Vocational Training & Education for Clean Energy (VOCTEC) Program: Impacts and Lessons Learned
VOCTEC Program: Introduction

Fiji - 2014
VOCTEC Program Overview

- **Sponsor:** Initially funded by the US Agency for International Development
- **Contractor:** Arizona State University
- **Partners:** Appalachian State and Green Empowerment
- **Overall Objective:** To build awareness, knowledge and capacity of local stakeholders in developing countries to sustain renewable energy systems
Program Objectives

- Build local capacity to operate and maintain clean energy systems. The objective is achieved through:
  - Development and transfer of curricula
  - Development of training centers
  - Training of educators and staff
  - Integration of gender, entrepreneurship, and effective teaching skills
  - Assessment of impacts

India - 2016
Technologies & Training Levels

- Renewable Energy Technologies
  - Solar/PV
  - Micro-Hydro
  - Small-Wind

- Training Levels
  - Workshops for policy and decisions makers (L3)
  - Training for educators and engineers (“train-the-trainer”) (L2)
  - Technical training for creating skilled workforce (L1)
Training Components

- Training Toolkits
- Classroom Material
- Social awareness & gender inclusion
- Hands on, classroom & Online learning
- Supporting material (Posters, manuals)
- Impact measurements
- Educational Games

VOC TEC
VOCATIONAL TRAINING AND EDUCATION FOR CLEAN ENERGY
## Training Stats (USAID)

<table>
<thead>
<tr>
<th>Role</th>
<th>Trained</th>
<th># of trainings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technicians</td>
<td>320</td>
<td>24</td>
</tr>
<tr>
<td>Educators</td>
<td>200</td>
<td>9</td>
</tr>
<tr>
<td>Policy Makers</td>
<td>115</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Trainings Delivered: 37
## VOCTEC Project Training Events

<table>
<thead>
<tr>
<th>Solar PV</th>
<th>Wind</th>
<th>Micro-hydro</th>
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</thead>
<tbody>
<tr>
<td><strong>4 Policy Makers trainings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Guyana – 2012</td>
<td>• Fiji – 2014</td>
<td>• Fiji – 2014</td>
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<tr>
<td></td>
<td>• Nepal – 2015</td>
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<tr>
<td><strong>9 Educators trainings</strong></td>
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<td></td>
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<tr>
<td>• Fiji – 2013 &amp; 2014</td>
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<tr>
<td>• Palau - 2014</td>
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<tr>
<td>• Kenya – 2014</td>
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<tr>
<td>• Kenya – 2015 &amp; 2016 <em>(all women)</em></td>
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<tr>
<td>• Nepal – 2015</td>
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<td></td>
</tr>
<tr>
<td>• India – 2014 &amp; 2016 <em>(83% women)</em></td>
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<td></td>
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<tr>
<td><strong>24 Technician trainings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Tonga, 2 Fiji, Vanuatu, Solomon Islands – 2013</td>
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<td></td>
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<tr>
<td>• 2 Samoa, 2 Kiribati, 2 Marshall Islands, Federated States of Micronesia, 2 Palau, PNG, Tonga, Vanuatu, 2 Fiji – 2014</td>
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<tr>
<td>• Kenya – 2015 <em>(all women)</em></td>
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<td></td>
</tr>
<tr>
<td>• Nepal - 2015 <em>(all women)</em></td>
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<tr>
<td></td>
<td>• Liberia – 2014</td>
<td></td>
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<tr>
<td></td>
<td>• Solomon Islands – 2015</td>
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</table>
Expanded VOCTEC Activities around the Globe
## Expanded Partnerships: Organizations

<table>
<thead>
<tr>
<th>Sponsors</th>
<th>Partners</th>
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</thead>
<tbody>
<tr>
<td>USAID</td>
<td>TETRA TECH</td>
</tr>
<tr>
<td>ENEFIA</td>
<td>THE UNIVERSITY OF THE WEST INDIES ORIENS EX OCCIDENTE LUX</td>
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<tr>
<td>IRENA</td>
<td>USP</td>
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<tr>
<td>ADB</td>
<td>THE UNIVERSITY OF THE SOUTH PACIFIC</td>
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<tr>
<td>IDB</td>
<td>NSF</td>
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<tr>
<td>NEW ZEALAND</td>
<td>Strathmore UNIVERSITY</td>
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</table>
Training Stats (USAID + Others)

- Technicians: 620
- Educators: 200
- Policy Makers: 115
- Entrepreneurs: 20
Key Accomplishments

Nairobi, Kenya, 2016
Solar Curricula and Toolkit Development

- The curriculum design (for educators and technicians)
  - 50-50 class-room lectures to hands-on exercises
  - Mobile Training Toolkits (MTTs) - essentially a "Lab on the Go"
  - Interactive games
  - Posters for end-users
  - Pre-and post assessments and surveys
Educational Games for PV

- Assist in learning about certain topics and concepts
- Reinforce development of a skill or concept in a fun interactive way
- Give learners the freedom to experiment
- Teach them how to set goals while providing them with feedback
- Prepare them to better problem solve and enhance their critical thinking skills
Measuring Impact

- Assess the short term impact of the trainings on knowledge, attitudes and behaviors

- Analyze assessment data for continuous refinement of trainings

- Measure long term impacts, when feasible
Lessons Learned and Recommendations

- Strong partnerships are critical for sustainability
- Infrastructure and resources are important for long term sustainability
- Evaluating trainees’ learning performance motivates the trainees to succeed
- Follow up with trainees is challenging:
  - Geographic and connectivity challenges
  - Hard to assess the long-term impact on the trainees
Empowering Women (Gender Inclusion)

Kenya, 2015

India, 2016

Nepal, 2015

Kenya, 2016
2015 Kenya Train the Trainer

Source: ASU & Strathmore University
2015 Kenya Train the Trainer

Source: ASU & Strathmore University
WISEE - Women in Sustainable Energy & Entrepreneurship

Aimed at empowering women to acquire, use and promote renewable energy technologies in order to increase their participation in energy and entrepreneurship sector and contribute to enhancing access to clean energy products and services in Eastern Africa.

Source: Strathmore University
WISEE Goals

- Train women to design, install and maintain energy systems
- Engage with policy makers to build their capacity
- Build the capacity of women end-users to operate and maintain renewable energy systems
- Provide quality solar PV solutions to customers
- Increase the number of women entrepreneurs, licensed solar installers, and trainers
- Network with like-minded national, regional and international bodies to share experiences
- Conduct research on gender and energy
2015 Kenya Technician Training
WISEE trainers

Source: Strathmore University
Increasing Solar Licenses

March 2016
Total Solar License: 267
Male: 251
Female: 16

From the 16 women,
- 4 were from the 2015 ASU/Strathmore women’s trainings
- 4 more are registered to sit for the exam.
- 2 are getting their practical experience

Source: C. Weis LLC
Mentorship
2016 Kenya Train the Trainer

• Narrative on 75 students applying for this class. Detail who was in this class (ERC, Kenya Power, 6 technical colleges... Rim, I may need help categorizing who was in the class)

Source: Strathmore University
Building Teacher Capacity

Source: C. Weis LLC
Comfortable Environment

Source: Strathmore University
Less Intimidating

Source: Strathmore University
Learning to use Tools

Source: C. Weis LLC
Key Relationships for Women in a Traditionally Male Field

Source: Strathmore University
Taking Pride in a New Skill

Source: Strathmore University
Women Instructors

Presence of female instructors creates a more comfortable environment for female trainees and increases their participation in the class.

Source: Strathmore University
Contributing to a Clean Energy Future

Source: C. Weis LLC
Future Trainers of End-users and Technicians

Source: C. Weis LLC (2)
Female recruitment is helped when the trainings are advertised as women-only.

Source: Strathmore University
Training courses conclusions

- Who is the audience?
- What are the workforce skill set needs?
- Are we training our technicians to educate the end users?
Technical Training Conclusions

Questions to ask before training

- What jobs will the graduates from this training program be prepared to work at after this training?
- Is the market developed enough to employ trained students?
- Is the program assisting students to enter the workforce as apprentices?
THANK YOU

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