



Workshop on Improving Energy Services to Support Laboratory Infrastructure at Health Facilities in Haiti

Sponsors: USG PEPFAR Program and Haiti National Reference Laboratory Training Curriculum
Prepared by: USAID Office of Infrastructure & Engineering • Training Instructor: Walt Ratterman

AGENDA NOTES

DAY 1 MONDAY MAY 12

Introductions

Participants Introductory Remarks
Background Information and Course Introduction
Roles and Responsibilities of Different Stakeholders

Students, Teachers, Translators, Trainers, Hosts Dr. Boncy and Rachanee Cheingsong
Program Information, Goals and Key Objectives of the course (Jeff Haeni/USAID Office of Infrastructure & Engineering)

Energy Systems Overview

Why Systems Fail
Basic Electrical Principles
Short Quiz on Basic Electrical Principles Loads Versus Sources
Watt-hour Concept Energy Efficiency
Overview of Various System Configurations
Overview of Scope

Class Discussion

DAY 2 TUESDAY MAY 13

Equipment and Inverter / Battery Design

Load Equipment Site Visit #1
Daily Watt-hour Calculations Inverter / Battery System Design
Guest Speaker

Review loads of common laboratory equipment
Calculate loads of actual clinic and review energy systems
Use spread sheet for tallying loads, watt-hours and diversification Sizing of the Inverter and the battery bank
Inverter and Battery Representative Velerio Canez presents on locally available inverters and batteries, approximate costs, and future models

DAY 3 WEDNESDAY MAY 14

Equipment and Inverter / Battery Design Introduce Generators to the System

When do we need a generator?
The role of the generator in the system. Sizing of the Generator
Three Phase versus Single Phase System Installation with the Generator
Guest Speakers

Generator Representative Soged and Onan / Cummins & Kohler Representative discuss generator sizing, maintenance, fuel consumption, various models of engines

AGENDA

NOTES

DAY 4 THURSDAY MAY 15

When should we consider Solar, and How?

When should we consider Solar Panels to charge the batteries?

Discussion of conditions that might warrant use of solar power

Guest Speaker from Solar Industry

Basic Principles of Photovoltaics System Concepts and Components Design Concepts
The Concept of PSH
PSH Resources
PSH in Design
Inefficiencies and Production Losses
System Design with Solar Panels
Hands-on look at various components in class

Sunenergy representative Rowolson (invited) will discuss PV / Generator systems and economics, and overall design considerations

Guest Speaker from Solar Industry

DAY 5 FRIDAY MAY 16

Installation of Inverter / Battery Systems

Physical Installation of the Inverter / Battery System
AC OUT connections
AC IN connections
DC Connections
Basic Programming Requirements
Operation and Maintenance Trouble Shooting

Discussion will follow handbook prepared for class

Power Conditioning Beyond the Inverter / Battery system

Student Guest Speaker

Presentation on various types of power conditioning equipment that are available

Engineer Jakob

DAY 6 SATURDAY MAY 17*

Installation Work

Wire Sizing
Load Consideration
Temperature Consideration
Voltage Drop
Types of Wire
Branch Circuit Design
Overcurrent Protection
Disconnect Switches
Mounting and Racks
Grounding
DC Wiring (Panels and Batteries)
Series and Parallel Connections
Big difference in voltage drop considerations
Loads likely to be in Battery Cables

Present voltage drop tables for low voltage work, and interactive V.D. excel

sheet for all work

Worksheets on series / parallel wiring exercised

Mr. Brierre from RPS will discuss outback power equipment

Guest Speaker from Solar Industry

AGENDA

NOTES

DAY 7 MONDAY MAY 19

Installation Work

Installation Introduction
Class Design
Purchase the Equipment

DAY 8 TUESDAY MAY 20

Installation Work

Work on site to install or correct the system

DAY 9 WEDNESDAY MAY 21

Installation Work

Work on site to install or correct the system

DAY 10 THURSDAY MAY 22

System Programming and Maintenance

Programming
Load Management
Maintenance Issues

DAY 11 FRIDAY, MAY 23

Wrap Up

Finish discussion on any uncompleted topics
Questions and Answers
Examination