

**AGENDA FOR THE
U.S.-JORDAN ELECTRIC POWER TRANSMISSION PARTNERSHIP
EXECUTIVE EXCHANGE VISIT**

**BETWEEN THE
NATIONAL ELECTRIC POWER COMPANY (NEPCO)
OF JORDAN**



**AND
ARIZONA PUBLIC SERVICE (APS)**



**April 3-13, 2010
in Phoenix, Arizona**

Managed by
UNITED STATES ENERGY ASSOCIATION (USEA)

Funded by
THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)



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FROM THE AMERICAN PEOPLE

USEA
United States Energy Association

Partnership Goal:

To introduce and transfer best utility practices for planning, operating, managing and maintaining electric power transmission systems.

Executive Exchange Objectives:

1. Improving the reliability and stability of the transmission grid system.
2. Accelerating the integration of renewable energy into the grid.
3. Improving transmission system planning and operations.
4. Introducing advanced techniques for operating the Jordanian electricity market and handling cross-border electricity exchange and cooperation.

Participants:

National Electric Power Company of Jordan (NEPCO) www.nepco.com.jo

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USEA Coordination (www.usea.org)

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United States Energy Association

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Phone: 202-312-1230, Fax: 202-682-1682

Sunday, April 4, 2010

10.30 NEPCO delegates Depart Amman, Jordan for Chicago O'Hare International Airport on American Airlines flight 7201 (Operated by Royal Jordanian), arriving at 15.55

18.55 NEPCO delegates depart Chicago O'Hare International Airport for Phoenix International Airport in Phoenix, Arizona on American Airlines flight 1733, arriving at 20.50 (delegation will be met by Jason Hancock in the baggage claim area)

Lodging: Phoenix Airport Marriott
1101 North 44th Street
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Executive Time

Monday, April 5, 2010

APS (www.aps.com)

*Arizona Public Service Company is the largest electric utility in Arizona and the principal subsidiary of publicly-traded S&P 500 member **Pinnacle West Capital Corporation** (NYSE: PNW), which in turn had been formerly named **AZP Group**, when Arizona Public Service reorganized as that holding company in 1985. APS, with 4,000 MW of generating capacity, serves more than one million customers in 11 counties throughout most of the state, but mainly concentrated in northern and central Arizona.*

The holding company, Pinnacle West Capital, through its APS utility sells wholesale and retail power to the wider western United States and also provides energy-related services. Through another major subsidiary, Pinnacle West, it also develops and manages real estate in Arizona.

LOCATION: APS Deer Valley:
2121 W Cheryl Dr.
Phoenix, AZ 85021

9.00-9.15 OVERVIEW OF PROGRAM OBJECTIVES AND INTRODUCTION OF DELEGATION (USEA)

9.15-10.00 PRESENTATION ON TRANSMISSION SYSTEM IN JORDAN (NEPCO)

- Overview of NEPCO
- Recent changes since last exchange visit

10.00-10.30 Break

10.30-11.00 OVERVIEW OF APS TRANSMISSION SYSTEM

- Overview of APS
- Recent changes since last exchange visit

11.00-12.00 TRANSMISSION PLANNING-OVERVIEW

- Integration of Renewable Generation
 - Technical Impact
 - Regulations
- Long-term Planning
- Near-term Planning
- Importance of Regional Planning & Development
- Special Considerations for Transmission Planning under Privatization of Distribution and Generation Sectors

12.00-13.00 Lunch**13.00-13.45 NATIONAL RENEWABLE ENERGY LABORATORY (NREL) WESTERN WIND AND SOLAR INTEGRATION STUDY (WWSIS)*****Presenter: Ron Flood***

- Background
- Wind, Solar and Load Data
- Study Scenarios
- Key Findings
 - Feasibility
 - Benefits
 - Requirement of Reserves or Storage
 - Economic Impacts
 - Transmission Requirement
- Conclusions

13.45-14.30 APS RENEWABLE ENERGY INTEGRATION

- Forms of Renewable Energy Used
- Interconnection to Grid (Transmission or Distribution) and Energy Transfer to System
- Forecasting
- Special Issues
 - Generation resource management/ scheduling
 - Forecasting
 - Forms of Variability
 - Data needs and projects

14.30-14.45 Break**14.45-16.30 ENERGY EFFICIENCY AND DEMAND RESPONSE*****Presenter: Zachary Fryer***

- Reasons for Energy Efficiency and Demand Side Management
- Federal Policy
- State and Western Regional Policy
- Requirements
- APS Programs to Meet/Exceed Requirements
- Operational Considerations

Tuesday, April 6, 2010

9.00-10.30 SMART GRID**Presenters: Barbara Lockwood Tony Tewelis, Les Rainey**

- The Case for Modernization
- Smart Grid: Benefits to Utilities, Customers and Society
- Planning for the Smart Grid: Strategy and Business Case
- Policy, Standards and Regulation
- Flagstaff Smart Grid Pilot
- Demand Response and the Smart Grid

10.00-10.30 Break**10.30-12.00 INTEGRATION OF LARGE SCALE NUCLEAR POWER PLANTS TO THE GRID**

- Stability Issues
- Maintaining Reserve
- Issues with Light Load
- Transmission Capability

12.00-13.00 Lunch**13.00-14.30 FEDERAL REGULATORY ISSUES****Presenter: Lindy Fisker**

- Impediments to Regional Transmission
- Energy Policy Vision
- Regional Planning
- Harmonizing Approaches to Cost Allocation
- Backstop Siting Authority
- Recent Congressional Action
- Energy Super Highway
- Green Power Express

14.30-15.00 Break**15.00-16.30 RENEWABLE RESOURCES PROCUREMENT PROCESS****Presenter: Gordon Samuel, Jr.**

- Renewable energy requirements at Federal and State Level
- APS renewable to date
- Preferred technologies in resource plan
- Procurement strategies and Process

Wednesday, April 7, 2010

APS (site visit)

8.00-17.00 DEPART HOTEL FOR SITE VISIT TO APS PALO VERDE NUCLEAR GENERATING STATION

Thursday, April 8, 2010

9.00-10.00 TRANSMISSION SYSTEM OPERATIONS

Presenter: Steve Phegley

- Relay Coordination Between Main & Backup Relays
- Methodology of Planning Under-Frequency Scheme -Best Practices
- Transmission Metering
 - Intelligent Automatic Meter Reading Systems

10.00-10.30 Break

10.30-12.00 TRANSMISSION MAINTENANCE

- Software for Maintenance Management at APS
- Replacement Policy for Aging Infrastructure
- Substation Maintenance
 - Transformer Maintenance

12.00-13.00 Lunch

13.00-14.40 EMERGENCY RESTORATION

- Advanced Planning & Preparation
- Identifying Causes of Critical Disturbances
- Improving Response Time
- Assessing the State of the Entire System
- Voltage Control
- Maintaining Load/Generation Balance
- Frequency Control (Under Islanded Condition)
- Synchronization Considerations
- System Protection Considerations
- Black-Start
 - Selection of Generation Which Can Be Started (Automatic, Manual)
 - Location Selection For Black-Start Generation
 - Transmission Consideration (Paths Between Black-Start Units, Long Distances)

14.40-15.00 Break**15.00-17.00 OPERATOR TRAINING**

- Operating Procedures Dealing with "Abnormal" System Conditions
- Simulator Based Training
- Training Requirements for Operator Training With Respect To "Abnormal" Conditions (EMS, SCADA, AGC)
- Training Program
 - Training Objectives
 - Upgrading Courses
- Restoration Procedures
- Creating a Life-like Training Environment
- Motivating Factors
- Evaluating Training Results
- Evaluating Effectiveness of Training Program

Friday, April 9, 2010**8.00 Depart for Site visit: Coconino Substation, Flagstaff, Arizona**

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 3440 N Country Club Drive
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Saturday, April 10, 2010

Return from Flagstaff, Arizona

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Sunday, April 11, 2010

18:00 **APS Hosted Cultural Event: Phoenix Suns vs. Houston Rockets Basketball Game in the APS Arena Suite**

Monday, April 12, 2010

07.00 Delegates depart hotel for Airport for Return flights to Amman

10.35 NEPCO delegates depart Phoenix International Airport in Phoenix, Arizona for Chicago O'Hare International Airport on American Airlines flight 1144, arriving at 16.00

19.30 NEPCO delegates Depart Chicago O'Hare International Airport for Frankfurt, Germany on American Airlines flight 84, arriving at 11.10 Tuesday, April 13, 2010

Tuesday, April 13, 2010

19.30 NEPCO delegates Depart Frankfurt, Germany on American Airlines flight 7198 (Operated by Royal Jordanian) for Amman Jordan, arriving at 19.45