

Trainer Instructions: Electricity

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Title	ELECTRICITY
Objective	To obtain an understanding of electricity, including electricity generation and transmission, characteristics of electricity, and the main areas for electricity conservation.
Minimum duration and approach	<ul style="list-style-type: none"> ▪ 1 session (1.5 hours), including the quiz and workshop exercise ▪ Recommended approach: spend up to 1 hour on the PowerPoint presentation, and then ask participants to do the quiz and workshop exercise individually or in pairs for about 20 minutes. They can be combined because the workshop exercise is short. Leave 10 minutes for going through the answers. ▪ Presentation: 29 slides ▪ Textbook chapter: 15 pages
Contents	<ul style="list-style-type: none"> ▪ Future electricity scenario ▪ Generation and distribution ▪ Phase of electricity ▪ Active and reactive power ▪ Power factor correction ▪ Electrical load management ▪ Electrical billing mechanisms ▪ Transformers
Assessment of participants	<ul style="list-style-type: none"> ▪ Pose questions during the presentation. Ask participants what the Power Factor is before explaining the term. Some suggested questions are included in the trainer notes underneath each slide. ▪ Take the quiz with 10 multiple choice questions. ▪ Carry out the workshop exercise, where participants are asked the following: <p style="margin-left: 20px;"><i>During April 2003, a plant recorded a maximum demand of 600 kVAr and average power factor (PF) of 0.82. The electricity utility requires a minimum PF of 0.92. For every 1 percent below this PF, a penalty of US\$ 250 per month has to be paid. The plant installed a 100 kVAr capacitor at the end of April 2003.</i></p> <ol style="list-style-type: none"> 1. Calculate the improvement in PF for May 2003 2. Calculate the penalty to be paid during May 2003 <p style="margin-left: 20px;">If participants have difficulties completing the workshop exercise, or if time is limited, it may be helpful to give them the steps to determine the PF improvement:</p>

	<ul style="list-style-type: none"> - <i>Operating kW</i> - <i>kVAr required at 0.82 PF</i> - <i>New kVAr after capacitor installation</i> - <i>New kW</i> - <i>New power factor</i>
<p>Other comments</p>	<ul style="list-style-type: none"> ▪ It is important to give this session before the sessions on electrical equipment (electric motors, fans and blowers, lighting, pumps and pumping systems, cooling towers, compressors and compressed air systems, and refrigeration and air conditioning) because many of the terms and definitions explained here are in other sessions. ▪ If participants are reasonably technical and already possess the basic knowledge on electricity (e.g., electrical engineers) then this session can be shortened. ▪ Case study options from www.energyefficiencyasia.org or other sources could be included in this session as illustrations of how other companies reduce energy consumption and costs.