



# **PACE - Private Public Partnerships in Rural Electrification Uganda**

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## **International Stakeholders Meeting**

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# Country Background

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- 24.6 million People
- Physical area 236,040 Km<sup>2</sup>
- GDP Per Capita US \$ 300
- Urban Rural Mix 25:75
- Percentage Electrification 4%
- Generation Installed Capacity 320MW
- Literacy Rate 65%
- Overland Temperature 26-28<sup>0</sup>C



# Energy Situation

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- Uganda has one of the World's Lowest Per Capita Consumption of Modern Energy – Petroleum and Electricity
- 90% of Uganda's total Energy consumption is Provided by Biomass
- Only 4% of the Population have access to Electricity yet Uganda has an Energy demand growth of 7% per annum



## Energy Situation – Cont'd

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- Up till the early 90's there was little concern for Energy sector issues and energy was synonymous with Grid power
- Policy concerns were governed by the annual budgetary allocations by the MOF
- In early 90's the Energy department was established
- In 1999 the Electricity Act was passed



## Energy Situation – Cont'd

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- In September 2002 the MEMD published the Energy Policy
- Mechanisms are now in place for the guidance of the developments of a broader range of energy forms
- Opportunities are now ripe for investments in solar, biomass, mini & micro grids



# Key Developments

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- Power sector Restructuring and Privatization based on the June 1999 Strategic plan
- The plan emphasizes the need for competition in promoting efficiency and on private sector participation
- The Electricity Act, 1999 gave legal backing to the reforms and ended the monopoly by the state Utility
- IPP's have since embraced the sector



# Recent Renewable Energy and Energy Efficiency Developments

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- The power sector currently requires new investments. The options include:-
  - Decentralized power systems
  - IPP projects
  - M'gt contracts with large utilities
- Gov't in collaboration with the W Bank has initiated the 10 year phased Energy for Rural Transformation Program (ERT)



# Renewable Energy Dev'pts

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- Solar PV market - The private sector being the major actor over 10,000 units have been installed to date
- The solar market development has had to overcome a series of barriers with support of the GEF funded UPPPRE project
- A lot still has to be done





# Renewable Energy Dev'pts

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- Micro Hydro formerly reserved to Churches and the mines scattered around the Country
- The key sizes ranging between 60 - 90kW
- Mini hydro common with the mines ranging from 1mW – 5mW
- The newest at KCC installed capacity 8 - 10mW



# Renewable Energy Dev'pts

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- Efficient Biomass Use
- This has largely been the preserve of the NGO's attempts have been made to:-
  - Popularize, increase efficiency and disseminate cooking devices
  - Improve the environment via afforestation
- A lot still remains to be done



# Private Sector Involvement in Electricity provision

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- Prior to passing the Electricity Act 1999 private sector Electricity provision was largely through “Auto-generation” based on petroleum generators the total capacity in 1997 standing at 70mW



# Private Sector Involvement in Electricity provision

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## ■ New IPP's

- Uganda Rural electrification Co ltd – W Nile
- Mt Elgon Hydropower
- Hydromax Ltd – Baseruka Hoima
- Kakira Sugar works – planned 2.6mW /4.5mW
- Sugar Corporation of Uganda 2mW Installed
- Kinyara Sugar Works proposed 1.5mW
- Uganda Rural electrification Co ltd-Bushenyi
- Kilembe mines 3mW and Kasese Cobalt 8mW



# Private Sector Involvement in Electricity provision

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- Smaller Projects Micro hydros
  - Kisiizi Hospital 60kW installed planned 120kW
  - Kagando Hospital 60kW installed
  - Kuluva Hospital Nebbi 90kW
- Other independent Grids
  - Magale Hospital 37.5kW diesel genset powered minigrid



# Assessment of PPP's

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- Private participation in provision of power is still a new development therefore there are lessons to be learnt and experiences to be borrowed/shared



# Case study – Magale Hospital; E. Uganda

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- Sponsor: Magale Catholic Mission
  - Diesel powered (37.5kVA) minigrid
    - Fuel consumption 700 L diesel Pm
    - Had an over capacity
    - Financial constraints
  - Opportunity
    - Sell excess power to surrounding community
    - Decentralized system of governance (LC1)
    - Technical capacity
    - Committee



# Case study – Magale Hospital; E. Uganda cont'd

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- Charisma
- Low cost grid design
- Arrangements
  - Initially
    - Cost sharing the maintenance - the mission 10 days a month & the community 20 days a month
  - After experience
    - Tariff based on fixed category payments one bulb UGX 3000, commercial 7000 – 12000 per mo
    - Institutions flat rate 80,000 per mo
    - Served 43 customers





# Case study – Magale Hospital; E. Uganda cont'd

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## ■ Growth

- Month one (June 1999) 6 Connections
- Month five (October 1999) 61 connections
- Month nine (Feb 2000) 36 consumers 20 disconnections

## ■ Operation

- 7:00 – 10:00 pm daily
- 3 phases 40 Amps; 12 Amps and 8Amps



# Case study – Magale Hospital; E. Uganda cont'd

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- Trading centre consumed 75% of generation
- Had to meet 75% of the maintenance costs
- Tariff raise
  - Month six need for an increased tariff
    - Domestic 600018
    - Commercial 10000 – 20000



# Case study – Magale Hospital; E. Uganda cont'd

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- Benefits of the Mini-grid

- To the Hospital

- Community contribution to health services
- Increased hospital visitation
- Higher staff retention
- More non-resident medical staff (town power)
- Job seekers
- Increased medical services-Surgery, lighting etc
- Reduced generator bill for hospital (March 2000)
- Public health programs e.g. Video and TV progs



# Case study – Magale Hospital; E. Uganda cont'd

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- Benefits of the Mini-grid
  - To the trading centre
    - Increased population and visitors
    - Increased food
    - Reversed migration
    - Increased and renovated infrastructure
    - Increased hours of business
    - Increased security
    - Better property and lodging rates
    - Battery and mobile phone charging stations



# Case study – Magale Hospital; E. Uganda cont'd

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- Benefits of the Mini-grid
  - To the Institutions
    - Improved academic performance 40% pass rate
    - Today all schools have own gensets or PV systems



# Case study – Magale Hospital; E. Uganda cont'd

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- Month 17 - Collapse

- Problems

- Increased load and fuel prices; regular tariff hikes
- Suspicion of the elec. Committee
- Switch from energy efficient bulbs to incand.
- Introduction of high power gadgets – irons etc.
- Trip switches shut down an entire phase and resulted in indignation by the “clean users”
- Demand for compensation for supply fluctuations
- Bill collection problems and Defaults
- Demands for national tariff rate and a 24-hour service
- Network depreciation



## Case study – Magale Hospital; E. Uganda cont'd

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- New developments
  - Magale down sized its Genset to 3kVA
  - Installed a 325wp Solar PV system
- Other institutions
  - All purchased gensets
- Community
  - Lobbying the Gov't for a 30 km grid extension



# Case study – Magale Hospital; E. Uganda cont'd

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- Lessons learnt
  - Based on Charisma
  - Lack of legal and regulatory framework
  - Need for tariff subsidy
- Hopefully the issues shall be covered under the ERT and other sector programs e.g. Power IV