

DSM CONSUMER CONSULTATIONS SUMMARY REPORT

15 April 2014

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USAID JORDAN ENERGY SECTOR CAPACITY BUILDING

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DELOITTE CONSULTING LLP

USAID/ ECONOMIC DEVELOPMENT AND ENERGY OFFICE (EDE)

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Table of Contents

AC	RONYMS AND ABBREVIATIONS	. III
1.	INTRODUCTION	1
2.	APPROACH AND METHODOLOGY	1
3.	RESULTS	3
4.	SUMMARY AND LESSONS LEARNED	8
5.	ANNEXES	9

Acronyms and Abbreviations

APC Arab Potash Company

ASEZA Agaba Special Economic Zone Authority

DSM Demand-Side Management

EDCO Electricity Distribution Company

ERC Electricity Regulatory Commission

ESCB USAID Energy Sector Capacity Building Project

ESCO Energy Services Company

HFO Heavy Fuel Oil

IDECO Irbid District Electricity Company

JEPCO Jordan Electric Power Company

JREEEF Jordanian Renewable Energy and Energy Efficiency Fund

kWh Kilo Watt Hours

MEMR Ministry of Energy and Mineral Resources

M&E Monitoring and Evaluation

NEPCO National Electric Power Company

PV Photovoltaics

QA Quality Assurance
SWH Solar Water Heating

VFD Variable Flow Devices

1. Introduction

The Energy Sector Capacity Building Activity (Contract # AID-OAA-I-13-00018, Task Order # AID-278-TO-13-00003) was executed with Deloitte Consulting LLP on July 24, 2014. USAID's Energy Sector Capacity Building activity applies a broad, adaptable approach to meet the energy sector's evolving needs. In coordination with other relevant activities, it works towards:

- 1. Successful development and adoption of a utilities incentive mechanism to promote energy efficiency, including a robust monitoring, evaluation, and validation system;
- 2. Increased institutional capacity of the Jordanian energy sector partners including the Ministry of Energy and Mineral Resources, Electricity Regulatory Commission, and electricity production, distribution, and transmission companies;
- 3. Strengthened presence, capacity and regulation of energy services companies through market research, business development services, accreditation of those companies, and the creation of an energy services association; and
- 4. Flexible response mechanism for emergent energy sector needs and opportunities on a demand-driven basis.

This report is a deliverable under *Task 3 – Building the Business Case for DSM* and *Subtask 3.7 - Conduct consultations with consumer groups*. The Work Plan called for the ESCB Project to reach out to each of the major tariff segments, to ensure all consumer groups are consulted.

2. Approach and Methodology

DSM programs affect different customers according to the type of tariff they fall under and the types of electricity end-uses employed. Industrial customers have very different usage parameters for their electrical power compared to commercial customers – let alone residential customers. ESCB endeavored to reflect the diversity of electricity prices and uses through focus groups comprising different types of customers and different geographic areas. The objective was to better understand the concerns of non-residential utility customers and identify the opportunities for and obstacles to saving energy. There was no attempt to consult with household/residential consumers, as these consumers do not have a readily-available association or organization to represent them.

Two approaches were used to identify customers for consultation:

Through electricity suppliers (IDECO, EDCO and NEPCO) who in turn invited a group of participants they felt were representative of the overall customer profile.

By directly contacting representatives of specific sectors (e.g., Hotels and Schools)

There are some entities which were originally identified as a target for consultations but were either deferred or merged within other groups for the reasons described below:

1. <u>Chamber of Industry / Chamber of Commerce.</u> The focus groups invariably deal with members of either organization and by extension there would be no need

to engage them directly. Both Chambers were represented during the consultations organized by the distribution companies.

- 2. <u>Banks.</u> The financial sector is of interest both as a consumer of energy and as a potential financer of energy saving investments. The concern was that there would be some confusion as to why there were being consulted. The financial community will be consulted with during stakeholder consultation efforts following approval of a DSM incentive mechanism.
- 3. <u>NGOs.</u> A discussion directly with the NGOs would not have led to additional data on a specific sector but more a general commentary on the current status of the energy situation in Jordan.
- 4. <u>Hospitals.</u> In many ways hospitals are similar to hotels. The major difference is the presence of mission critical equipment for which saving energy is not the main priority. While there was no focus group for hospitals, a meeting with the Electricity Department Manager in one hospital showed that they are concentrating on lighting replacement programs.

Table 1 summarizes the consumer consultation events.

Focus group	Where	When	# of participants
IDECO customers	IDECO HQ	February 5 th 2014	17
EDCO customers	Movenpick Aqaba	February 12 th 2014	14
NEPCO customers	Crown Plaza Hotel	February 13 th 2014	11
Schools	ESCB Offices	March 5 th 2014	5

The same basic consultation format was used in all the focus groups:

- Welcome and Introductions
- Meeting purpose and objectives
- Introduction to Demand-Side Management
- Consultation questions

The ESCB presentation introduced energy efficiency concepts and presented several specific DSM measures (e.g., efficient lighting, solar water heating, efficient motors, street lighting). This presentation was followed by a 60-90 minute discussion with the participants. Lunch was provided following the consultation.

The consultation process was organized around the following questions:

- 1. Have you taken action to save energy? What kind of actions?
- 2. What challenges have you faced in trying to save energy?
- 3. Where would you go for advice about saving energy?
- 4. Would the energy saving measures presented be of interest to you?
- 5. What kind of payback period would you expect for investing in saving energy?
- 6. What can the distribution company do to help you save energy?

3. Results

Results are presented according to the order in which the consultations took place.

IDECO

Over half of the consumers attending the IDECO consumer consultation were shopping mall and student dorm operators. Other participants played a relatively minor role in the discussion. The responses to the discussion questions are described below.

1. Have you taken action to save energy? What kind of actions?

The main energy saving action mentioned was switching from incandescent bulbs to CFL, fluorescent tubes to LED and fluorescent tubes to CFLs. Mall operators noted that energy saving can also be accomplished through dimming or turning off the lights in low traffic areas, use of motion sensors, natural lighting.

2. Where would you look to find out about energy saving ideas?

Most consumers initially research energy savings measures internally, with an engineering consultants or contractor called in for a detailed feasibility assessment and cost estimate. No one mentioned IDECO as a resource for energy saving ideas.

3. Who would you go to for advice on saving energy?

Word-of-mouth was the most common and most reliable source of information, followed by consultants. No one mentioned IDECO as a source of advice on saving energy.

4. Are any of the DSM ideas presented of interest to you?

Efficient lighting was mentioned by all, while variable flow devices (VFDs) were mentioned by mall operators for saving on cooling and heating needs. Several participants also cited commercial scale Solar Water Heating (SWH)

5. If you invested in energy efficiency, what kind of payback period would you expect?

All of the participants would require a short payback period, perhaps 1-2 years, in order to convince their management to make the investment. Some participants noted that although payback period is important, the size of the investment is also important as management is unwilling to take on very costly projects.

6. What can the distribution company do to help you save energy?

The most useful role for IDECO would be to provide technical advice when requested. Technical advice would include technical specifications for lighting and other energy saving measures. IDECO should also provide auditing services which will reduce the cost of going to a consultant.

7. General Comments

3

¹ All participants are listed on the signup sheets provided as an annex.

Consumers see energy efficiency as a risky investment, both because of a perception that energy saving products have poor quality and concerns that energy-efficient equipment will have higher maintenance costs.

There should be national testing facilities for all suggested DSM programs to ensure that only good quality products enter the market

There is considerable interest in PV but cost and space considerations are a major factor.

There was a general concern about electricity price increases. Although these increases will make it possible to invest in energy savings, it will not reduce the total energy cost but only cover the tariff increase.

The DISCOs have an image problem, as they are seen as a debt collection agency rather than a service provider

Awareness programs are needed for the public and businesses to let consumers know about their energy saving options.

Malls have an average monthly bill of 20-40 thousand JDs. Chamber of Commerce and student dorms average around 5000 JDs per month.

EDCO

The EDCO consumers consulted were mainly the operators of large gated communities (Tala Bay, Saraya, and Ayla). Other participants included the Kempinski Hotel, Grand Hyatt Hotel, Aqaba Water Company, ASEZA, Aqaba Development Corporation and the Ports Authority.² The responses to the discussion questions are described below.

1. Have you taken action to save energy? What kind of actions?

The gated community operators noted efficient street lighting, LED for hotels, VFD for water pumping, district heating and cooling. Ayla in particular reduced pumping cost by 40%. Tala Bay VFD reduced pumping consumption by 60%. Aqaba Water Company has had success with VFD for water pumps. Other actions include simple operational changes (checking that lights are off at end of working day).

2. Where would you look to find out about energy saving ideas?

These large consumers mainly used internal teams or consultants. No one mentioned EDCO as a source of energy saving ideas.

3. Who would you go to for advice on saving energy?

All participants noted that consultants were the main source of energy saving advice. No one mentioned EDCO as resource for saving energy.

4. Are any of the DSM ideas presented of interest to you?

Indoor Lighting, VFD for water pumping, VFD for heating and cooling, street lighting, and commercial scale SWH were the DSM ideas of most interest.

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² All participants are listed on the signup sheets provided as an annex.

5. If you in invested in energy efficiency, what kind of payback period would you expect?

The participants saw availability of financing, not the payback period, as the main obstacle to investing in saving energy.

6. What can the distribution company do to help you save energy?

All agreed that providing technical advice about specific energy saving measures, such as technical specifications for lighting, would be very useful. Also useful would be providing an incentive for investment in EE equipment. The participants noted that EDCO would be considered objective and credible when it came to preparing bidding documents or selecting products.

7. General Comments

The Jordan Engineers Association is not yet active in encouraging EE or assisting businesses wanting to implement EE.

Large project developers reported no problems working with EDCO, and praised ECO's quick response times.

New tariffs and metering technology should be introduced to reduce overall electricity consumption.

There is great potential to develop new ways of raising awareness about energy efficiency. Electricity meter readers could distribute energy saving information or talk to facility or household owners directly about EE.

The consumers commented regarding the image of the distribution company. There is a feeling that EDCO works as a debt collection agency, which has an effect on the trust of even large customers.

Product quality, especially for lighting, should be addressed by more active involvement of JSMO and other government agencies in regulating the market. For example, poor experiences with CFLs have forced consumers to revert to incandescent bulbs.

These consumers from the south also felt that Amman was always the focus of awareness-building and energy projects, while consumers in other governorates are neglected.

There was a concern expressed that government regulations on street lighting prevented the use of efficient lighting. Similarly, wheeling charges need to be clarified for those who wish to make an investment in PV.

NEPCO

NEPCO provides high-voltage electricity supply to some of the largest industrial customers in Jordan. Attendees as the NEPCO consumer consultation were the Arab Potash Company and several cement manufacturers.³ These very large energy consumers have different needs according to their industrial processes, and much of the energy management work at these facilities is carried out by internal

5

³ All participants are listed on the signup sheets provided as an annex.

teams. These companies continuously pursue energy saving measures and would be interested in any support a DSM program could provide, especially financial support. These companies seem less interested in short term benefits and willing to accept longer payback periods. Profiles of several of these large facilities are provided below:

- 1. Arab Potash Company (APC) has an annual electricity bill of 70 million JD plus another 50 million JD for HFO. This represents 40% of total production cost per unit output (\$100 out of \$250/ton), APC operates a CHP facility providing steam as well as 15 MW of electricity (APC's peak demand is 50MW). Reducing production cost is vital because potash prices have been declining of late (Selling price has declined from 1000/ton in 2011 to \$300/ton today). APC's main load is 4 x 3MW seawater pumps and 9 x 2MW harvesters. The plan operates continuously at constant load, reducing the applicability of energy savings through VFD motors. APC has some capability for managing peak demand. APC is considering a 10MW PV plant which could return its investment within 5 years. An internal energy committee handles energy management decisions for steam and thermal processes.
- 2. Rajhi Cement has an annual electricity bill of 20 million JD. Current energy intensity of cement production is 115 kWh/ton, compared to an international standard of 89 kWh/ton. The factory was originally designed for an energy intensity of 102 KWh/ton. The main load is 3 x 4.5 MW mills 60% of normal maximum load of 22MW). When operating at full capacity maximum load rises to 33MW. Rajhi has already implemented programs for VFD, lighting and mechanical equipment modification.
- 3. Lafarge Cement has an annual electricity bill of 20 million JD. Lafarge has already implemented VFD and a continuous monitoring and energy management program. Lafarge has applied for a license to construct a 25 MW PV power plant for its own-consumption.
- 4. Manaseer Cement operates a new factory fitted with the latest enegy-saving process technology. Manaseer is interested in heat recovery systems for their main kiln.

All participants expressed a very good working relationship with NEPCO. All are interested in exploring financing options for additional energy saving investments. All are ready and willing to work with NEPCO on energy saving and demand reduction measures.

Schools

Schools are a distinct energy-consuming market segment because of their fixed working hours and relatively uniform end-uses and load profile. Their load coincides with the day peak and any seasonal variation is easily attributed to heating and cooling loads. ESCB consulted with four schools in a similar manner to the DISCO focus groups. The responses to the discussion questions are described below.

1. Have you taken action to save energy? What kind of actions?

All of the participants identified energy saving opportunities in their lighting loads, but noted that it is very expensive. Most have taken a strategy of gradual replacement over time. Amman Baccalaureate School has installing sub meters in order to more carefully monitor consumption. King's Academy has invested in a district heating and

cooling system as well as timers for certain loads, Building Managements Systems (BMS), and a switch from diesel to LPG for its boilers. Modern American School has configured its campus as a smart building, including automatic closure of windows when ACs are turned on

2. Where would you look to find out about energy saving ideas?

The largest schools have an internal energy management team. Others look to consultants and expressions of interest (EoI) for potential contractors. No one mentioned JEPCO as a resource for providing energy saving ideas.

3. Who would you go to for advice on saving energy?

Once again, the largest schools have internal resources while others rely on word of mouth and consultants. No one mentioned JEPCO as a source of advice on saving energy.

4. Are any of the DSM ideas presented of interest to you?

All of the participants were interested in lighting, air conditioning, solar water heating. Others expressed interest in refrigeration and VFDs as well.

5. If you in invested in energy efficiency, what kind of payback period would you expect?

Maximum allowable payback is 4 years, with 3 years or less preferred.

6. What can the distribution company do to help you save energy?

All of the participants pointed to providing technical advice and assistance, such as technical specifications for lighting and SWHs.

7. General Comments

Of the participants, monthly bills ranged from 10,000 to 75,000 JD. Most participants were skeptical regarding why government and DISCOs would be helping larger schools if they are paying for electricity at a rate which contributes to recovering NEPCO's losses. There is a general lack of awareness about energy saving measures in schools, especially at senior management level. In a similar vein to the opinions expressed during the other consultations, there is a lack of trust in DISCOs, and a feeling they act more as debt collection agencies than service providers. One participant noted that irregular meter readings (read every 35 days instead of monthly) resulted in schools reaching the higher rate levels. Cost of investment is a major concern for senior management; thus there is interest in financing options and incentives. Concern was also expressed regarding the poor quality of existing products on market and the need for clear standards, labeling and testing procedures.

Hotels

There was no formal consultation with hotels as a consumer group. However, the ESCB team spoke at length with the Jordan Hotel Association (JHA), and took note of comments expressed by hotel operators at the EDCO consumer consultation. JHA commented that 5-star hotels have energy management policies in place as they are part of international chains with specific policies on energy efficiency. Due to these efforts many 5-star hotels have already implemented the most economical

energy saving measures. Some hotels are now working cooperatively and with the involvement of the regulator (Electricity Regulatory Commission, or ERC) on a jointly owned PV plant and wheeling arrangement to provide for their own-consumption.

4. Summary and lessons learned

With the exception of NEPCO, lighting was the energy saving opportunity cited most frequently in all of the consultations; however cost and product quality were mentioned as the barriers to investment. There was also great interest in SWH and VFD for various applications.

Product quality and the role JSMO must play to ensure the market is regulated featured highly on the list of concerns. Such quality and credibility concerns translate into the risk-averse behavior seen in consumers considering energy saving product investments.

Another recurring theme is the attitudes towards the distribution companies. DISCOs were not seen as a resource for customers considering their energy saving and bill reduction options. Rather, DISCOs in the view of many consumers seem less concerned with providing a good service than with collecting bills.

The creation of DSM and energy efficiency advisory units at the DISCOs is one step that could be taken to change the image of DISCOs in the minds of consumers.

DISCOs do have technical credibility with consumers. Should DISCOs offer a technical service such as advice or auditing, the consumers consulted seemed willing to trust that the quality of the work will be good. They also see DISCOs as more objective and less likely to be biased towards a certain product than energy service providers or manufacturers.

There was general acceptance that DISCOs will be able to handle large bulk procurement programs and that they have sound technical knowledge allowing them to eliminate poor quality products from any procurements.

The lack of cheap and easy access to financing was seen as a very critical obstacle. By extension performance contracts would be welcomed by all.

Lessons learned for future consultations

As with any first-time activity, there were some issues faced during the consumer consultations which provided a learning experience for the project.

- As seen in the IDECO and EDCO consultations, there is a tendency for one or two people to dominate the discussion in larger groups.
- The presence of a representative from the electricity supplier is detrimental to the process as they feel obligated to defend their company when criticized.
- There were cases when the participants steered the discussion away from the topic at hand such as IDECO customers talking at length about faulty meters and EDCO customers talking about which entity should be in charge of EE awareness campaigns for the public.

5. Annexes

IDECO Attendees

Moayad Alamari	Arabella Mall
Samer Alissa	Arabella Mall
Yahya Abulhijleh	Irbid Chamber of Industry
Hisham Affouri	Irbid Chamber of Industry
Sarah Khrais	Irbid City Center
Mohammad Alshoha	Irbid Chamber of Commerce
Mohammad Awadallah	Aswaq Qubbeh
Jihad Tamimi	Sameh Mall
Mohammad Tawfiq	Amari
Abdelbast Alawneh	Irbid Mall
Wasfi Alawneh	Irbid Mall
Ghazi Al-Sarhan	Al Hasan Youth City
Ahmad Sheikh Karim	Shams Trading
Bassam Maabreh	Al Hasan Youth City
Ahmad Malkawi	IDECO
Ahmad Senfa	

EDCO Attendees

Ayman Al Bedawi	Kempinski Aqaba
Elias Saba	Tala Bay
Tariq Juhani	ASEZA
Firas Ghassan	Aqaba Container Terminal
Abdelaziz Taamneh	EDCO
Sami Zawatin	EDCO
Bader Tashtoush	EDCO
Fadi Eid	Saraya Aqaba

Sohaib AlBordaini	Jordan Phosphate Mines Company
Mohammad AlTarawneh	Aqaba Water Company
Reem Al-Sibakhi	Ayla Consulting
Ahmad Mahamid	Kemira Arab Potash Company
Osama Albdoor	Aqaba Development Corporation
Hikmat Gharaibeh	Ports Corporation

NEPCO Attendees

Hussam Abbadi	Qatraneh Cement
Ali Awwad	Qatraneh Cement
Mohammad alSheikh	Manaseer Cement
M. Hassan	Manaseer Cement
Bassam Al-Etawi	Rajhi Cement
Ali Hamaideh	NEPCO
Salem Amer	Lafarge
Allan Khalil	NEPCO
Ibrahim Hasan	NEPCO
Fouad AlZoubi	Arab Potash Company
Muwaffaq Humeidat	NEPCO

Schools Attendees

Osama Abu Azza	Amman Baccalaureate School
Maher Zamel	Modern American School
Ola Bseiso	King's Academy
Issa Hourani	King's Academy
Hasan Ayoub	Rae'd Arabi School

Sample Presentation

Slide 1



Demand-Side Management Consumer Consultation

March 5, 2014

Slide 2



Meeting Agenda

12 to 12:15 Welcome and Introductions 12:15 to 12:30 Meeting purpose and objectives 12:30 to 12:45 Introduction to Demand-Side

Management

12:45 to 1:30 Consumer consultation

1:30 to 2:30 Lunch

Slide 3



Who we are

- Project name: Jordan Energy Sector Capacity Building Project (ESCB)
- Project owner: Ministry of Energy and Mineral Resources
- Project sponsor: USAID
- Project partners: Electricity distribution companies, NEPCO, and the Electricity Regulatory Commission (ERC)
- Implemented by: Deloitte Consulting and Eco-Consult

Slide 4



ESCB project objectives

- Reduce energy demand growth through saving energy
- Develop a legal/regulatory environment that supports energy efficiency, renewable energy and private investment
 Facilitate consumer and business access to energy efficiency
- knowledge, practices and technology

 Strengthen the financial sustainability of the electricity sector



Who you are

- Hotels
- Hospitals
- · Private schools
- · Water companies
- Factories
- · Malls and shopping centers
- Property developers and owners

Slide 6



What can Demand Side Management do for you?

- Save energy!
- Manage your electricity bills
 Establish a partnership between you and your electricity company
- Improve awareness of how to reduce electricity costs
- Create an energy saving industry in Jordan

Slide 7



Types of demand-side management

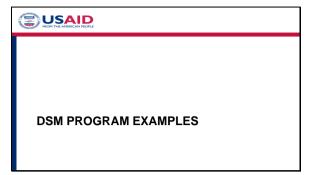
- · Customers and electricity companies cooperate to reduce demand and
- Customers and electricity companies share the costs to invest in energy savings measures
- Electricity companies or third parties provide advice and assistance to customers
- Electricity companies and customers cooperate to reduce electricity usage during high-price periods
- Electricity companies and manufacturers cooperate to bring down the cost of energy efficient appliances and equipment for customers

Slide 8

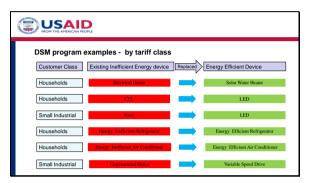


Purpose of the consultation: Understand more about consumer attitudes and interest in saving energy

- Are electricity consumers aware of and interested in saving energy?
- Are consumers already taking action to save energy?
- · What challenges have you faced in trying to save energy?
- Where do consumers go to get advice on saving energy?
- What types of energy saving activities would be useful to you?
- What role should electricity companies play in helping you save energy?

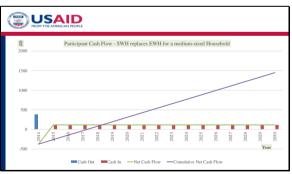


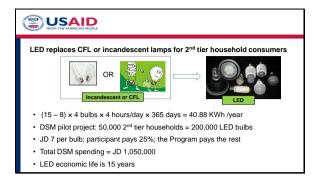
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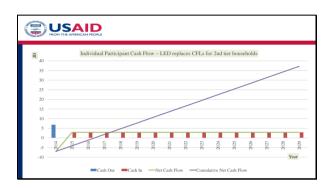
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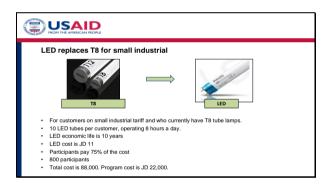




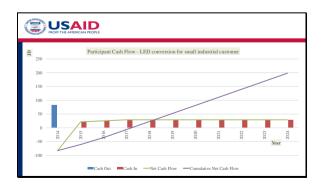


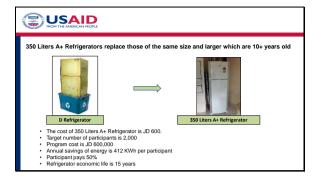
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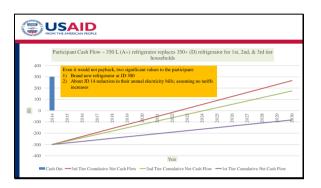


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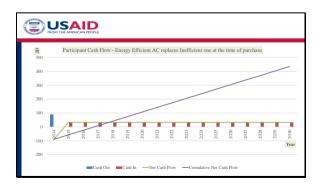


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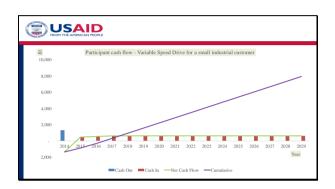
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Slide 22



Slide 23

