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# ENERGY POLICY PROGRAM

## LIVE LINE TRAINEE ASSESSMENT REPORT

### PESCO, GEPCO, HESCO AND FESCO

#### APRIL - MAY 2014



**July 2014**

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# ACRONYMS

AEAI	Advanced Engineering Associates International, Inc.
ALM	Assistant Lineman
DISCOs	Distribution Company
EPP	Energy Policy Program
FESCO	Faisalabad Electric Supply Company
GEPCO	Gujranwala Electric Power Company
HESCO	Hyderabad Electric Supply Company
IESCO	Islamabad Electric Supply Company
LESCO	Lahore Electric Supply Company
LLM	Live Line Maintenance
LM	Lineman
LS	Line Service
M&E	Monitoring and Evaluation
MEPCO	Multan Electric Power Company
NTDC	National Transmission and Despatch Company
PESCO	Peshawar Electric Supply Company
QESCO	Quetta Electric Supply Company
SEPCO	Sukkur Electric Power Company
T&P	Tools and Plans
USAID	United States Agency for International Development

# EXECUTIVE SUMMARY

This assessment report summarizes and highlights the responses from Live Line Maintenance (LLM) training participants collected during site visits conducted between April and May 2014. Based on participant feedback, the assessment recommends improvements to a refresher course that will be conducted during the fourth quarter of 2014. The Energy Policy Program (EPP) trained 38 linemen in LLM from four regional distribution companies (DISCOs) from January to December 2013.

As a result of the LLM training, each DISCO has a trained crew to work on live lines with new tools and transportation equipment for high voltage lines. By working on live lines, DISCOs will reduce the number of bottlenecks by avoiding shutdowns for maintenance and repairs. In turn, LLM training will reduce power outages and losses currently affecting the reliable delivery of electricity to consumers.

Although four DISCO crews completed classroom and field-based training, these crews did not receive hot stick tools and trailers due to shipping delays. As a result, these four crews will receive a refresher course with the new tools. The chart below details the locations of the participants:

DISCOs	Linemen
Peshawar Electric Supply Company (PESCO)	17
Gujranwala Electric Supply Company (GEPCO)	7
Hyderabad Electric Supply Company (HESCO)	7
Faisalabad Electric Supply Company (FESCO)	7
<b>Total</b>	<b>38</b>

To support the refresher course and future training for the remaining DISCO crews, EPP conducted four site visits to interview and survey previous participants. EPP asked the participants to detail the challenges they faced during the training program, and to propose potential solutions for a refresher course. The participants identified the following recommendations:

- Translation of the training material into Urdu for better conceptual understanding
- Increased duration of the in-classroom training course from three to four weeks
- Improved trainer capabilities and increased number of demonstrations during the field-based training

Before additional training is provided, EPP will conduct an assessment of the curriculum, trainers, and facilities (NTDC Tarbela Training Center). The results of the assessment will be shared with the Training Center assessors to help them strengthen future programs. After the Training Center Assessment, EPP will deliver the four refresher courses and the remaining five LLM programs in FY2015.

This assessment reviews the background on LLM training, participant feedback and recommendations provided by participants, their supervisors, and EPP's Monitoring and Evaluation (M&E) Team. Annex I – Collected Comments provides additional comments highlighted in the feedback forms to improve future training.

Following the refresher course, EPP's M&E Team will conduct an additional assessment to collect participant feedback. EPP collected linemen and officials' contact details from all the organization for future monitoring and evaluation.

# BACKGROUND

Prior to LLM training, lines were often shut down for routine and preventative maintenance which resulted in losses and created bottlenecks in energy delivery and reliability. EPP helped each DISCO develop one LLM crew dedicated to using new hot stick tools, maintenance techniques, and trailers to service live 132kV and 66kV transmission lines. Each DISCO crew underwent a 14-week intensive training program that consisted of:

- 4 weeks of in-class training focused on health and safety standards
- 10 weeks of extensive field-based training, including supervision, on-the-job practice with hot-stick tools, and bare hand maintenance techniques

To date, PESCO, HESCO, GEPCO, and FESCO have been trained with IESCO, LESCO, SEPCO, MEPCO, and QESCO remaining. Due to shipping delays, the hot stick tools and trailers will not be delivered to the DISCOs until September 2014, at which time EPP will deliver a refresher course. EPP anticipates training the remaining DISCO crews in the second quarter of FY2015. In preparation for the refresher course, EPP conducted a detailed assessment of the previous participants to review their experience, capacity gaps, and challenges. The assessment outlines improvements, USAID procedure compliance, refresher course

recommendations, and future monitoring and evaluation procedures.

EPP's Monitoring and Evaluation (M&E) Team conducted a post-LLM training assessment from April-May 2014 to identify the program's results, challenges and sustainability. The assessment consisted of two steps:

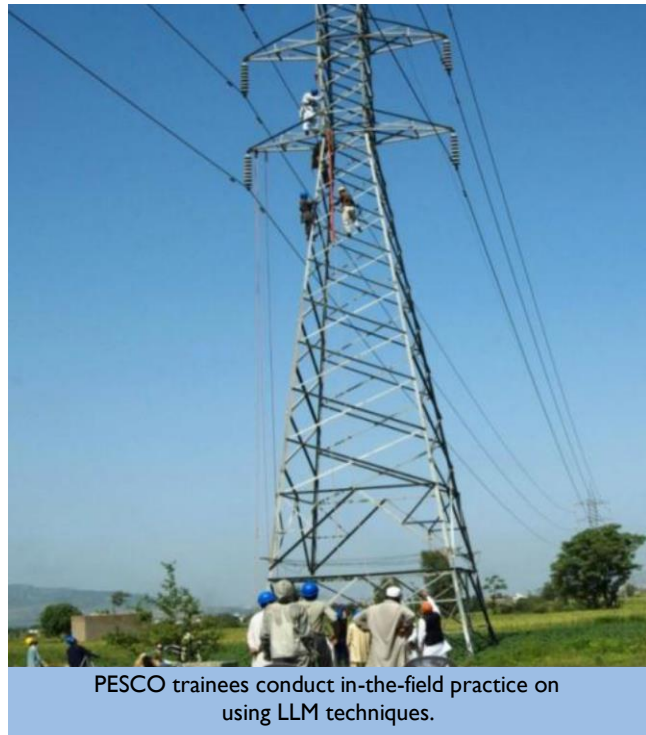
- Feedback forms completed in person with M&E Team members
- Sound bites collected from the participants and the DISCOs' Chief Engineers

This two-step assessment process provided the linemen and engineers an opportunity to express their opinions about the training, and gave EPP important information that will shape future programs.

## OBJECTIVE

The training sought to:

- Highlight the achieved results
- Identify challenges faced
- To take necessary actions based on the feedback provided by the linemen before the refresher course training for improved results
- Sustainability assessment for future and similar trainings
- Identify areas needing improvement



# POST LIVE LINE TRAINING ASSESSMENT

## MONITORING AND EVALUATION VISITS

In conducting the training assessment, EPP's M&E Team worked closely with Mr. Sher Ahmed, EPP's LLM Coordinator. Assessment forms are attached in Annex II – Assessment Feedback Forms and were delivered in both English and Urdu. EPP visited 4 DISCOs on the following dates:

- Peshawar Electric Supply Company (17 Linemen) – April 9, 2014
- Gujranwala Electric Supply Company (7 Linemen) - April 24-25, 2014
- Hyderabad Electric Supply Company (7 Linemen) - May 8, 2014
- Faisalabad Electric Supply Company (7 Linemen) - May 21 - 22, 2014

## ASSESSMENT FINDINGS

The findings below are based on meetings with the linemen, Chief Engineers, Superintendent Engineers, and the Technical Directors at PESCO, GEPCO, HESCO and FESCO. The tables highlight the issues discussed and the comments received.

Highlighted Issues	General Feedback and Comments
<b>PESCO</b>	
Management	<ul style="list-style-type: none"> <li>• Linemen placed a request for an office at PESCO to minimize their daily travel</li> <li>• Many linemen travel from distant areas and face difficulties in coordination</li> </ul>
Refresher Course	<ul style="list-style-type: none"> <li>• Linemen requested to extend the duration of the refresher course from three weeks to four weeks to address precautionary measures and include a detailed explanation/demonstration</li> </ul>
<b>GEPCO</b>	
Medical Concerns	<ul style="list-style-type: none"> <li>• The Chief Engineer requested to have the findings of the incident report shared with his department</li> <li>• Linemen requested availability of medical facilities during training in the event of incidents</li> </ul>
Refresher Course	<ul style="list-style-type: none"> <li>• GEPCO will nominate more linemen for the refresher course</li> <li>• The lineman who experienced an incident during training opted not to pursue further training</li> <li>• Participants requested a more experienced trainer who can conduct practical, physical demonstrations</li> </ul>
<b>HESCO</b>	
Refresher Course	<ul style="list-style-type: none"> <li>• HESCO will nominate two or three more linemen for the refresher course</li> <li>• Linemen requested to extend the duration of the refresher course from three weeks to four weeks to address precautionary measures and include a detailed explanation/demonstration</li> <li>• Participants requested a more experienced trainer who can conduct practical, physical demonstrations</li> <li>• Dead tower training should also be provided during the refresher course</li> </ul>
Facilities	<ul style="list-style-type: none"> <li>• Better lodging and medical facilities should be provided to the participants</li> </ul>
<b>FESCO</b>	
Refresher Course	<ul style="list-style-type: none"> <li>• FESCO will nominate more linemen for the refresher course</li> <li>• Linemen requested to extend the duration of the refresher course from three weeks to four weeks to address precautionary measures and include a detailed explanation/demonstration</li> <li>• Participants requested a more experienced trainer who can conduct practical, physical demonstrations</li> </ul>

## GENERAL COMMENTS

Linemen were asked to complete the Live Line Training Assessment Form, and were provided assistance by EPP's M&E Team. Most of the linemen opted to fill the forms out in Urdu, and EPP translated their responses to generate sound bites and quotes. General comments and findings appear below:

*"The live line training was introduced for the first time in Pakistan and we are very lucky for receiving this training. This training will not only enhance our skills, but it will be fruitful for our DISCOs to perform better in supplying the electricity to the end consumer"*

*"We are thankful to USAID for their efforts and time invested in providing the live line training at Tarbela training center"*

*"Training was given with the latest procedures and techniques which has enabled us in learning new ways of working at the live line tower"*

*"The training has enabled the linemen to work on the live line towers without switching them off, which would lead in less power outage. This less power outage will help in reducing the losses and hence will improve the revenues for DISCOs"*

*"The linemen and the Chief Engineers have requested a 2nd Monitoring and Evaluation assessment session after the LLM training refresher course"*

Linemen suggested the following changes be made related to the duration of the training and the trainer.

*"Increase the duration of the refresher course from three weeks to four weeks due to the fact that precautionary measures require a detailed explanation and walk through, which requires more time for developing a thorough understanding"*

*"The linemen should be provided a fair amount of per-diem during the course of the training to cover the daily expenditures"*

*"The training manuals given to us were in English, which caused difficulty in comprehending; since most of the linemen do not know how to read or write English"*

*"All trainees have learned the maintenance work on normal 132 kV towers but very little was taught on 132 kV dead towers. Once the tools and plants are given for the refresher course, training should be given on the 132 kV dead towers as well"*

*"The trainer was helpful, however, due to his old age he was not able to demonstrate the practical implementation of the theoretical knowledge given. Please hire more experienced instructors who can explain the practical work using the tools and plants at the work site"*



# RECOMMENDATIONS

As a result of EPP's assessment, the following recommendations have been offered to enhance future LLM programs and the refresher course:

## LANGUAGE

The training manuals given provided in English, which resulted in comprehension gaps given most of the linemen do not read or write in English. EPP recommends translating materials into Urdu after the third party training assessment is complete.

## TRAINING DURATION

All participants requested more time for the refresher course to include precautionary measures, an increased number of physical demonstrations, and field-based experience. These linemen will receive their refresher course utilizing the new tools that EPP procured. Furthermore, linemen have requested training on 132kV dead towers during the refresher course.

## TRAINER EXPERIENCE

Almost all of the participants felt that the trainer was not able to demonstrate the practical aspects of the curriculum in the field due to his physical limitations. The participants and EPP recommend that the trainer should possess the physical ability to practically demonstrate the curriculum going forward.

## FACILITY IMPROVEMENTS

All the linemen at Tarbela's Training Center requested better lodging and medical facilities. Immediate medical facilities should be provided to participants should any incidents occur. EPP recommends that NTDC improve the lodging facilities at the Tarbela Training Center, as well. The current facilities lack the appropriate infrastructure to deliver effective training and billet participants. To complete the training, EPP will provide appropriate accommodations located near the training center, and provide per diem for participants in line with USAID rates.

## PARTICIPANT SELECTION AND BRIEFING

Going forward, EPP will employ USAID-approved participant selection and eligibility criteria. Specifically, EPP will employ the following selection criteria for future participants:

- Less than 45 years of age.
- 10-15 years of experience in their department. For junior linemen, 1-2 years of experience.
- Completion of 10<sup>th</sup> Grade of equivalent and the ability to read and write in Urdu
- Willingness to attend the training sessions
- Mental and physical fitness to perform the standard duties of a lineman

For the refresher course, EPP will continue the training of participants who completed phase one. There is potential to add additional linemen from the previously-trained DISCOs, however they will undergo training from the beginning of the program to ensure full comprehension. For the remaining DISCOs, EPP will request nominations of 30 linemen for 15 trainees that will be interviewed by EPP's LLM Training Coordinator and the M&E Team. The selection process will be detailed using grading criteria and recommendations.

# ANNEXES

# ANNEX I: COLLECTED COMMENTS

	Overall Experience	Live Line Training Course	Concerns about the Training	Comments
PESCO	<ul style="list-style-type: none"> <li>• Live Line Maintenance was introduced for the first time in Pakistan and we are very lucky to receive this training. This training will not only enhance our skills, knowledge and attitude but it will also be fruitful for PESCO to perform better in supplying the electricity to the end consumer</li> <li>• Recognizing USAID's efforts for providing live line training under their supervision to work on 132kV live line i.e. to replace the damaged insulator and repairing of the jumpers.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the duration of the refresher course from three weeks to four weeks due to the fact that preventative measures require a detailed explanation and walk through, which requires more time for developing a thorough understanding.</li> </ul>	<ul style="list-style-type: none"> <li>• As most of the Linemen belong to far-flung areas, USAID should assist PESCO in establishing an office within PESCO to minimize the traveling costs</li> <li>• The linemen should be provided a fair amount of per-diem during the course of the training to cover the daily expenditures</li> </ul>	<ul style="list-style-type: none"> <li>• 16 linemen have been trained at PESCO out of which one person hasn't showed up during the assessment process due to some mental disorder.</li> </ul>
GEPCO	<ul style="list-style-type: none"> <li>• This training was a whole new experience and helped us in gaining practical knowledge.</li> <li>• Please hire more experienced instructors who can explain the practical working of the equipment using the tools &amp; plants at the work site</li> </ul>	<ul style="list-style-type: none"> <li>• The live line training refresher course duration should be increased for better on the job learning</li> </ul>	<ul style="list-style-type: none"> <li>• There should be a short training on the workings of the dead tower as well</li> <li>• There should be an increase in the daily per-diem for carrying out the daily expenditure</li> <li>• Better health facilities should be provided in case of any unfortunate event</li> </ul>	<ul style="list-style-type: none"> <li>• A lineman named Mohammad Sohaib got into an unfortunate event due to his carelessness during his work at the tower. Furthermore, he clearly mentioned in the sound bite that he does not want to continue his training.</li> </ul>

	Overall Experience	Live Line Training Course	Concerns about the Training	Comments
HESCO	<ul style="list-style-type: none"> <li>• Training has helped us learn more about the safety measures at the tower</li> <li>• Trainer was helpful, however, due to his old age he was not able to demonstrate the practical implementation of the theoretical knowledge given during the classes.</li> <li>• All the members of training learned the maintenance work on normal 132 kV towers but very little work was taught on 132 kV dead towers.”</li> </ul>	<ul style="list-style-type: none"> <li>• Linemen have requested to increase the duration of the refresher course to four weeks, which will enable them in better understanding and revising the content learned.</li> </ul>	<ul style="list-style-type: none"> <li>• The training manuals given were in English, which caused difficulty in comprehending; since most of the linemen do not know how to read or write English</li> <li>• Once the T&amp;P are given for the refresher course, training should be given on the 132 kV dead towers as well.</li> <li>• The refresher course duration should be 1-2 months</li> </ul>	<ul style="list-style-type: none"> <li>• HESCO will nominate more linemen for the refresher course</li> <li>• Key takeaways from the training are: i) working on normal 132 kV towers with bare-hands and hot-stick methods, ii) safety procedures and first aid instructions, iii) emphasis on teamwork</li> </ul>
FESCO	<ul style="list-style-type: none"> <li>• We are thankful to USAID for their efforts and time in providing the live line training at Tarbela training center</li> </ul>	<ul style="list-style-type: none"> <li>• Refresher course duration should be increased from 4 weeks due the fact that precautionary measures require a detailed explanation and walk-through, which requires more time for developing a thorough understanding</li> </ul>	<ul style="list-style-type: none"> <li>• Trainer was elderly and was not able to explain the practical working of the tools at the training site.</li> <li>• Training will enable the linemen to work on the live line towers without switching them off, which would lead in less power outage.</li> <li>• Once the T&amp;P is given for the refresher course, training should be given on the dead tower as well.</li> <li>• Provide better lodging and medical facilities to the trainees</li> </ul>	<ul style="list-style-type: none"> <li>• FESCO will nominate 3 more linemen for the Tools and Plants refresher course.</li> <li>• Training was very helpful for the department, enabling the line men to work on the tower without any major switch off. Less outage during performance of technical procedures will ensure efficient work.</li> <li>• Training with the latest T&amp;P will help in reduction of losses and increase in revenues.</li> <li>• FESCO management has ensured full cooperation with EPP in the refresher course.</li> </ul>

# ANNEX II: ASSESSMENT FEEDBACK FORMS

**Confidential information redacted**

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