Lessons learned on enhancing local capacity of Appropriate Renewable Energy Technologies (ARET) for productive uses

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UN Economic and Social Commission for Western Asia (ESCWA)
Expert Group Meeting on "Methodology for Mainstreaming Appropriate Green Technology Initiatives in Rural Areas of the Arab Region"
25-26 February 2015, Beirut, Lebanon
UNIDO Energy Projects Footprint

UNIDO’s Energy Portfolio covers in more than 60 Countries
Incremental Levels of Access to Energy

Level 1
Basic human needs

Electricity for lighting, health, education, communication and community services (50-100 kWh per person per year)

Modern fuels and technologies for cooking and heating (50-100 kgoe of modern fuel or improved biomass cook stove)

Level 2
Productive uses

Electricity, modern fuels and other energy services to improve productivity e.g.
- Agriculture: water pumping for irrigation, fertilizer, mechanized tilling
- Commercial: agricultural processing, cottage industry
- Transport: fuel

Level 3
Modern society needs

Modern energy services for many more domestic appliances, increased requirements for cooling and heating (space and water), private transportation (electricity usage is around 2000 kWh per person per year)

SOURCE: IEA Adapted from AGECC 2010 Report
Our Renewable Energy Strategy

- Create business development opportunities through increasing access to energy through mini-grids;
- Mainstream the use of RE in industry (SMEs);
- Support innovative business models to promote RE in business sector.
Rural electrification in remote village with hybrid RE

Adapting to the seasonality

- Gasifier needs careful feeding and maintenance;
- Less attention to SHP operation (cleaning, logbook etc);
- After-service from city;
- Less commitment due to main grid connection;
Piloting innovative micro hydropower in India

Globally untapped hydropower potential

1) 3 sites with different business models for rural industry
2) Incubation & local manufacturing
3) Local capacity development & hub

- Unit cost vs. Economics of scales
- O&M training
- Local manufacturing takes time
- System trial for incubation

Simple tech: 10kW ultra-low head MHP
Agents for RE supply & productive use

Knowledge flow

Cost coverage

Manufacturer (RE tech, peripheral) → Retailer/Installation personal → Operator

Customer (RE supply/Prod. asset) → After-service personal → Income generation

Appropriateness

✓ Accessibility of tech/peripherals (import vs. localization?)
✓ Profit making vs. O&M cost (cost reduction and/or increase profit)
✓ Knowledge flow & required local capacity at each hub
✓ Scale of rural industry for profit-making
Required local capacity (RE+prod. assets)

1. **Adaptation/installation** of tech (e.g. trash rack, turbine, generator)

2. **Operation** (trash collection, logbook, power output, emergency/safety measure, mechanical/electrical)

3. **Maintenance** (after-service, repair with locally available parts)

4. **Full utilization of energy** generated (peak load management, EE, night use)
Recipe for local capacity development

1. **Local absorber** (technician/professional/institution/SMEs) for local service hotline/hub for scaling-up

2. **Experienced practitioner** both for energy supply and demand (O&M)

3. **Civil Society Organization** as local facilitator/mentor to support asset owner for sustainability (biz model, productivity, marketing support)

4. **A holistic training** to cover skills from energy supply to consumption