Ensuring the Sustainability of PEPFAR Infrastructure Investments In Guyana

Jeffrey Haeni[a†], Julia Roberts[b], Edris George[b], and Walter Ratterman[c]

[a]Office of Infrastructure and Engineering, United States Agency for International Development

[b]United States Agency for International Development – Guyana Mission

[c]Consultant to Institute for International Education

The Challenge:

A total of 290 Million people lack access to modern energy services in PEPFAR focus countries:

PEPFAR Focus Country	Electrification Rate %	Population Without Electricity (millions)	Population with Electricity
Ethiopia	2.6	67.2	1.8
Uganda	4	24	1
Rwanda	5	7.8	4.1
Mozambique	8.7	16.9	1.6
Kenya	9.1	28.7	2.9
Tanzania	9.2	33	3.3
Zambia	18.4	8.7	2
Botswana	26.4	1.3	0.5
Haiti	33.5	5.5	2.8
Namibia	34.7	1.3	0.7
Nigeria	44.9	66.6	54.3
Cote d'Ivoire	50.7	8.1	8.3
South Africa	67.1	14.7	30
Vietnam	79.6	16.3	63.9
Guyana	not available	not available	not available

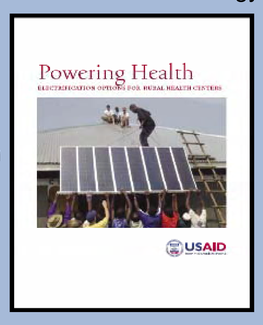
The lack of reliable energy services directly impacts PEPFAR programming through:

- Compromised sustainability of laboratory infrastructure investments: Poor quality power damages sensitive laboratory equipment, air-conditioners, and x-ray machines. Expensive power compromises the long term financial sustainability of power-intensive PEPFAR supported facilities.
- Limited reach of programs: A lack of energy services limits the ability of PEPFAR to deliver HIV/AIDS prevention, treatment, and care services to rural areas.
- Loss of critical supplies: A lack of reliable energy services can result in a loss of cold-chain dependent blood, testing reagents, pediatric ARV drugs, and rapid test kits.

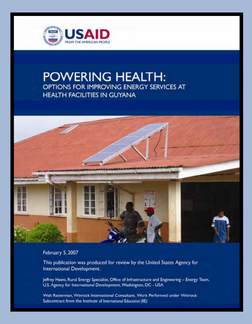
The Program:

The USAID Energy Team has launched a program to provide information and technical support to PEPFAR programs to address these critical energy challenges.

Publications:
- The Energy Team published a manual targeted at PEPFAR partners and other health care professionals which details a step-by- step approach to addressing energy issues at health facilities.



Technical Assistance: The Energy Team has provided technical assistance to the PEPFAR programs in Guyana and Rwanda. This TA is flexible to meet the needs of the program.



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Guyana Assessment Objectives:

Key Question: What options exist to use renewable energy sources or strengthen traditional electricity supplies to improve energy services at Health Facilities in Guyana?

Objectives:
a) reduce power costs for health care facilities
b) improve energy reliability and quality at grid-connected facilities
c) expand reach and quality of health services in interior

Direct PEPFAR Impact:
a) reduce long term energy costs of power intensive infrastructure currently under construction
b) reduce loss of PEPFAR laboratory infrastructure from poor quality power
c) improve quality of care by reducing service disruptions during power outages at key care facilities
d) expand PEPFAR testing and treatment services to un-electrified interior regions of Guyana

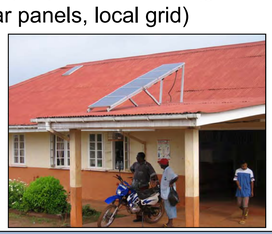
Methodology:

The Assessment Team spent two weeks in Guyana meeting with stakeholders and visiting a wide range of health facilities in country:

Representative Facilities Visited

New Amsterdam Regional Hospital and Blood Bank
- serves 60,000 per year
- hospital built in 2004
- expensive and unreliable power
- site of new Blood Bank

Mahdia District Hospital
- serves community of 5000
- transient mine workers identified as high-risk
- multiple power sources (generator, solar panels, local grid)



Micobie Health Center
- serves 360 people
- part time local health worker
- PV panel for lighting and communications

Key Findings:

Lack of reliable power supply effects nearly every health facility visited in Guyana. The effectiveness, sustainability, and reach of several PEPFAR programs in Guyana have been compromised by the lack of reliable power. The following illustrates the key issues at representative facilities:

New Amsterdam
- Air conditioning units burn out because of power spikes
- power anomalies damage x-ray machine and laboratory equipment, compromise accuracy of test results
- expensive power ($0.30/kWh) limits MOH ability to sustain services without external support.

Mahdia
- Low voltage damaging lights, and equipment
- Grid power only available from 6pm – 6am
- Expensive power:$4.00/kWh
- Diesel too expensive to run back- up generator all day

Micobie
- solar system near failure
- no training of health worker on maintenance issue
- system designed and installed incorrectly
- 13 of 21 solar systems installed at health facilities between 1982 and 2004 inoperable

Analysis:

Currently, Madia District hospital pays an average of $4.00/kWh for electricity which is poor quality and intermittent!!! (compare to average U.S. cost of $0.10)

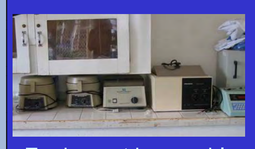
Installing a diesel generator is not always the most cost effective or sustainable option for providing reliable power to off-grid or poorly grid-connected facilities such as Mahdia. The analysis below demonstrates the significant savings that can be achieved by utilizing technologies such as batteries and solar panels to power the Mahdia District Hospital:

Scheme	Initial Capital Cost	Lifetime cost of power ($/kWhr)	
		Diesel = $0.88/L (cost at time of visit)	Diesel = $1.80/L (wet season peak cost)
Estimated Electricity need: 16,000 Whrs/day			
Solar only	$55,000	$1	$1
Solar/diesel hybrid	$47,000	$1	$1
Generator only	$7,000	$2.4	$3.45
Current cost of Power	unknown	$4	

Mahdia District Hospital: Impact of Power Issues

The district health worker at Mahdia cited power issues as his #1 problem in providing effective care.

Laboratory Infrastructure



Equipment inoperable as a result of power anomalies

X-ray lab on-hold for lack of power source.

Care

The Hospital has no power between 6 a.m. and 10 a.m., and between 2 p.m. and 6 p.m. This lack of power impacts the availability and quality of care during these times.

Conclusions:

Improving the power supply for health facilities in Guyana could have a dramatic impact on the quality and availability of care, especially in the country's rural interior. The following recommendations are being considered by the PEPFAR team and the MOH for inclusion in the FY08 COP.

- The poor quality of grid power should be a major consideration in the design of all PEPFAR-supported renovation projects – such as the blood bank in New Amsterdam and the National Reference Lab in Georgetown. Appropriate back-up systems, power conditioning units, and/or complete self- generation units should be seriously considered to stabilize the power supply and improve the quality of health care delivery.
- The international donor community, local stakeholders, and the MOH should seriously consider the power demands of all new infrastructure projects in the health sector. Consideration of energy saving design elements, such as natural lighting and passive cooling, as well as the use of energy efficient appliances should be a pre-requisite for all infrastructure projects.
- Solar power is the most economic option to meet the energy needs of small off-grid health posts, while solar-diesel hybrid systems are the most cost effective option for larger interior district hospitals such as Mahdia. ***However, investments in solar solutions are only advisable if a corresponding training and maintenance program is initiated. Previous solar electrification projects in Guyana's health sector have a poor track record of sustainability.***
- Investment in power supplies for currently un-electrified health posts could help expand vaccination programs, PMTCT, blood transfusion and other services throughout Guyana's rural interior.

† For more information contact: Jeffrey Haeni, USAID Washington, JHaeni@usaid.gov