Sustainable Green Energy - Safaricom's Experience

GSMA – Green Power for Mobile (GPM) 7th Working Group Workshop

Sarova Whitesands – Mombasa – Kenya

15th – 16th March 2011

Sichiri Mukunzi,
Head, Technical Operations Support & Logistics Dept, Safaricom Limited

Safaricom



Content;

- Overview.
- Network Footprint.
- Challenges
- Green Energy Initiatives
  - Status of Green Energy.
  - Other Initiatives.
- Sustainability
- Future Outlook.

Safaricom

Safaricom - Background

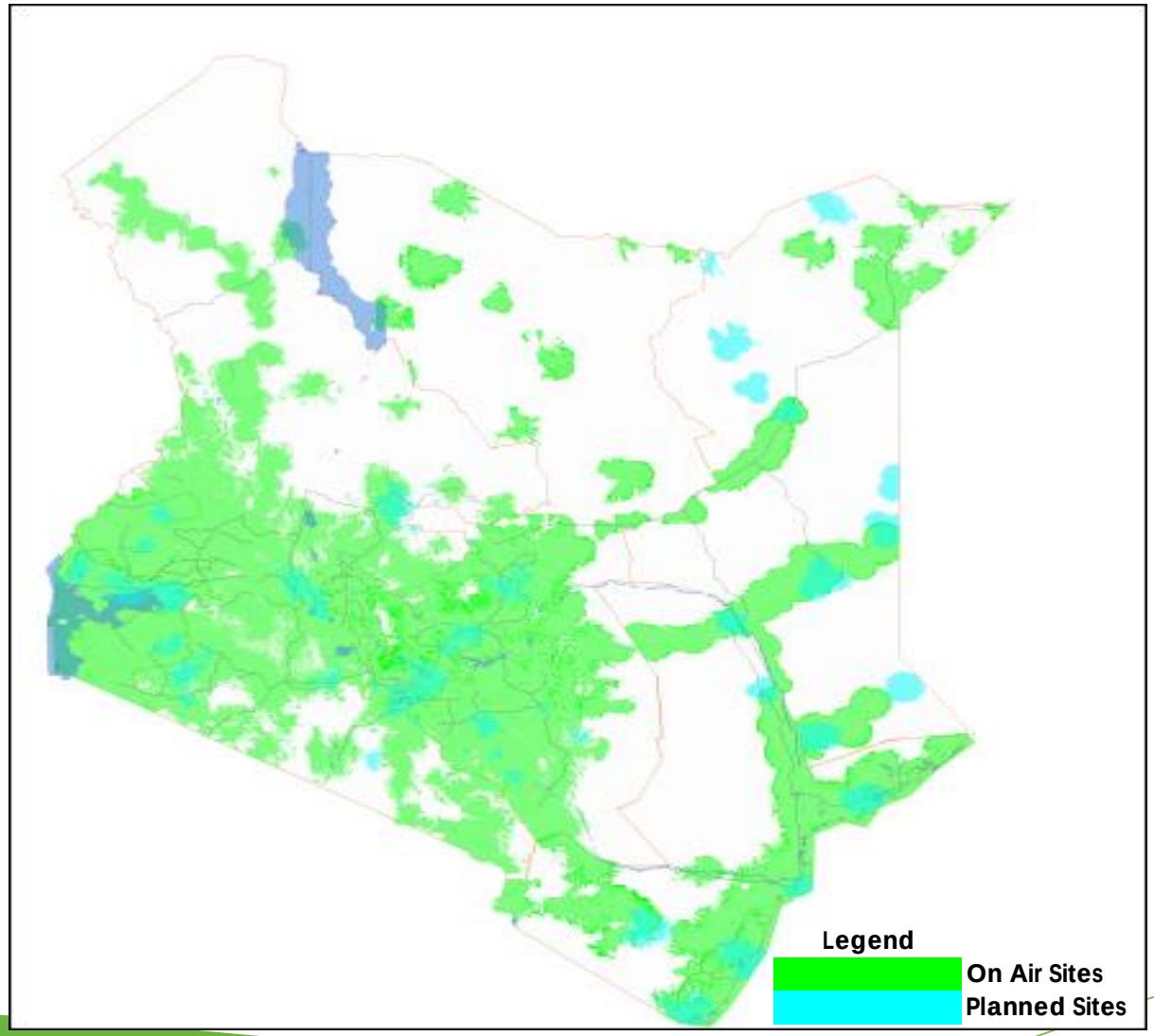
- Safaricom Limited was formed in May 2000 as a joint venture between Telkom Kenya and Vodafone UK.
- Safaricom is the leading mobile services provider in the country, with a subscriber base of over 18M, a market share of 75% and MPESA subscribers at 14M.
- Present shareholding of Safaricom (40% Vodafone, 35% GOK, 25% Public shareholding through Nairobi Stock Exchange (NSE).
- Countrywide network covering over 80% of the Kenyan population. Estimated Kenyan population is 39M by 2009 census results.
- Voice, data services (GPRS/EDGE/HSPDA/WiMAX), Mobile Money Services (MPESA) and other Value Added Services (pay bill e.t.c).
- 3G rolled out in 50% of the sites in the network.

Safaricom

Overview - General

- Safaricom has about 2,500 base stations with a mix of 2G, 3G and WiMAX technologies.
- Most of the sites are powered by grid power, with backup diesel generators, 10% of the sites are on 24/7 DEG power and 3% on renewable energy hybrid system.
- Focus is on reduction of generator running hours to save on NOPEX, conserve the environment (reduce Carbon footprint), green image, green business leadership.

Safaricom Network Coverage



Safaricom

Overview – GSM Technology

- Safaricom has about 2,500 2G base stations, 1,250 3G sites and 200 WiMAX sites.
- Focus is on rolling out energy efficient telecom equipment; BTSs (flexi-BTSs, diet sites e.t.c), Multi-radio, BSCs, Node Bs, RNCs e.t.c.
- Strategy to roll-out outdoor BTSs and eliminate the need for cooling.
- Automatic TRX shut-down (trials).
- Cycling of batteries to reduce on genset running in grid sites.

Safaricom

Challenges

- Safaricom sites consumes an average of 700,000Litres of diesel per month, 70% consumed by off-grid sites at a cost of KES 87M.
- 2,308 sites with diesel generators (DEG).
- Prohibitive high costs of diesel (Middle East, North Africa crisis e.t.c).
- Delivery logistics' problems in remote areas.
- Fuel theft and adulteration.
- Carbon emissions and environmental pollution from combustion of fossil fuel.

Challenges – Contd.

- Slow pace of grid penetration in rural remote areas.
- Unhealthy, frequent outages of grid power.
- Inefficient air conditioners (High energy consuming).
- Premature battery failures.
- Fuel theft and adulteration.

Green Energy Initiatives

Reasons for Green Initiatives;

- Slow Pace of Power Connection to BTS sites by the National Grid Power Company
- Lack of Grid Power infrastructure in the remote rural areas.
- Ever increasing cost of diesel.
- High logistic cost of maintenance and diesel delivery to remote sites.
- Sustainable Energy Use (Environmental issues, carbon footprint).
- Corporate Social Responsibility (Community Power Projects, Green Image e.t.c).
- Availability of renewable energy resources.

Safaricom

Green Energy Initiatives - Overview

- Sites located in areas remote from national grid power infrastructure to be deployed on renewable energy solutions (solar, wind hybrid systems).
- To reduce on carbon footprint by reducing the generator running hours.


Olisirua


Osopuko



Osopuko


North Horr


Laisamis


Sololo


Morua Nachok

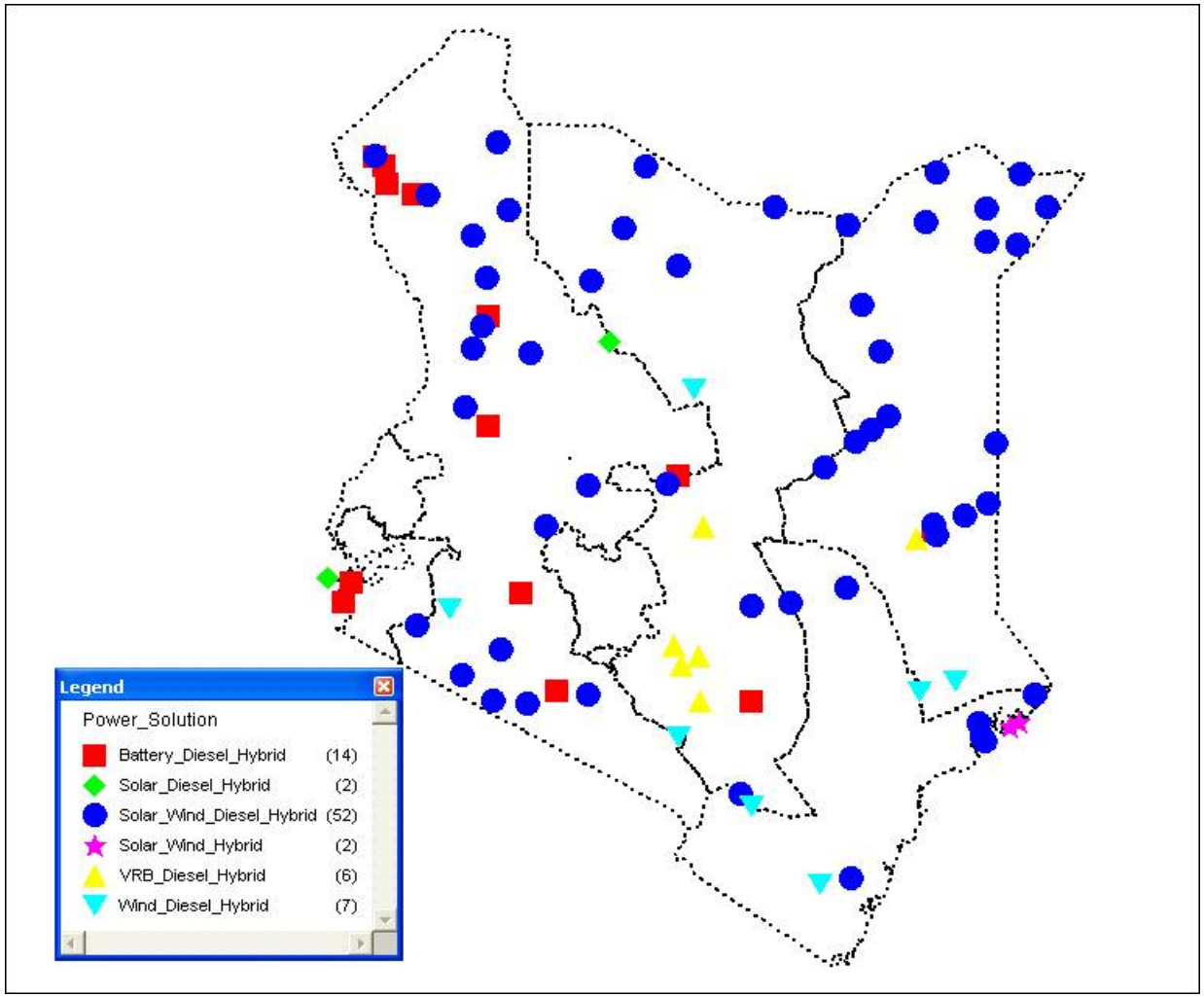
Safaricom

Status of Power Systems

#	Power Source Category	No. of Sites
1	Solar_Wind_Hybrid (Pure Green)	2
2	Solar_Diesel_Hybrid	2
3	Solar_Wind_Diesel_Hybrid	52
4	Wind_Diesel_Hybrid	7
5	Battery_Diesel_Hybrid	14
6	VRB_Diesel_Hybrid	6
	Total Number of sites on RPS	**83**
	Number of Sites on Air	**2485**
	% of Green Power Sites	**3.34%**

Safaricom

Status of Green Power Sites



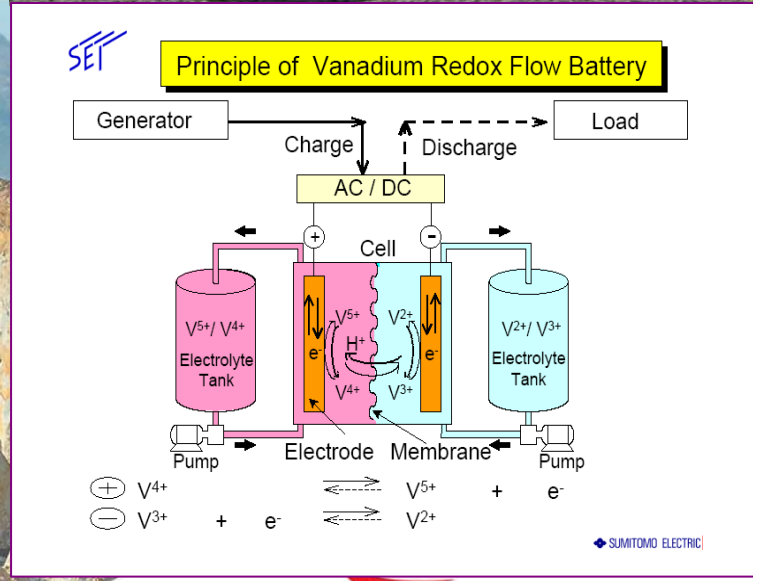




Other Initiatives

- Improvement of Quality of Grid Power through;
  - Power Management Units, PMU/(PIU)
  - Automatic Voltage Regulators (AVR)/Stabilizers, Isolation Transformers e.t.c.
  - Autophase Selectors (APS)
- Deployment of long-life (high cycle and deep discharge batteries) e.g. Vanadium Redox Battery (VRB) to replace Lead Acid batteries.
- Deployment of cyclic batteries to reduce on genset hours in grid sites





Other Initiatives – Contd.

- Energy Efficiency Measures;
  - DC air conditioners, Temperature/Voltage controlled generator running.
  - Efficient telecoms equipment; BTSs, BSCs Node Bs, RNCs e.t.c
  - Battery Coolers and free-cooling systems.
- Other Initiatives under trials; Biofuels, Hydrogen Fuel Cells, Straight Vegetable Oil (SVO).
- Extending the grid – Safaricom constructs power-lines upto 6kM in off-grid areas using her own resources, thereby reducing on genset running.

Safaricom

Green Power Equipment - Vendors

- Winafrique Technologies Limited.
- Philafe Engineering Limited.
- Huawei Technologies Limited.
- Ericsson Kenya Limited.



Green Power – Sustainability Aspect

- Green business leadership (The local environment regulator (NEMA) awarded Safaricom the best environmental compliant company in the telecom sector in 2010.
- Environmental Conservation (reduction in carbon footprint).
- Corporate Social Responsibility (CSR), giving to the community;
  - Social Impact; Community Power Project (improving lives within the community, Community Schools' Computer Projects, mobile charging booth)





Green Power – Sustainability Aspect



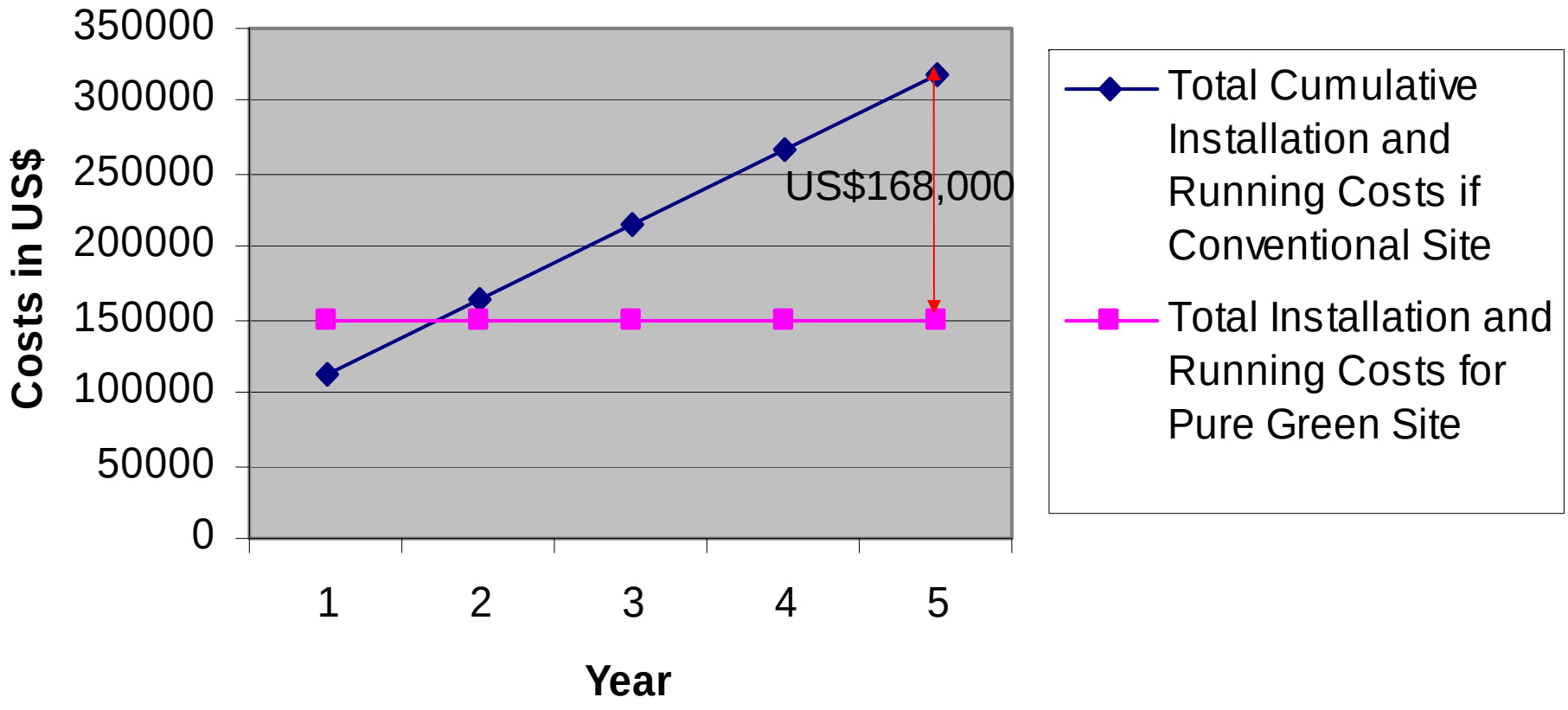




- **Empowering local community; Street lighting, water pumping, community surveillance radio, supply of power to local mission hospitals.**

Safaricom

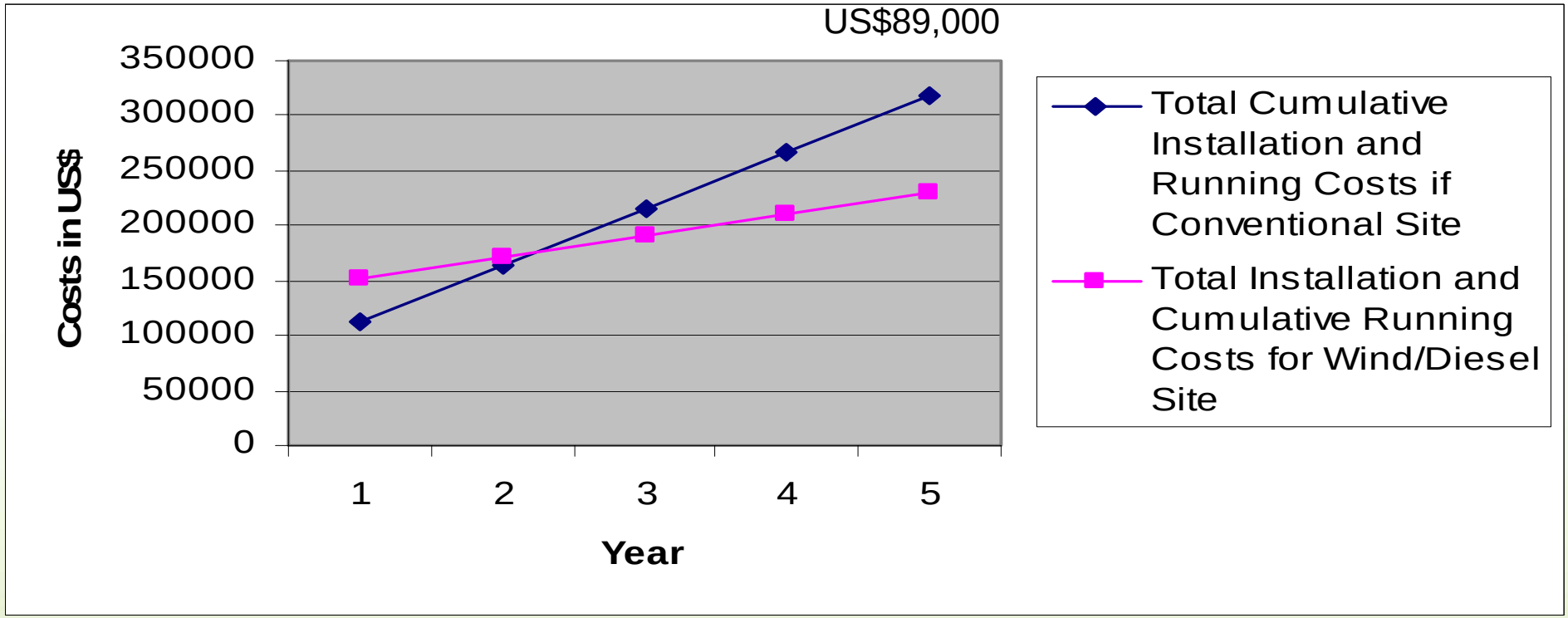
Green Energy – Economic Justification



- Solar_Wind Hybrid system (Pure Green Site), Simple Payback Period (SPB) of less than 2 years.

Safaricom

Green Energy – Economic Justification

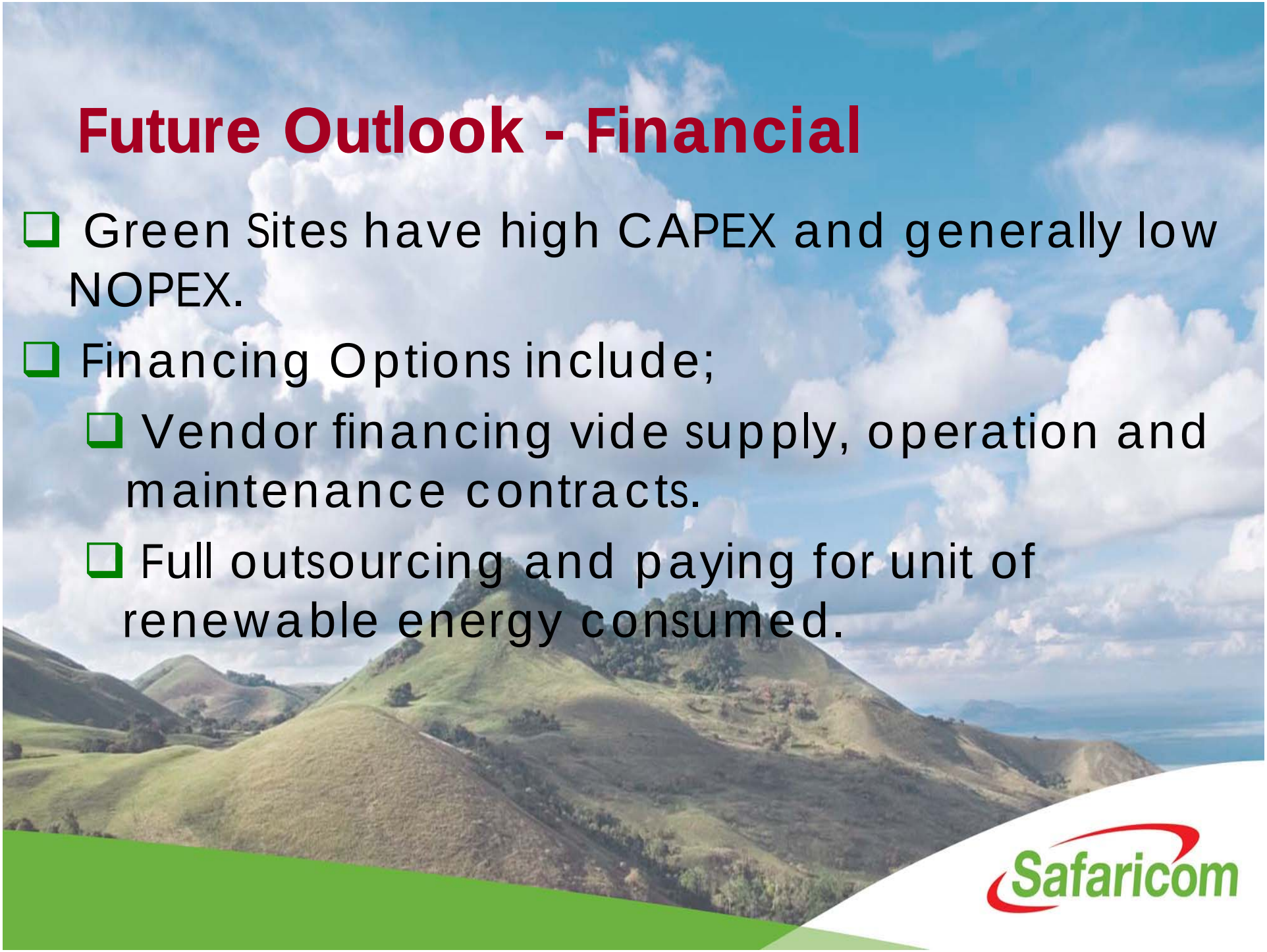


- Solar_Wind_Diesel Hybrid system, Simple Payback Period (SPB) of just over 2 years.

Safaricom

Future Outlook - Financial

- Green Sites have high CAPEX and generally low NOPEX.
- Financing Options include;
  - Vendor financing vide supply, operation and maintenance contracts.
  - Full outsourcing and paying for unit of renewable energy consumed.



Future Outlook - Technology

- Equipment Selection (Wind-Solar);
  - Low maintenance wind turbines.
  - Efficient wind turbines and solar PVs.
  - Employee solar tracking controlled solar power.
  - Reducing Renewable Energy footprint, GSM tower hoisting of wind-turbines and solar PVs on power/BTS shelters.



Future Outlook – Technology – Contd.

- Efficient Telecom equipment; BTSs, BSCs, Node Bs, RNCs e.t.c.
- Temperature and voltage controlled grid and DEG changeover (deep discharge, cyclic batteries).
- Roll-out of outdoor sites.
- Remote site monitoring and control; battery management, energy sources management.

Safaricom


Thank You
Niko na Safaricom