

EMI Electrical Owner's Representative Strategy & Implementation Professional Development Course



designing a world of hope



Course Description: EMI Electrical Owner's Representative Strategy & Implementation

In locations where EMI serves, the electrical system is often an afterthought in the planning process and neglected by maintenance personnel. In addition, there is often a shortage of trained electrical design and construction professionals.

This course will use recent project trips to illustrate EMI's electrical design build strategy as it has been developed to address these challenges.



Learning Objectives

**At the completion of this course,
participants should be able to:**

L.O. 1: describe EMI's electrical design build strategy and how it addresses the unique challenges of developing countries.

L.O. 2: explain how to implement .

L.O. 3: understand the roles and responsibilities of key team members in this design build strategy.

L.O. 4: apply this strategy to a new EMI project.



Introductions

Presenter: Hannah Peterson, PE

Before EMI:

- Solar Power [Fronius, Nusun]
- Diesel Generators [Cummins]
- Data Acquisitions [US Air Force]

EMI

- 5 years
- Associate Staff, Electrical Engineer

Outline

- Why? EMI Electrical Owner's Representative Projects
- Step by Step Process
- How you can get involved

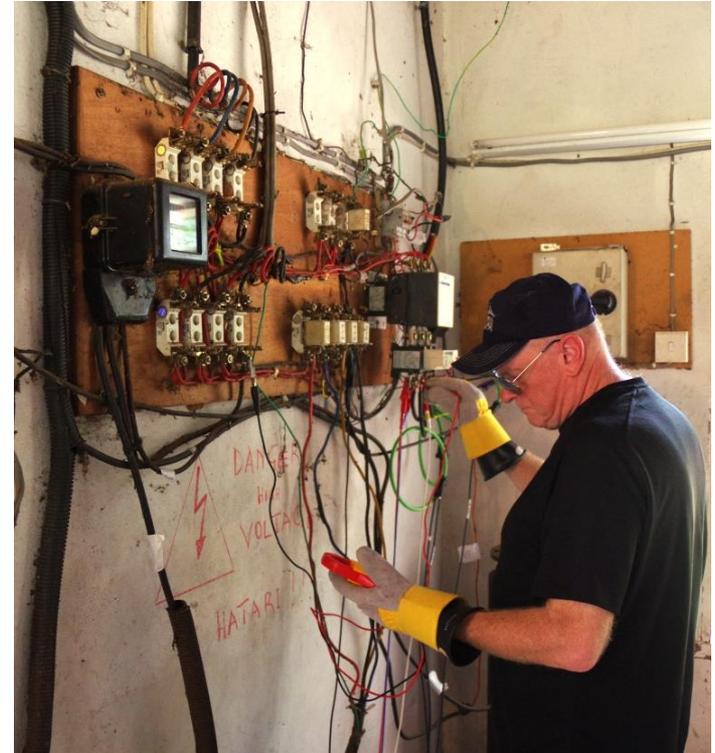
Why?

EMI Electrical Owner's Representative Projects

- EMI Clients struggle with how to implement designs provided by EMI.
 - Holding contractors accountable to design
 - Finding a good quality contractor
 - Going from conceptual design to detailed design with a local contractor
 - Making sure they are getting what they paid for
- Impossible without expertise/training in electrical work

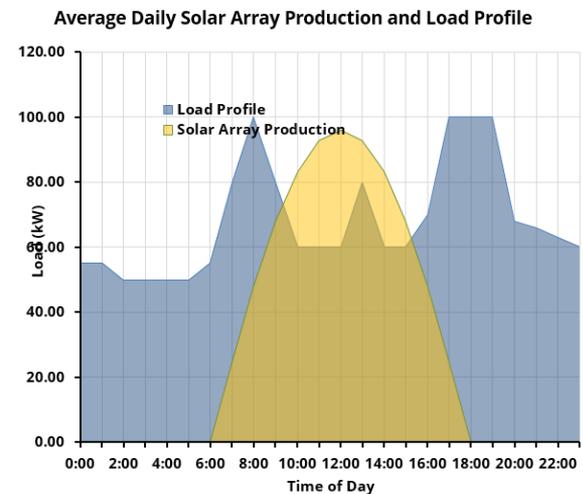
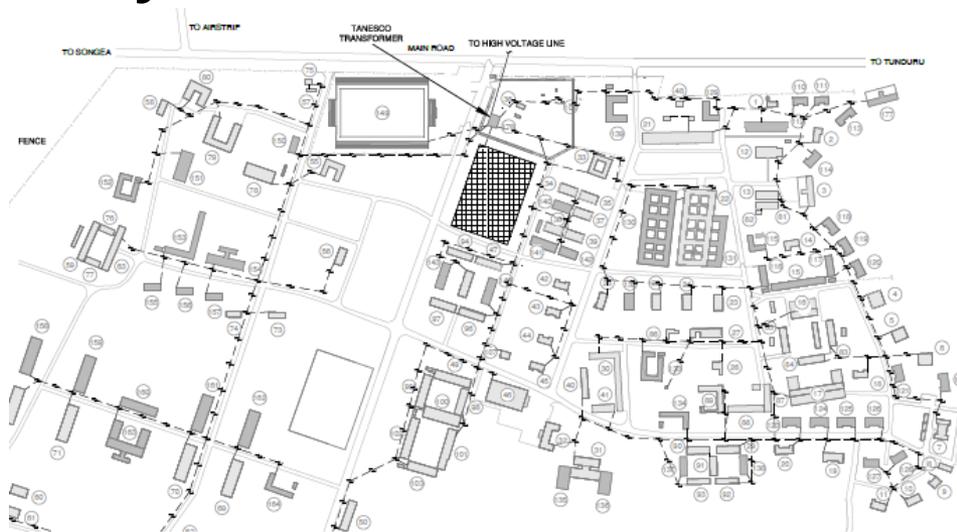
Step 1: Initial Site Assessment

- Detailed Single Line and Electrical Site Layout of Existing Site
- Understand what client sees as their electrical issues
- Identify electrical safety issues
- Understand Future Site Expansions and/or new electrical loads
- Collect as much Power Analyzer/Load data as possible



Step 2: Conceptual Design

- Load Study
- Energy Source Cost Analysis
- Initial Voltage Drop Calculations
- Proposed Future Single Line and Electrical Site Layout



Step 3: Funding



USAID
FROM THE AMERICAN PEOPLE

THE LEONA M. AND HARRY B.
HELMSLEY
CHARITABLE TRUST

D DEICHMANN
Stiftung

Client Secures Funding for project

- Writing grant proposals
- Internal funding approvals
- EMI does not currently have an in-house grant writer. Our involvement is in answering technical questions from the grant writer or reviewing their technical content for technical accuracy if requested.



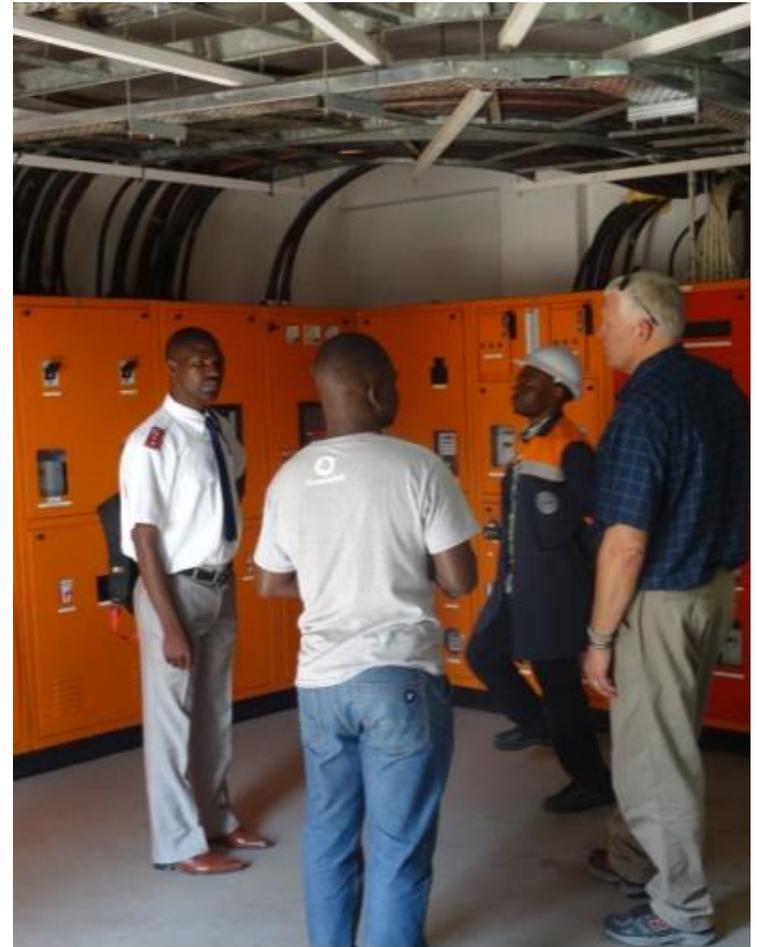
2019 **EMI Conference**

connect | train | inspire

#EMIconference19

Step 4A: Finding/Assessing the capability of Local Contractors.

- In country is preferred
- In person visits/interviews are essential in this context
- View Past Projects
- Teachable & Willing to Train



Why Preference for Local Contractor?

- Costs are less – especially labor
- Keeps economic benefit in country
- Understands local resources available
- Understands site constraints



Why Preference for Local Contractor?

- Liability falls on Design Build Firm
- Design Build Firm becomes local knowledge for ongoing maintenance and technical issues
- Local materials available for repair



Step 4B: Identify Local EMI Representative

- Not contractor
- Local person, ideally living on the site or able to be on the site frequently.
- Some technical knowledge



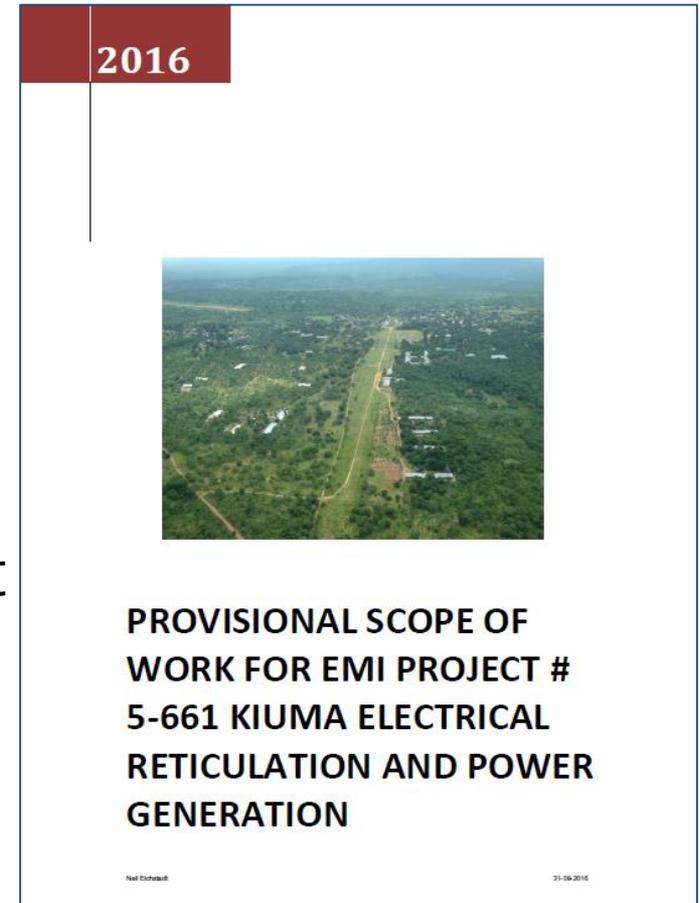
Step 4B: Identify Local EMI Representative

- On Site Quality control
- Able to participate in EMI teleconferences and provide needed local input.
- Good communicator, responsive.
- Connected to the ministry



Step 5: Preparing Documentation to Request Quotes

- Based on local contractor ability can be split into two:
 - Detailed Design
 - Construction
- Writing Statement of Work (SOW) and requirements documentation defining what contractors are bidding on
- Review/Edit of Conceptual Design



Step 6: Submit Request for Quote to contractors



- Send to top 3 contractors that have indicated verbally they want to bid on it.
- Includes SOW with drawings, and requirements
- Expect itemized quote
- Payment schedule is based on completion of deliverables. Penalties for late completion.



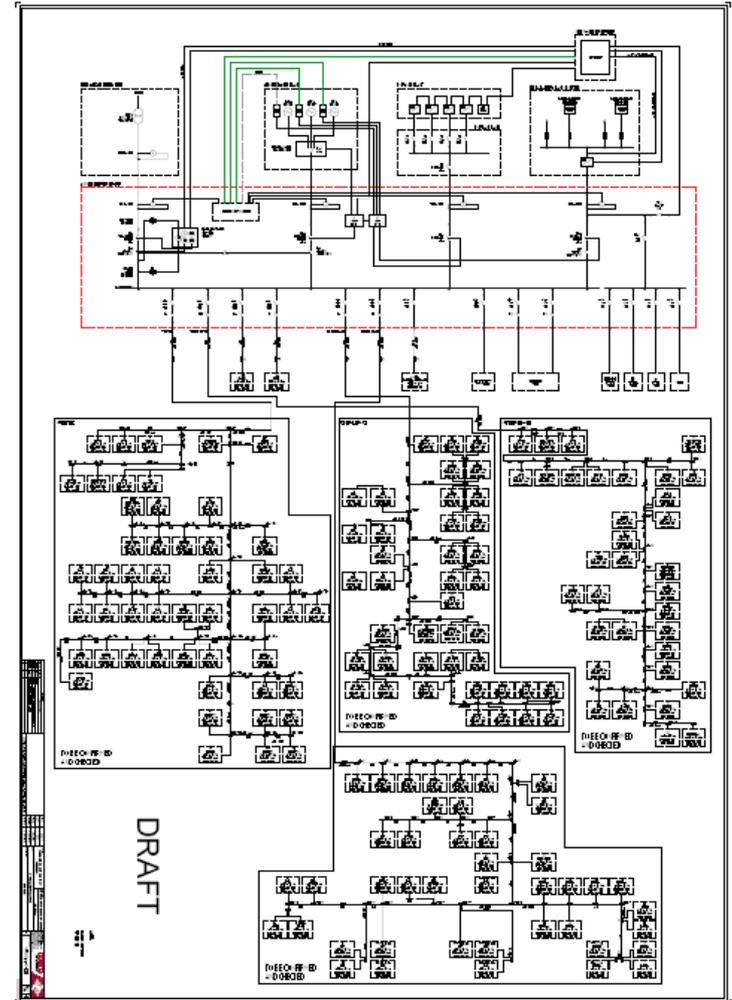
Step 7: Review Quotes and select a Contractor for Detailed Design (and Construction)

- Did contractor provide the information we requested? Itemized quote, etc.
- Are itemized prices reasonable? Too high or too low can be a red flag.
- Past projects
- In person and phone interviews
- At least 2 bids to compare. Ideally 3.



Step 8: Detailed Design Process

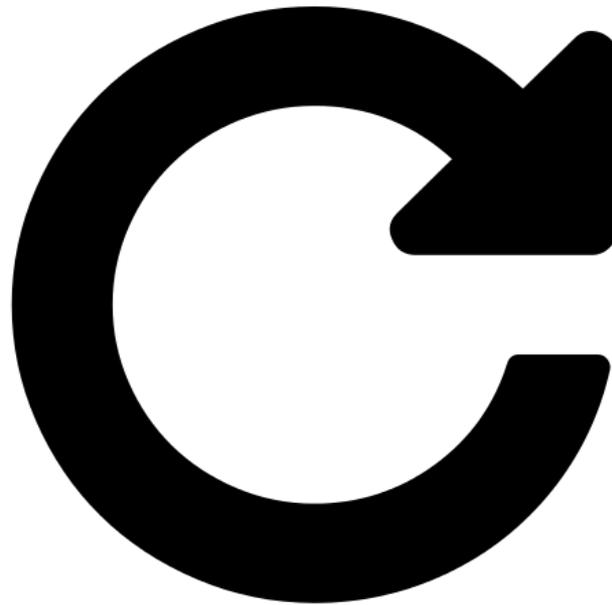
- Weekly EMI internal calls
- Weekly contractor calls.
- Project schedule reviews
- EMI very involved in the detailed design process.



connect | train | inspire

#EMIConference19

Step 9: Repeat Contract Process if Construction a separate contract



Step 10: Construction/ Installation

- EMI On site representative is essential at this point.
- Tracking of all financials and progress. EMI gives approvals for payments.
- Documentation of any deviations or change orders
- Photos taken frequently and reviewed by EMI engineers.



Step 11: Commissioning Inspection/Review

- Contractor provides commissioning documentation
- EMI Representative does initial inspection and provides photos and snag list.
- EMI Engineering team does on site follow up inspection and review of all commissioning documentation and generates a snag list.



Step 12: Giving Operations and Maintenance Training



- Train for Operations and Maintenance
- Instill values of safety and longevity
- Instill Local Ownership

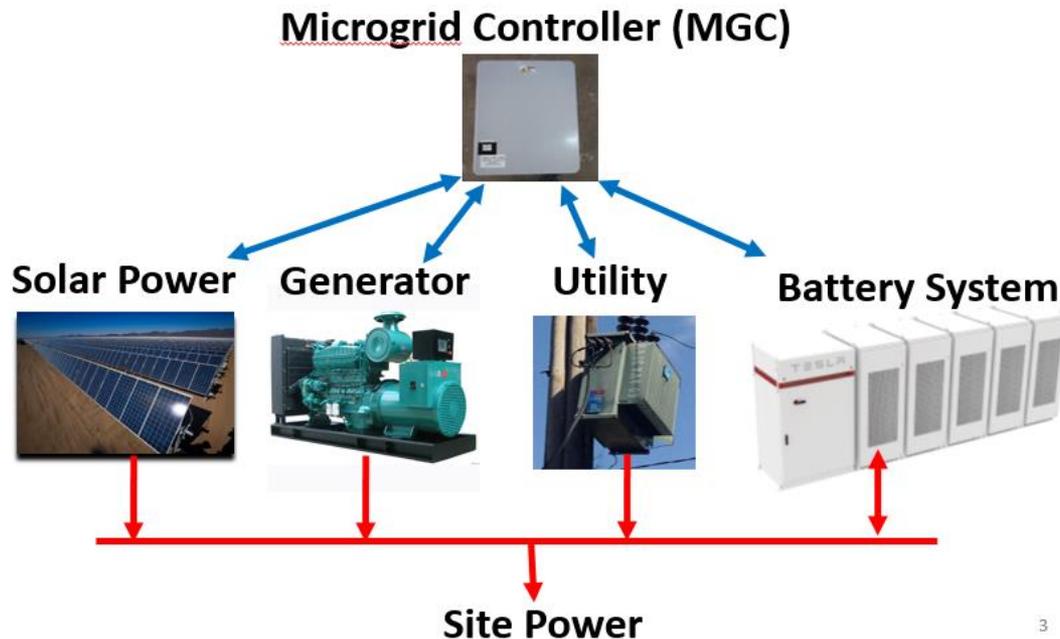
Step 12: Giving Operations and Maintenance Training

- Train as many as possible. 30 Trainees for KIUMA.
- At the end provided leadership with list of names in roughly 3 tiers.
- Evaluate both on natural aptitude and knowledge.



Step 12: Giving Operations and Maintenance Training

- Designed for students with little knowledge of electrical systems
- Use methods easily attainable to those from more oral backgrounds
- Translate training and materials to local language.



Step 12: Giving Operations and Maintenance Training

- Include training on essential O&M skills we take for granted in the US: reading charts, filling out a checklist, troubleshooting thought process and teamwork.



EMI Training Method

- Include Simplified Drawings and Diagrams that use photos and symbols more than text
- Hands on parts throughout



EMI Training Method

- Deck of flashcards: photo/function
- Analogies
- Lots of Repetition and classroom quizzing (not written test)
- Peer Training



Sharing Jesus

- Bible story/Testimony and song in their language to start each day of training.
- Demonstrating patience, love, kindness, and humility in all our interactions.



Sharing Jesus

- Praying for everyone and everything. Asking God to make Himself known through the project. Offering to pray for individuals as needs arise.



Current EMI EE Owner's Rep Projects

- Wrapping up KIUMA, Tanzania; Bongolo Hospital, Gabon; and UMRI, India.
- Salvation Army, Zambia – In detailed design phase with local Zambian contractor. Moving into construction bid and construction in early 2020.
- Potential future projects – Malawi and Iraq

Interested in Joining?

- Follow project through to completion
- 2-5 hours per week
- Site visits



Contact: Hannah.Peterson@emiworld.org



2019 **EMI Conference**

connect | train | inspire

#EMIconference19



designing a world of hope