Technical Issues Facing New Micro-grid Developers

Dr. Matt Basinger, EngScD
Director, Advancing Engineering Indonesia
Technical Issues Facing New Micro-grid Developers

1. Standards

Construction standards are often largely missing or minimally enforced resulting in poor quality to even dangerous infrastructure – workmanship from many contractors & “skilled” laborers has little accountability.

2. Synthesis

Smart-meters have become off-the-shelf technologies, but integrating smart-meters into local payment & communication gateways often requires software development and technical savvy.

3. Scaling

Traditional centralized micro-grids result in major land and security issues while limiting “incremental” scaling. Distributed generation and storage technologies for micro-grids are needed from inverter (and battery) manufacturers.
Standards: Workmanship, Accountability
Synthesis: Technology Integration into Local Channels

- Consumer Mobile Phone
- Mobile Network Provider
- Smart Meter
- Power System (Inverter Monitoring)
- Internet Service Provider
- SMS Gateway (Payment)
- SMS Gateway (Metering / Monitoring)

**KEY:**
- SMS
- Internet

**Softwares:**
- Power-side Management Software
- Payment-side Management Software
Synthesis: Technology Integration into Local Channels

- Consumer Mobile Phone
- Mobile Network Provider
- Smart Meter
- SMS Gateway (Metering / Monitoring)
- Internet Service Provider
- SMS Gateway (Payment)
- Power System (Inverter Monitoring)
- Power-side Management Software
- Payment-side Management Software

**KEY:**
- SMS
- Internet
Scaling: (Needed) Distributed Generation & Storage

- Security issues
  - Land issues
  - Expandability

Distributed Generation & Storage
Traditional Centralized Power System - Land Issues
Security Issues
Expandability that Tracks Increased Demand

- Lighting
- Entertainment
- Refrigeration
- Milling, Grinding
Expandability that Tracks Increased Demand

- Refrigeration
- Milling, Grinding
- Entertainment
Expandability that Tracks Increased Demand

Refrigeration

Milling, Grinding

Entertainment
Expandability that Tracks Increased Demand

Milling, Grinding

Refrigeration
Expandability that Tracks Increased Demand

Milling, Grinding

Refrigeration
Expandability that Tracks Increased Demand
Expandability that Tracks Increased Demand
Expandability that Tracks Increased Demand
(Needed) Distributed Generation & Storage Components

SMA Sunny Boy
Smart Energy
Grid-tied Inverter

enphase micro-inverter

SMA Sunny Island
Battery Inverter

enphase
AC-battery
(under development)
Scaling: (Needed) Distributed Generation & Storage

- Security issues
- Land issues
- Expandability