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ELECTRIC DISTRIBUTION UTILITIES OF JORDAN LAUNCH PARTNERSHIP PROGRAM WITH USEA

*National Grid and the Sacramento Public Utility District (SMUD)
Experts Share "Best Practices"*

by Tricia C. Williams, Senior Program Coordinator



Delegation inspects solar photovoltaic rooftop of National Grid's new headquarters, a Gold LEED building.

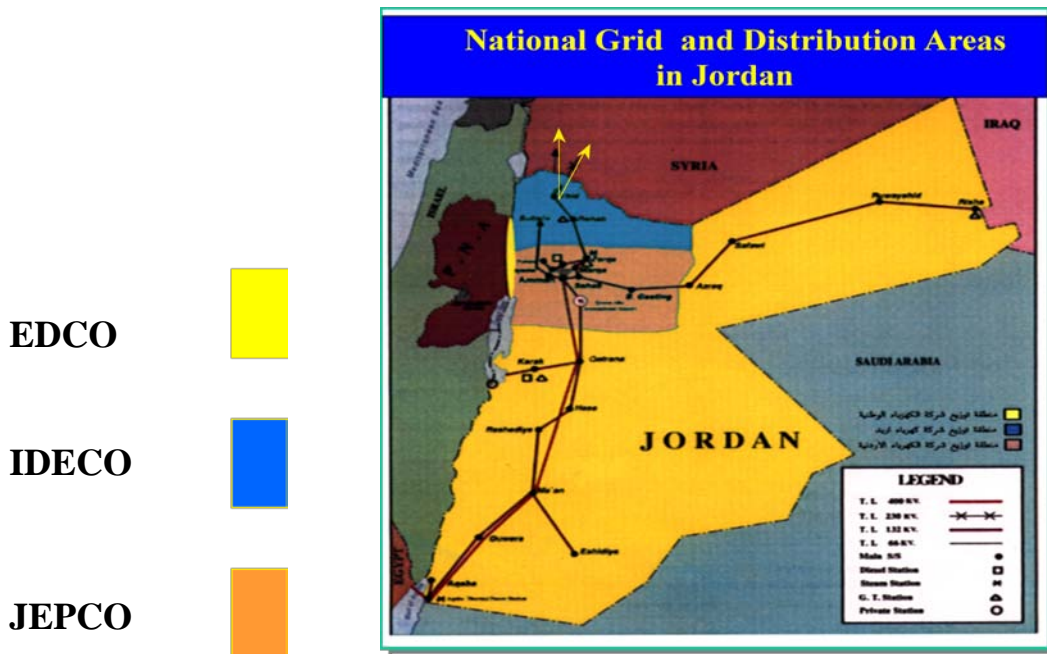
The **Jordan Electric Power Company (JEPCO)**, **Electricity Distribution Company (EDCO)** and **Irbid District Electric Company (IDECO)** completed the first executive exchange under their new partnership from May 25-June 4, 2009 in Massachusetts, California and Washington, DC. The **Jordanian Distribution Utility Partnership** was created to improve energy efficiency programs, reduce distribution losses and improve regulatory affairs in Jordan. The distribution utilities' partnership is sponsored by the **United States Agency for International Development (USAID)** and organized by the **United States Energy Association's (USEA) Energy Utility Partnership Program (EUPP)**.

BACKGROUND ON ENERGY SECTOR IN JORDAN

The Government of Jordan faces two challenges in the energy sector – rising demand due to population growth and increased per capita consumption, and a reduction in the availability of below market priced fuel. Jordan imports 96% of its oil and gas, which in 2007 accounted for 19% of the Country's GDP. The rising cost of importing energy resources has forced the government to reconsider its energy consumption policies and address the issue of reliance on international energy markets for direct imports. The distribution sector will have a vital role in meeting this challenge and is actively analyzing energy efficiency programs, integrating renewable energy and reducing losses.

The distribution sector comprises three companies all of which are now privately owned.

- **Jordan Electric Power Company (JEPCO)** was formed in 1947 as a private power company, serves Amman and central Jordan and supplies about 64% of electricity consumers in Jordan. JEPCO is not fully privatized; the Jordanian government owns 23%.
- **Electricity Distribution Company (EDCO)** covers the south and east of Jordan, with 8,396 km of network that serves 139,821 customers. EDCO was established in 1997, as part of the break-up of the Jordan Energy Authority and was privatized in November 2007 when it was purchased by **Kingdom Electricity Company (KEC)**.
- **Irbid District Electric Company (IDECO)** was established in 1961 and serves the northern part of the country with 13,148km of network serving 250,623 customers. 55.4% of IDECO was also purchased by **Kingdom Electricity Company (KEC)** in November 2007.



OBJECTIVE OF EXECUTIVE EXCHANGE

The intent of the executive exchange was to introduce policy and regulatory initiatives and incentives for energy efficiency programs, the U.S. regulatory environment and reducing distribution system losses through system design. Key topics were:

1. Promoting consumer energy efficiency and energy conservation, energy load management through demand side management and renewable energy technologies.
2. Setting equitable tariffs, providing incentives for energy efficiency, renewable energy and conservation, incentive based performance measures and indicators and improving regulatory relationships.
3. Optimizing network efficiency by improved planning, programs to reduce power losses due to technical problems and theft, improved maintenance and inventory management practices and employee and management training techniques.



Delegation giving a briefing at USEA on the energy sector in Jordan in Washington, DC. From left to right: Dr. Ghaleb Maabreh, ERC; Amin Al Frieihat, EDCO; Saad Abuodeh, KEC; Ahmed Thainat, IDECO; and Marwan Bushnaq, JEPCO.

BOSTON, MA: MEETINGS WITH NATIONAL GRID ON ENERGY EFFICIENCY



Seated from left to right: Saad Abuodeh, KEC; Anwar Ellayan, JEPCO; Fayez Al-Qawasmeh, IDECO; Marwan Bushnaq, JEPCO; Hassan Abdullah, JEPCO; Firas Kamrajji, EDCO; Ala' Alqar'awi, IDECO; and Laura Orfanedes, Cadmus Group.

In Boston, Massachusetts, the Jordanian distribution utilities met with **National Grid** where they discussed energy efficiency programs, the state electricity regulatory system and the regulatory relationship. National Grid is an international energy delivery company. In the U.S., National Grid delivers electricity to approximately 3.3 million customers in Massachusetts, New Hampshire, New York and Rhode Island, and manages the electricity network on Long Island under an agreement with the Long Island Power Authority. National Grid is the largest power producer in New York State, owning 6,650 megawatts of electricity generation that provides power to over one million LIPA customers and

supplies roughly a quarter of New York City's electricity needs. It is also the largest distributor of natural gas in the northeastern U.S., serving approximately 3.4 million customers in New York, Massachusetts, New Hampshire and Rhode Island.

Energy efficiency programs at National Grid are funded by customers and state programs. National Grid must explain to the regulatory commission how it will disburse these funds and if it achieves its goals, can earn money for its shareholders. The current mechanism for the shareholder incentive is broken into three categories: a savings mechanism (expected lifetime energy and demand savings and dollar value of non-electric benefit); a value mechanism (achieved net benefits compared to expected net benefits); and other performance metrics. National Grid is paid the incentives in real time but may not receive approval from the regulatory commission for six months to six years.

For commercial customers in their service territory, National Grid provides strategies, business solutions and incentives. Most of the portfolio is centered around new and existing buildings. The existing building strategy is to replace equipment so the incentive structure is 50% of cost or a two year pay back, whichever is less. For small businesses, National Grid pays a vendor 100% of the total project cost, and the customer repays 30% of the cost either through a lump sum with a 15% discount or on their bill as a line item, interest free for 24 months.

The delegation was very interested in National Grid's experiences with savings on CFL lighting. National Grid said 15-20% savings could be achieved easily by switching to CFLs.



While in Boston, MA, the delegation also visited **TransForm Pharmaceutical**, a gas customer of National Grid, to learn about their new trigeneration facility. The TransForm facility is a solar assisted combined heat, cooling and power unit that provides 29% of cooling capacity and 38% of hot water heating capacity on a typical design day. The unit provides 250kW of base-load electric power to the facility all year long and saves about \$220,000.00 a year in energy costs.

Delegation at National Grid gas customer TransForm Pharmaceutical's trigeneration facility. From left to right: Ala' Daoud Alqar'awi, IDECO; Dr. Ghaleb Maabreh, ERC Amin Al-Freihat, EDCO; Fayez Sitan Al-Qawasmeh, IDECO; Sa'ad Abuodeh, KEC; Frank Voss, TransForm Pharmaceuticals; John Hammond, USEA; Marwan Bushnaq, JEPCO; Hassan Abdullah, JEPCO; Ahmad Thainat, IDECO; Firas Kamrajji, EDCO; and Anwar Ellayan, JEPCO.

BOSTON, MA: MEETINGS WITH NATIONAL GRID ON REGULATORY AFFAIRS

National Grid highlighted several key regulatory points of great interest to the delegation. In particular, the Massachusetts regulatory commission realized it did not have the necessary knowledge or resources to review every individual utility action. Therefore, the commission is using Performance Based Ratemaking (PBR), an approach that reduces the amount of time the regulator must spend on mundane utility issues and allows the utility to more effectively run its business. National Grid and the regulatory commission's view is to create a framework with guidelines, incentives and penalties and let the utilities run their business using a carrot and stick approach.

WASHINGTON, DC: MEETINGS WITH D.C. PUBLIC SERVICE COMMISSION ON TARIFFS



Delegation with DC Public Service Commission staff including Felicia Bowman, Executive Director; Joseph Nwude, Deputy Executive Director for Regulatory Matters; Felix Otiji, Senior Accountant; Christopher Lipscombe, Senior Attorney Advisor; and Roger Fujihara, Senior Electricity Economist.

The mission of the **District of Columbia Public Service Commission (DCPSC)** is to serve the public interest by ensuring that financially healthy electric, gas and telecommunications companies provide safe, reliable and quality utility services at reasonable rates for District of Columbia residential, business and government customers.

Discussions at the DC Public Service Commission centered on rate determination.

Of particular interest to the Jordanian distribution utilities were how performance targets, allowable rates of return and reasonableness are determined and how energy efficiency programs are funded through ratepayers. The DCPSC also mentioned they were looking into decoupling rates so the utility does not lose money with the decrease in energy sold due to energy efficiency measures taken by consumers.

SACRAMENTO, CA: MEETINGS WITH SACRAMENTO MUNICIPAL UTILITY DISTRICT (SMUD) ON ENERGY EFFICIENCY

As the sixth largest publicly owned utility in the country in terms of customers served, the **Sacramento Municipal Utility District's** service area covers 900 square miles, including California's capital city, Sacramento County. Today, SMUD offers competitive rates that are consistently lower than investor-owned utilities in the state through a diverse portfolio of generation sources, including renewable energy.

At SMUD, the energy efficiency goal for 2009 is a 40 MW peak demand reduction (in the peak months of June, July and August) and 145 GWh annual reduction in energy use. SMUD has many successful commercial and residential programs. The multifamily energy efficiency retrofit program for apartment complexes has been one of the most successful and has been oversubscribed even after SMUD lowered incentives from \$50 to \$40. This program addresses the issue of split incentives in energy efficiency programs between building owners and renters.



General Manager John DiStasio welcomes the delegation to SMUD.

SACRAMENTO, CA: MEETINGS WITH SACRAMENTO MUNICIPAL UTILITY DISTRICT (SMUD) ON DISTRIBUTION



Jordanian distribution executives examine SMUD bucket truck.



Delegation in SMUD's field equipment testing facility. This facility tests gloves, hot sticks, rubber sleeves and all other equipment used when working on energized power lines. Utilities in Jordan do not have similar testing of equipment.

SMUD also discussed at length its approach to distribution system planning and loss reduction which was of great interest to the delegation. The Jordanian delegation noted a large difference between their transformer loading and number of transformers on the system and SMUD's. SMUD has nearly 80,000 transformers – about 1 per 8 customers. SMUD's total losses are 7% with distribution losses comprising 60% of the total losses. In contrast to Jordan's system, SMUD's lines are short and distribution substations are fairly close so losses are lower.

The delegation requested further information and any available studies that discuss the effect of moving away from overhead lines to direct buried and the cost/benefit analysis that shows conduit will be cheaper in the long run.

The Jordanian delegation also had many questions on load forecasting. To forecast its daily loads, SMUD primarily uses expected daily temperature because temperature directly affects the heating and cooling requirements of its customers. Additionally, SMUD will adjust the forecast to account for newly added customer loads. For instance, in planning the availability of generation capacity, if the expected temperature is 105 F, to be on the safe side, SMUD plans to have sufficient capacity available in case the real temperature were to rise to 110 F. This provides a cushion for operations.

EXECUTIVE EXCHANGE VISIT RESULTS

The Executive Exchange Visit gave the three distribution utilities the opportunity to interact with their peers in the United States to discuss matters pertaining to energy efficiency, distribution system planning, and regulatory affairs. This initial visit provided overviews of two progressive U.S. distribution utilities and focused on specific issues they are currently facing which resulted in the following:

- EDCO, IDECO and JEPSCO received energy efficiency plans from National Grid and SMUD;
- EDCO, IDECO and JEPSCO agreed to create a task force with other related/interested parties such as NEPCO, to coordinate the creation of the partnership's deliverables and create common programs and proposals;
- Participants began exploring the possibility of switching funds currently allotted for rural electrification (which is over 95% complete) to a fund for energy efficiency;
- The utilities will analyze the process of cable injection (injecting silicone in each end of the cable to fill voids and cracks and extend the cable life) for possible application in Jordan.
- Participants are less skeptical about CFL lighting after learning both utilities have found a minimum 15-20% savings by switching to CFLs.

NEXT STEPS

The distribution utilities' executive exchange was quite successful. In addition to the material presented and the information exchanged, the program also helped outline the direction for future partnership activities. USEA will continue to work with EDCO, IDECO, JEPSCO and their U.S. counterpart utilities to help facilitate the:

- Creation of a blueprint for products per sector (residential, commercial and industrial) of economical and achievable energy efficiency products and programs;
- Development of proposals for policies and regulations to the Jordanian government and Energy Regulatory Commission (ERC) to trigger the development of appropriate policies and regulation on energy efficiency, conservation and DSM programs and incentives per sector (based on best practices) using international benchmarks;
- Creation of a template and procedures for consumer energy audits to find methods to conserve energy;
- Development of a new conceptual network configuration/master plan based on international best practices;
- Development of network design and system expansion criteria based on international best practices;
- Development of a long term plan to convert the existing distribution system to medium voltage; and the
- Reorganization of human resources departments at all three utilities.



Delegation inspects Siemens' manufacturing plant in Sacramento, California with solar PV on roof and parking structures that provide 50% of the facility's energy needs.

USEA is currently planning a follow up visit to Amman, Jordan in September 2009.

PARTICIPATING U.S. ORGANIZATIONS

- National Grid
- D.C. Public Service Commission
- Sacramento Municipal Utility District

JORDANIAN PARTICIPANTS

1. Sa'ad Abuodeh, Board member in EDCO and the CEO of Kingdom Electricity Co. (KEC)
2. Mohammad Amin Al-Freihat, Director General, EDCO
3. Firas Kamrakjy, Financial Department Manager, EDCO
4. Ahmad Thainat, Director General, IDECO
5. Fayez Sitan Al-Qawasmeh, Managing Director for Commercial and Financial, IDECO
6. Ala' Daoud Alqar'awi, Head of Planning Section, IDECO
7. Marwan Bushnaq, General Manager and Member of the Board of Directors, JEPSCO
8. Anwar Ellayan, Planning Department Manager, JEPSCO
9. Hassan Abdullah, Technical Applications Department Manager, JEPSCO
10. Dr. Ghaleb Maabreh, Commissioner, ERC

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