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AEE CHAPTER DEVELOPMENT & CEM[®] TRAINING WITH TRAIN-THE-TRAINER

Executive Summary Report
Final Report

July 06, 2010

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AEE CHAPTER DEVELOPMENT & CEM[®] TRAINING WITH TRAIN-THE-TRAINER

EXECUTIVE SUMMARY REPORT

FINAL REPORT

USAID JORDAN ECONOMIC DEVELOPMENT PROGRAM

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DELOITTE CONSULTING LLP

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USAID/ OFFICE OF ECONOMIC GROWTH (EG)

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FOREWORD

The Association of Energy Engineers (AEE) is a nonprofit professional society of over 12,000 members and over 18,000 certified professionals in 78 countries. The mission of AEE is “*to promote the scientific and educational interests of those engaged in the energy industry and to foster action for Sustainable Development.*”

AEE offers a full array of informational outreach programs including seminars (live and internet based), conferences, journals, books, and certification programs.

AEE's network of 71 local chapters meets regularly to discuss regional issues. AEE's roster of corporate members is a veritable “who's who” from the commercial, industrial, institutional, governmental, energy services, and utility sectors.

AEE has extensive experience providing Chapter Development and Training programs around the world, many through USAID and other government contracts. AEE has successfully performed government contracts in Romania, Bulgaria, Turkey, Cyprus, Egypt, Jamaica, Ukraine, Russia, and India. AEE certification training programs are also active in South Africa, Mexico, Canada, China, Ireland, Spain, France, Portugal, and Taiwan.

Most recently under the USAID Jordan Economic Development Program, through Deloitte Consulting LLP, AEE assisted in the development of the AEE Jordan Chapter, presented a 5-day Comprehensive Training Program for Energy Managers, and conducted a Certified Energy Manager® (CEM®) exam and Train-the-Trainer program in Amman, Jordan.

EXECUTIVE SUMMARY

With the support of EDAMA Association and USAID, AEE provided its expertise to establish a sustainable program in Jordan; thus, allowing the greatest number of Jordanian engineering professionals the opportunity to benefit from the crucial knowledge and skills that can be obtained by the most respected and well-known energy management training program and certification in the world, the CEM.

AEE developed an AEE Jordan Chapter and presented a 5-day Comprehensive Training Program for 50 Jordanian engineers. Following the course, AEE conducted the Certified Energy Manager (CEM) certification exam for the same 50 participants. A 1-day Train-the-Trainer program was administered for six recommended participants that passed the CEM exam and met all certification requirements. AEE conducted these programs in English in System International units.

As a result of these programs, the local AEE Jordan Chapter will work in correlation with EDAMA Association and AEE to provide Certified Energy Manager training to Jordanian engineering professionals, with the mission to upgrade energy skills in the workforce. The AEE Jordan Chapter will provide Jordanian energy professionals with a platform for industry networking and knowledge sharing; fostering personal, professional, and industry development in Jordan.

Through the training course, a strong base of 34 Certified Energy Managers was established. Additionally, six of those individuals were approved as AEE Authorized International CEM Trainers for Jordan. The AEE Authorized International CEM Trainers for Jordan have the knowledge and resources to continue the training through the AEE Jordan Chapter working in association with EDAMA and AEE to reach the greatest number of energy professionals. The new CEMs will generate interest and healthy competition between energy professionals to earn the CEM certification. Individuals earning the CEM certification are now recognized worldwide as having the highest level of competency in energy management.

AEE CHAPTER DEVELOPMENT

AEE led the Chapter Development with assistance from Isam Mustafa and Mr. Larry Good, the Director of Membership Development for AEE and the Chairman of the International Certification Board. Development commenced at the beginning of March 2010.

STEERING COMMITTEE

Mr. Good worked with a core group of Jordanian engineers recommended by USAID to form the Chapter Steering Committee for the AEE Jordan Chapter. USAID provided ten contacts (Table 1), several of which showed significant interest and enthusiasm regarding their ability to participate in a leadership role with the chapter. Larry Good chose the individuals listed below to be on the Steering Committee (Table 2).

Table 1: Initial Chapter Contacts Provided by USAID

Initial Chapter Contacts Provided by USAID		
Name	Affiliation	Email
Dr. Fawwaz Al Karim	Al Ahliya Private University/Prof.	fkarmi@greentech.ae
Eng. Laith Al Qasem	SABEQ/CoP	laqasem@sabeg-jordan.org
Eng. Saleh AL Tayeh	Terra Vertis/Manager	salah@mepowerserve.com
Eng. Asad Zatar	Nur Systems /Manager	info@nursolarsys.com
Eng. Hanna Zaghloul	Kawar Energy/CEO	hanna.zaghloul@kawar.com
Eng. Luay Jildeh	EMS/Manager	l.jildeh@ems-int.com
Eng. Walid Shaheen	NERC/Acting President	w.shahin@nerc.gov.jo
Eng. Mahmood Al Eis	MEMR/Planning Director	dplanning@memr.gov.jo
Eng. Isam Mustafa	SABEQ/EWE Sector Lead	imustafa@sabeg-jordan.org
Eng. Nedal Zatari	GreenTech/CEO	nedal@greentech.ae

Table 2: Contacts Chosen by AEE for Chapter Steering Committee

Contacts Chosen by AEE for Chapter Steering Committee		
Name	Affiliation	Email
Mr. Ismael Al-Hinti	Nur Energy & Environmental Services/Consultant	ialhinti@hotmail.com
Eng. Saleh AL Tayeh	Terra Vertis/Manager	salah@mepowerserve.com
Eng. Luay Jildeh	EMS/Manager	l.jildeh@ems-int.com
Eng. Isam Mustafa	SABEQ/EWE Sector Lead	imustafa@sabeg-jordan.org
Eng. Nedal Zatari	GreenTech/CEO	nedal@greentech.ae
Mr. Hanna Zaghloul	Kawar Energy/ CEO	Hanna.Zaghloul@Kawar.com
Mr. Jalal Al-Khasawneh	EcoSol/ Technical Manager	jkhasawneh@ecosol-int.com
Mr. Nassar Majali	EDAMA/ CEO	
Mr. Mohammad Hamdan	University of Jordan/Dean of Engineering	

ONSITE MEETINGS

Mr. Good traveled to Amman, Jordan on March 18, 2010. While in Amman, he facilitated three general AEE membership meetings and two interim board meetings (see Appendix for meeting minutes).

A list of meeting presentations is provided in Table 3 (see Appendix for copies of presentations).

Table 3: Chapter Meeting Presentations Presented by Larry Good

Chapter Meeting Presentations Presented by Larry Good		
Date	Presentation Title	Meeting
March 21, AM	"AEE Training & Certification Programs"	Prescreening Activity
March 21, PM	"Welcome to AEE"	1 st General Meeting
March 22, AM & PM	"Best Practices & Operations"	1 st Interim Board Meeting & 2 nd General Meeting
March 23, AM & PM	"Chapter Sustainability"	2nd Interim Board Meeting and 3rd General Meeting
March 24, PM	"AEE's International Chapters Around the World"	Chapter Charter Ceremony

CHAPTER POSITIONS

CHAPTER OFFICER AND COMMITTEE CHAIR POSITIONS WERE DETERMINED BY THE STEERING COMMITTEE (TABLE 4).

Table 4: Chapter Positions

Chapter Positions		
Name	Affiliation	Position
Mr. Ismael Al-Hinti	Consultant	Steering Committee Member
Eng. Saleh AL Tayeh	Terra Vertis/Manager	Chapter Treasurer/ Legislation & Policies Committee Chair
Eng. Luay Jildeh	EMS/Manager	Steering Committee Member
Eng. Isam Mustafa	SABEQ/EWE Sector Lead	Steering Committee Member
Eng. Nedal Zadari	GreenTech/CEO	Chapter Vice President
Mr. Hanna Zaghloul	Kawar Energy/ CEO	Chapter President
Mr. Jalal Al-Khasawneh	EcoSol/ Technical Manager	Chapter Secretary
Mr. Nassar Majali	EDAMA/ CEO	Steering Committee Member
Mr. Mohammad Hamdan	University of Jordan/Dean of Engineering	Steering Committee Member
Mr. Amjad Alkam	EMS/CEO	Membership Committee Chair
Mr. Ahmad Al-Ghandour	Nur Energy & Environmental Services /Consultant	Newsletter Committee Chair
Dr. Ahmad Al-Salaymeh	University of Jordan/Director of Energy Center	Students and Scholarship Committee Chair
Dr. Fawwaz Al Karmi	Al Ahliya Private University/Prof.	Program Committee Chair

CHAPTER CHARTER

Larry Good also assisted in the creation of the chapter bylaws and presented the AEE Jordan Chapter Charter on March 24, 2010 (Chapter Charter presentation photo below).



Mr. Larry Good, Association of Energy Engineers representative, presenting the AEE Jordan Chapter Charter to Mr. Hanna Zaghloul and the founding members of the Jordan energy chapter. *Photo by: Hassan Ayoub*

Chapter Meetings

Larry Good facilitated 3 general AEE membership meetings & 2 interim board meetings onsite in Amman.

AEE Jordan Chapter

Chapter Charter was presented on March 24, 2010.

COURSE PARTICIPANT CERTIFICATION PRESCREENING

Larry Good assisted in the selection of 50 candidates from approximately 80 applicants to participate in the Comprehensive 5-day Training for Energy Managers and sit for the Certified Energy Manager (CEM) exam in April 2010 (See Appendix for list of preapproved applicants).

To be considered for the program, contenders had to meet stringent eligibility requirements. Applicants were required to complete the official CEM application and supply supporting documentation proving their education and experience in energy management.

AEE COMPREHENSIVE ENERGY MANAGER TRAINING

AEE prepared and shipped CEM Workbooks and *Guide to Energy Management, International Version* textbooks to Amman, Jordan prior to the course.

Dr. Barney Capehart and Dr. Eric Woodroof traveled to Amman, Jordan to teach the 5-day Comprehensive Energy Manager Training. Please find course outline below.

April 25, 2010, Day 1:

Course-

- Attendee Registration
- Opening Session
- Instructor Welcome and Introductions
- The Need for Energy Management (A); CEM® examination information (A) Conducting an Energy Survey (B)
- Conducting an Energy Audit (B)
- Energy Audit Instrumentation (C); Building Energy Codes and Standards (D); Energy; Energy Purchasing (E)
- Energy Rate Structures (G); Electric Rate Structures (H)

April 26, 2010, Day 2:

Course-

- Economic Analysis and Life Cycle Costing (I)
- Electrical Systems; Peak Load Reduction; Power Factor Improvement; Power Quality and Harmonics (K)
- Lighting Basics (L)
- Lighting System Improvements (L), and Building Commissioning (U)

April 27, 2010, Day 3:

Course-

- Electric Motors and Applications (M)
- Motors and Drives; Compressed Air Systems (M)
- HVAC Basics and System Improvements (O)
- Building Envelope (O)
- Attendee Help Session- Presented by one of the instructors, attendees had the opportunity to participate in a group discussion with sample questions and calculations.

April 28, 2010, Day 4:

Course-

- Boilers and Thermal Systems; Boiler Efficiency Improvement (P)
- Industrial Systems; Cogeneration and CHP (Q)
- Green Buildings (N); Practice Problems (J)
- Building Automation and Control Systems (V)

- Attendee Help Session- Presented by one of the instructors, attendees had the opportunity to participate in a group discussion with sample questions and calculations.

April 29, 2010, Day 5:

Course-

- Thermal Energy Storage (O), Maintenance (U); Alternative Financing and Measurement and Verification (W)

PROGRAM EVALUATION RESULTS

AEE requested that program participants complete a brief program evaluation after the close of the course.

They were asked questions that required them to check one of the following options: Strongly Disagree, Disagree, Not Sure, Agree, and Strongly Agree.

Please find the questions pertaining to the **Training Session** below along with the number of responses.

"The information that was presented to me will be useful to me in my work or my job search."

Total Responses: 25

Strongly Disagree: 1 Disagree: 0 Not Sure: 0 Agree: 12 Strongly Agree: 12

"The Presenters were knowledgeable of the material and presented it in a clear and interesting way."

Total Responses: 25

Strongly Disagree: 0 Disagree: 0 Not Sure: 0 Agree: 17 Strongly Agree: 8

"I was given enough time to ask questions, study and reinforce my learning through exercises."

Total Responses: 25

Strongly Disagree: 1 Disagree: 5 Not Sure: 4 Agree: 11 Strongly Agree: 4

Please find the questions pertaining to the **Training Material** below along with the number of responses.

"Workbook material was clear and supported my learning."

Total Responses: 25

Strongly Disagree: 1 Disagree: 3 Not Sure: 2 Agree: 14 Strongly Agree: 5

"The charts and graphs presented in the material supported my learning."

Total Responses: 25

Strongly Disagree: 1 Disagree: 1 Not Sure: 2 Agree: 16 Strongly Agree: 5

CEM EXAM & CERTIFICATION

All course participants were prequalified for certification eligibility by Mr. Larry Good with the assistance of USAID.

Those who were prequalified for certification and took the training course also sat for the CEM certification exam. AEE provided all exam materials. Participants had 4 hours to answer the required 130 questions. The maximum score possible is 1040.

Table 5: CEM Exam Sections

CEM Exam Sections	
Section Name	Points Possible
Energy Accounting and Economics (mandatory)	160
Energy Audits and Instrumentation (mandatory)	160
Electrical Systems	80
HVAC Systems	80
Motors and Drives	80
Industrial Systems	80
Building Envelope	80
CHP Systems and Renewable Energy	80
Building Automation Systems	80
Control Systems	80
Thermal Energy Storage Systems	80
Lighting	80
Boiler and Steam Systems	80
Maintenance	80
Building Commissioning and Measurement & Verification	80

AEE scored the exams and provided pass/fail letters for distribution to the participants.

After careful analysis of exam results, the AEE International Certification Board approved the addition of points for 19 questions that AEE found to be unclear to participants.

Of those taking the CEM certification exam, 34 received passing scores and received the CEM certification.

AEE issued the CEM certificates while USAID presented them to the participants at a graduation ceremony conducted on June 10, 2010 under the patronage of the Minister of Energy in Amman, Jordan.

Those gaining certification received a complimentary one-year AEE membership. AEE issued certificates and membership materials.

All participants attending the course also received framed CEM Course Completion Certificates at the ceremony.

PROGRAM EVALUATION RESULTS

AEE requested that program participants complete a brief program evaluation after the close of the course.

They were asked questions that required them to check one of the following options: Strongly Disagree, Disagree, Not Sure, Agree, and Strongly Agree.

Please find the questions pertaining to the **Certification Exam** below along with the number of responses.

"I felt prepared for the certification exam."

Total Responses: 24

Strongly Disagree: 1 Disagree: 6 Not Sure: 6 Agree: 11 Strongly Agree: 0

"I had enough time to complete the certification exam."

Total Responses: 24

Strongly Disagree: 10 Disagree: 8 Not Sure: 2 Agree: 4 Strongly Agree: 0

"The exam instructors were clear."

Total Responses: 24

Strongly Disagree: 0 Disagree: 1 Not Sure: 3 Agree: 11 Strongly Agree: 9

"The grading criteria were clear."

Total Responses: 17

Strongly Disagree: 1 Disagree: 1 Not Sure: 2 Agree: 10 Strongly Agree: 3

A majority of respondents indicated that they did not have enough time to complete the exam. The 4-hour limit is standard for all AEE certification exams, and was approved by all AEE Certification Boards. It is not uncommon to hear this response from participants as time is limited to illustrate their time management skills.

AEE JORDAN CHAPTER CEM TRAIN-THE-TRAINER

On April 30, 2010, Dr. Barney Capehart and Dr. Eric Woodroof held a Train-the-Trainer Session for future AEE Authorized International Trainers for the CEM program in Jordan.

The AEE Jordan Chapter chose potential trainers in advance. AEE instructors graded the potential trainers exams immediately following its completion. Once scores were determined, the AEE Jordan Chapter chose five individuals to attend the Train-the-Trainer session the following day. One individual who was already a CEM also attended the session (Table 6).

Dr. Capehart and Dr. Woodroof spent the day with the new trainers going over teaching styles, course content, and exam content. At the end of the session, the individuals signed AEE Authorized CEM Instructor agreements permitting them to present CEM training through the AEE Jordan Chapter and AEE in association with EDAMA.

Course Participants

50 qualified Jordanian Engineers were selected to attend the 5-day Energy Manager Training.

Graduation Ceremony

34 Jordanian engineers received their CEM Certificates in a Ceremony held June 10, 2010.

Table 6: Train-the-Trainer Participants

Train-the-Trainer Participants		
Title	Given Name	Family Name
Dr. Eng.	Ahmad	Al-Ghandoor
Eng.	Amjad	Alkam
Dr. Eng.	Ismael	Al-Hinti
Eng.	Jalal	Al-Khasawneh
Eng.	Tareq	Obeido
Eng.	Naim	Awadallah

OVERALL PROGRAM EVALUATION RESULTS

AEE requested that program participants complete a brief program evaluation after the close of the course.

They were asked to "Rate your overall satisfaction with the program from 1-5 (5=Very Satisfied). There were 17 responses with an average satisfaction rating of 3.88.

Additionally, they answered four questions that required written responses. Please find the questions below with the recorded responses.

"Comments about the Training or certification exam":

- The material was too big and needed longer than five days (at least 2 weeks)
- Great expertise; good refreshments
- Many questions were not covered in lectures and in workbook
- Need more time; many points in the exam were not covered in the material
- It should have been broken down into at least 2 sessions; it was too long
- Five working days is not easy to attend all the classes. It would have been better if it were a 2 days weekend and 3 working days (2 + 3= 5) this will be easier to arrange to attend all classes.
- I recommend to make the duration of the course longer and the exam a multi one
- concentrate on oil, water electricity, LPG examples, no coal
- I think the material can be made more relevant to Jordan's local information systems, like energy tariffs, structures, and utilities; however, it is always good to know about what is going on in other counties like USA. The training was too long. I recommend 1-3 days between course and exam for more study time.

"Which aspect of this week did you enjoy most? / Why?"

- Energy Accounting & Energy Audits / these areas are needed for my current work
- The knowledge gained was more than what one can acquire in University or work experience
- Last day / because I take the Green Building
- Mechanical Reactions
- Electrical issues, HVAC, economic analysis / they are the core of my work
- Renewable energy / crosses my work
- Economics and Energy Audits were added knowledge for me
- Economics / Cost and Value Engineering for Clients
- Being a member of this family
- All lectures were interesting; lecturers were very knowledgeable and friendly
- Discussion sessions
- Energy Accounting & Energy Auditing / I think they will be useful for my work
- Boiler, Lighting, and HVAC / refreshed the information I had forgotten
- EMO's, Maintenance & Financial Analysis / It is all new information to me
- Economics control

- Exceptional knowledge of trainers. Delivery was excellent. Material was made easy / Trainers used humor & simple examples. They were very pleasant, approachable, structured in ways which focused on what is really important.
- Knowing more about international standards in energy management and economic calculations. It is highly beneficial to compare your knowledge and experience with international experts and those who are specialized in the field.

“Did you encounter any administrative difficulties, if so please describe? [Examples: Pre-registration issues, or problems with registration onsite] / If yes, how were they resolved?”

- No
- There were no difficulties
- No
- No
- No
- No
- No
- No
- No
- No
- No
- No
- No
- No. Need certificate of attendance, showing the number of hours on the certificate for professional development units.
- None

“What can be done for future course to improve upon the program?”

- Maybe it is better to increase number of days for training and to allocate at least two days before the exam as study time.
- Cannot identify areas for improvement; the course was excellent.
- Learn the course at a slower pace.
- Conduct course in a remote venue.
- Extend duration of the program
- Distribute the learning materials at least one month prior to the training
- Allow additional days for material review
- Give more time for lectures (presentations); more time should be given to study for exam
- Give attendees more time to study since material is compressed
- Give more time for the course in order to concentrate more on the topics presented.
- More days should have been allocated for the lectures
- It should be divided into two courses to allow more time to review and study. The course should be half days and not full days.
- Give more time for studying. Exam can be after one week following the end of the course. The presentations may be every other day, to give enough time to study and comprehend the material.

- Customize alternative solutions to the level of project (simple/complex) available in Jordan.
- Allow 1-2 days between course and exam; give more time to Mechanical Reactions!
- The exam was more focused on the mechanical part, which is not fair for electrical engineers

“Please provide any additional comments here:”

- We need enough time to study and review the presented material
- Excellent work
- Very condensed; better to have some time between the end of course and the exam
- Provide more study time before the exam; more exam questions are usually needed for exams
- The problems are more oriented to calculations which makes the time very limited to solve them; mechanical and thermal questions were mixed with the electrical section which negatively affects the scores of electrical engineers.

Generally, all course participants have a similar views as the Jordanian participants. However, in AEE’s 30 years of experience, the same comments were made after the course format was altered. The course does offer a significant amount of material so participants must utilize the help sessions and their spare time to study after lectures to score as best they can on the exam.

These responses may indicate that there was a greater language barrier between the participants and instructors than USAID anticipated. Nonetheless, after completion of the course, the consensus from select participants and USAID counterparts was that giving the course in English provides a level of prestige that could not otherwise be achieved.

AEE will support the AEE Jordan Chapter should they decide to change the format of the course for Jordan by extending the number of days or breaking up the week. The 4-hour certification exam, however, must remain unchanged.

In conclusion, AEE is pleased with the great success of this program. The AEE Jordan Chapter is operating under the guidance of committed, successful and enthusiastic energy professionals in Jordan. The initial Comprehensive Energy Manager Training course was of great interest to energy professionals in Jordan and was perceived by those chosen to attend the training as very valuable. In addition, there are currently six talented professionals equipped to continue this training and share crucial energy management knowledge and practices. The AEE Chapter and ongoing CEM training program will provide professionals and industry in Jordan a recognizable symbol of leadership and commitment in the energy industry and provide the country of Jordan immeasurable benefits in the field of energy management.

APPENDICES

APPENDIX 1: GENERAL MEETING MINUTES

APPENDIX 2: STEERING COMMITTEE MEETING MINUTES

APPENDIX 3: MEETING PRESENTATIONS

APPENDIX 4: PREAPPROVED APPLICANT SPREADSHEET

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