areas.
- All these activities will require energy
- **THEREFORE, AFFORDABLE (COST EFFECTIVE), RELIABLE AND HIGH QUALITY ENERGY WILL BE NECESSARY FOR THE ECONOMIC DEVELOPMENT OF OUR COUNTIES**

Average Power Per Capita Per Person in African Countries

Country	Watts per Person
South Africa	581
Libya	354
Botswana	168
Namibia	161
Egypt	130
Swaziland	133
Tunisia	126
Zimbabwe	108
Gabon	102

Average Power Per Capita in African Countries

Country	Watts per Person
Chad	1.03
Burundi	2.44
Rwanda	2.50
Central African R.	2.86
Tanzania	3.57
KENYA	14.2
Ethiopia	3.80
Guinea Bissau	4.01

Average Power Per Capita in Developed World

Country	Watts per Person
Norway	2,812
Finland	1,918
Sweden	1,692
Kuwait	1,540
UAE	1,335
Australia	1,244
Taiwan	1,101
South Korea	879

SOURCES OF ENERGY-1

- **In Kenya we have the following sources of energy:-**
 - 1. Electricity**
 - 2. Fossil Fuels**
 - 3. Biomass**
 - 4. Solar**
 - 5. Wind**

SOURCES OF ENERGY-2

- Currently, Biomass (Wood fuel and charcoal) supply close to 68% of the total energy consumption in Kenya.
- Of the balance, 22% is supplied by imported petroleum products (including LPG).
- Electricity contributes only 9%
- Solar and other forms contribute 1%

PRESENTATION FOCUS

- Petroleum and electricity dominate the Commercial Energy
- For this presentation I will concentrate on Electricity which is considered to be the prime mover of industries and Services.

SOURCES OF ELECTRICITY IN KENYA

- The main sources of electricity generation in Kenya are :-
 - Hydro
 - Thermal
 - Geothermal
 - Wind
 - Solar
 - Bagasse
 - Biogas

ELECTRICITY GENERATION

AS AT 30TH JUNE 2011

Source	Installed Capacity	Effective Capacity	Energy (GWh)
Hydro	763.3MW	735.3MW	3,427.4
Thermal	600.6 MW	522.3 MW	2,286.0
Geothermal	198 MW	191MW	1,268.0
Bagasse	26MW	26MW	87.0
Imports	-	-	30.9
Wind	5.3MW	5.1MW	17.7
Total	1,593.2	1,479.7	7,117.0

ELECTRICITY GENERATION AS AT 30TH JUNE 2011

SOURCE	%GENERATION
HYDRO	48.00
THERMAL	32.32
GEOOTHERMAL	17.80
BAGASSE	1.20
WIND	0.25
IMPORTS	0.43
TOTAL	100

PROJECTED ELECTRICITY DEMAND

YEAR	DEMAND in MW
2011	1,230
2015	2,500
2020	4,700
2025	8,500
2030	15,000

World Energy Growth

- World net electricity generation is expected to increase by an average of **2.3 percent per year** from **2007** to **2035**.
- It is ,therefore, expected from **18.8 trillion kilowatthours** in **2007** to **25.0 trillion kilowatthours** in **2020** and **35.2 trillion kilowatthours** in **2035**
- Compare with Kenya's increase from **7,000GWH** in **2011** to **92,000MW** IN **2030**

World Energy Growth--2

- Electricity supplies an increasing share of the world's total energy demand and grows faster than liquid fuels, natural gas, and coal in all end-use sectors except transportation.
- From **1990 to 2007**, growth in net electricity generation outpaced the growth in total energy consumption (**1.9 percent per year and 1.3 percent per year, respectively**), and the growth in demand for electricity is expected to continue to outpace growth in total energy use up to **2035**.

World Energy Growth--3

- In general, projected growth in OECD countries, where electricity markets are well established and consumption patterns are mature, is slower than in non-OECD countries, where a large amount of demand goes unmet at present.
- The electrification of historically off-grid areas plays a strong role in projected growth trends.
- The International Energy Agency estimates that 22 percent of the world's population did not have access to electricity in 2008—a total of about 1.5 billion people.

ELECTRICITY ACCESS - KENYA

In Kenya ,75% of the people have no access to electricity.

World Energy Growth--4

- Regionally, sub-Saharan Africa is worst off. More than 71 percent of the population currently remains without access to power.
- With strong economic growth and targeted government programs, however, electrification can occur quickly.
- In Vietnam, for example, the government's rural electrification program increased access to power from 51 percent of rural households in 1996 to 95 percent by the end of 2008

World Energy Growth--5

- Renewable energy is expected to be the fastest-growing source of electricity generation up to Year 2035.
- Total generation from renewable resources is expected to increase by 3.0 percent annually, and the renewable share of world electricity generation will grow from **18 percent in 2007 to 23 percent in 2035**.
- Almost 80 percent of the increase will be in hydroelectric power and wind power.

World Energy Growth--6

- The contribution of wind energy, in particular, has grown swiftly over the past decade, from **18 gigawatts** of net installed capacity at the end of **2000** to **159 gigawatts** at the end of **2009**—a trend that is expected to continue into the future.
- Of the **4.5 trillion kilowatthours** of new renewable generation which will be added over this period, **2.4 trillion kilowatthours (54 percent)** is attributed to hydroelectric power and **1.2 trillion kilowatthours (26 percent)** to wind

Kenya's Additional Capacity

- In Kenya, the following will be the additions in capacity by 2030:-
 - Geothermal will increase from 198MW to 5,600 MW
 - 3,900 MW of coal will be installed during the period.
 - 9,000 MW of nuclear will be installed.
 - 2,000MW of Wind will be in service and finally,2000MW of imports will be realised.

FUNDING FOR EXPANSION-1

- The growth of electricity demand will occur in the counties.
- Currently, the Government, through the Rural Electrification Authority , has extended power to most of the counties.
- However, with the expected high demand, reinforcements will be required

FUNDING FOR EXPANSION-2

- The capital required for the planned generation ,transmission and distribution will be very high. Private Sector participation will be necessary to ensure that the counties have reliable, cost effective and high quality electricity for their development.

DEVELOPMENT OF RENEWABLES

- Non-marketed renewables are expected to continue providing energy to Kenya's rural areas; however, it is often difficult for us to find funding or international support for larger commercial projects. Plans for several mini and micro-hydroelectric projects in the counties have been advanced recently, and they may help boost supplies of marketed renewable energy in the mid-term.

Why Independent Power Producers (IPPs) ?-1

- Capable of raising investment capital through Project Finance
- Provide efficiency in both implementation of the Project and Operation of Plant
- Capable of fast tracking project implementation if necessary
- Provide opportunities to Governments for multiple industry players
- Leaves Governments to avail funds for Social needs

Why Independent Power Producers (IPPs)-2

- Maximizes plant availability
- Increases the country's skilled manpower.
- Experience in implementation of renewables
- Increases Government's tax collection.

Can Kenya attract IPPs-1

- The Kenya Government has substantially reformed the Energy Sector with an effective institutional, regulatory and legal framework.
- Four Independent Power Producers are already operating in the Country.

THE ANSWER IS ,THEREFORE, YES

What is needed to attract IPPs-2

- An independent Regulator is a **MUST** for meaningful IPP participation
- The Utility should be financially viable in order to meet its payment obligations.
- The Utility Staff should be capable of negotiating Power Purchase Agreements.
- The Governments' policy on tariffs **MUST** be clear and transparent

What is needed to attract IPPs-3

- The Government must put in place policies or incentives which provide the primary economic motivation for construction of renewable generation facilities. Good Corporate Governance **MUST** be demonstrated by the Utility as most financiers are not willing to deal with corrupt institutions

What is needed to attract IPPs-4

- The Government **MUST** demonstrate a fast and efficient commercial dispute resolution system.
- Government **MUST** have a foreign exchange system that allows easy access to foreign currency and easy repatriation of Dividends where foreign firms are involved.

Long Term Planning -1

- As noted, Kenya has vast potential of natural resources which must be fully utilized for the benefit of Kenyans.
- Long term planning must take into account a mix of all these sources to obtain least cost electricity to consumers

Long Term Planning -2

- Although renewable energy sources have positive environmental and energy security attributes, most renewable technologies other than hydroelectricity are not able to compete economically with fossil fuels
- Despite this, it is necessary that every Long Term plan must include renewables.

Public Private Partnership (PPP)- 1

- For small projects and renewable projects the Government can allow IPPs to implement them independently
- However, for large projects and those that have special risks, PPP's will be the best option.
- This can apply effectively not only to generation projects but also to transmission lines.

Greenfield IPP Investment

- IPPs, unlike the state owned utilities are willing to venture in the emerging technologies if the Feed In Tariffs are right. For example, the country is implementing 300MW wind power plant in Turkana, thus opening the area for development.

Conclusion

- The Counties will require reliable, cost effective and high quality electricity supplies to achieve economic development
- Whilst the major generation and transmission lines will be handled centrally, counties must exploit the mini and micro-hydro, biogas and wind resources which are in their counties.
- Counties must encourage innovation and also facilitate people to start value adding projects in their counties.
- The private sector should be encouraged and facilitated to invest in the counties.

DISCLAIMER

- The views and opinions expressed in this presentation are my own and **NOT** of TSAVO POWER COMPANY



**THANK YOU
FOR YOUR
ATTENTION**