

# **Environment & Sustainability Energy Related Successes and Next Steps**

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Deputy Director  
Environmental & Sustainability

## Discussion

- Solar
- Energy Efficiency
- Public Outreach
- Next Steps - Moving Forward

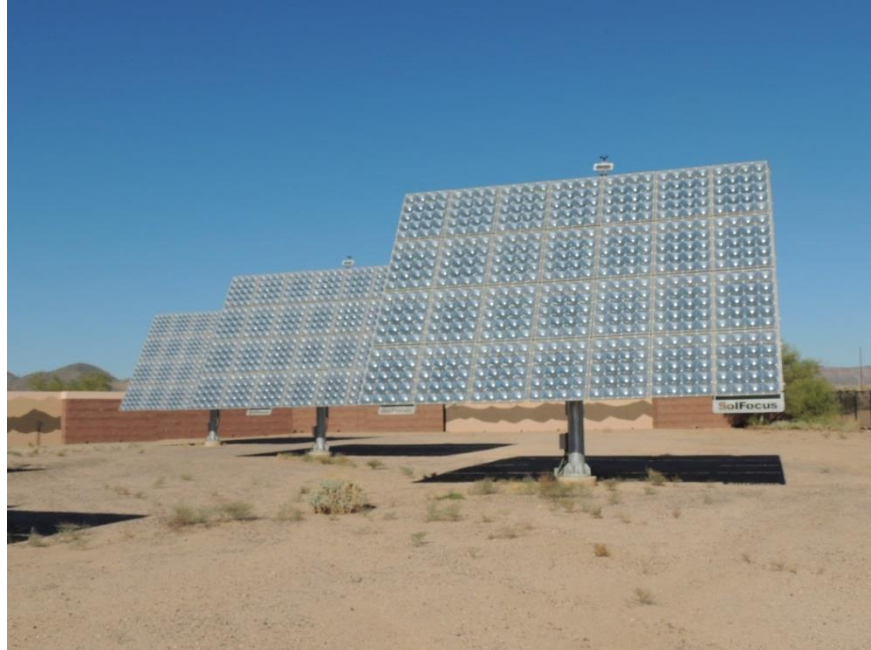
# Solar Benefits & Issues

- Over a 1MW solar portfolio
- Savings of nearly \$1.5M over 20 years
- Reduces carbon footprint
- Community visibility
- Meets the City's strategic initiatives
- Currently only done in positive cash flow areas
- SRP incentives changed in May 2014

# 70 KW - Concentrated Photovoltaic (CPV) Dual Tracking System

## Water Treatment Plant at Brown Road

- Solar generation offsets electrical usage at the Red Mountain ballparks



# 15 KW - Photovoltaic (PV) System

## Fire Station 220

- Roof mounted
- Solar power offsets electrical usage



# 5 KW - Photovoltaic System

## Fire Station 219

- Roof mounted
- Solar power offsets electrical usage





# 185 KW - Photovoltaic System

## Fire/Police Station 212

- Carport mounted providing
- Solar power which offsets electrical usage
- Shaded parking for the police vehicles



# 352 KW - Photovoltaic System

## Red Mountain Library

- Carport mounted
- Solar power offsets electrical usage
- Shaded parking





# 272 KW - Photovoltaic System

## Fiesta Police Sub Station

- Carport mounted system
- Solar power offsets electrical usage
- Shaded parking



# 294 KW - Photovoltaic System

## Red Mountain Multi-Generational Center

- Carport mounted
- Solar power offsets electrical usage
- Shaded parking



# 169 KW - Photovoltaic System

- Red Mountain Police Substation
- Carport mounted, the
- Solar power offsets electrical usage
- Shaded parking



## **Solar Services Agreement (SSA)**

- Discrete SSA for each location
  - System size, price per kilowatt hour (kWh), production guarantees
- Solar vendor
  - Installs, operates, maintains solar system and sells power
- Mesa purchases energy at agreed upon rate
- Term 20 years

## SOLAR PPA SAVINGS OVER TIME

Budgetary Proposal, pricing to be confirmed with engineering audit.

Price valid until 02/15/13

Year	Utility Costs without Solar	kWh Purchased*	PPA Cost per kWh	PPA Payments with Solar*	Sales Tax on PPA Payments	Utility Bill with Solar PPA	Total Electricity Costs	Net Savings*
1	\$116,603	491,681	0.061	\$29,993	\$2,399	\$79,472	\$111,864	\$4,739
2	\$120,101	489,223	\$0.061	\$29,843	\$2,387	\$82,175	\$114,405	\$5,696
3	\$123,704	486,764	\$0.061	\$29,693	\$2,375	\$84,968	\$117,036	\$6,668
4	\$127,415	484,306	\$0.061	\$29,543	\$2,363	\$87,855	\$119,761	\$7,654
5	\$131,238	481,848	\$0.061	\$29,393	\$2,351	\$90,839	\$122,583	\$8,654
6	\$135,175	479,389	\$0.061	\$29,243	\$2,339	\$93,923	\$125,505	\$9,670
7	\$139,230	476,931	\$0.061	\$29,093	\$2,327	\$97,110	\$128,530	\$10,700
8	\$143,407	474,472	\$0.061	\$28,943	\$2,315	\$100,404	\$131,662	\$11,745
9	\$147,709	472,014	\$0.061	\$28,793	\$2,303	\$103,808	\$134,904	\$12,805
10	\$152,140	469,556	\$0.061	\$28,643	\$2,291	\$107,326	\$138,260	\$13,880
11	\$156,705	467,097	\$0.061	\$28,493	\$2,279	\$110,961	\$141,734	\$14,971
12	\$161,406	464,639	\$0.061	\$28,343	\$2,267	\$114,718	\$145,329	\$16,077
13	\$166,248	462,180	\$0.061	\$28,193	\$2,255	\$118,601	\$149,050	\$17,198
14	\$171,235	459,722	\$0.061	\$28,043	\$2,243	\$122,613	\$152,900	\$18,335
15	\$176,372	457,264	\$0.061	\$27,893	\$2,231	\$126,760	\$156,884	\$19,488
16	\$181,664	454,805	\$0.061	\$27,743	\$2,219	\$131,045	\$161,007	\$20,657
17	\$187,114	452,347	\$0.061	\$27,593	\$2,207	\$135,472	\$165,273	\$21,841
18	\$192,727	449,888	\$0.061	\$27,443	\$2,195	\$140,048	\$169,687	\$23,040
19	\$198,509	447,430	\$0.061	\$27,293	\$2,183	\$144,776	\$174,253	\$24,256
20	\$204,464	444,972	\$0.061	\$27,143	\$2,171	\$149,662	\$178,977	\$25,488
21	--	--	--	--	--	--	--	--
22	--	--	--	--	--	--	--	--
23	--	--	--	--	--	--	--	--
24	--	--	--	--	--	--	--	--
25	--	--	--	--	--	--	--	--
<b>Total</b>								<b>\$293,562</b>

\* Values are estimated

Note: Sales tax on PPA payments is displayed separately. PPA rate is shown without assumed sales tax.



# Reasons for Solar

- Stimulus funds
- LEED certification
- Save money
  - SSA
  - Most of our solar energy produced for this reason
- Reduces greenhouse gas emissions

## **COM - EECBG Allocation - \$4.2M**

**1. Facilities Cool Roofing & Lighting Retrofits - \$1.65M**

**2. LED Streetlamps for Transportation - \$1M**

**3. Solar CPV Installation at RM Ball Fields - \$350K**

**4. Central Main St. Development Plan - \$315K**

**5. International Energy Conservation Code - \$13K**

**6. SE Wastewater Plant Aeration - \$755K**

**7. Siemens Energy Audit - \$103K**

**8. Building Controls Guidelines - \$30K**

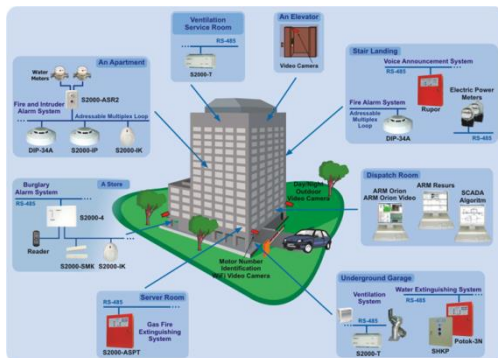
# COM - Energy Audit



- Evaluated 1.5 M sq. ft. Facilities
- 50+ Buildings and Parks
- Wastewater Treatment Plants
- Streetlamps & Parking Lots
- Solar



# Building Retro-Commissioning



## Budgeted Current Projects

### Convention Center B & C:

- Replace air handler units on B building
- Rebuild air handler units in C building
- Add building controls to B & C
- Add plate and frame to separate district cooling from buildings, reduce usage

### Main Library:

- Lighting retrofit all 3 floors
- Rebuild air handler units
- Add and upgrade building controls
- Replace outside lighting with LEDs
- Add plate and frame to separate district cooling from buildings, reduce usage

# City Facilities

## 2013 energy consumption and reductions

- Energy consumed in kWh 142,010,973
  - COM - 27%
  - SRP - 73%

### Solar equipment generation

- Beginning of 2013  $\approx$  .12%
- End of 2013  $\approx$  .74%
- Current status  $\approx$  1.2%

### Energy Efficiencies

- Reduced energy consumption  $\approx$  3%
- Target payback within life cycle
- Reduction of greenhouse gas emissions



# Living Green

- City of Mesa hosting workshops that teach our residents how to be sustainable at home
- Regional Leadership, Quality of Life, Community Engagement
- Partnered with SRP on workshops for the home, solar and other activities
- Customer Contacts, Awards Won



# American Solar Transformation Initiative



OPTONY



*Powered by*

**SunShot**

U.S. Department of Energy

# Next Steps & Moving Forward

## **Updated energy codes, guidelines and standards**

- Meet with SAT Committee on an ongoing basis to review and plan

## **Strategies and planning for future**

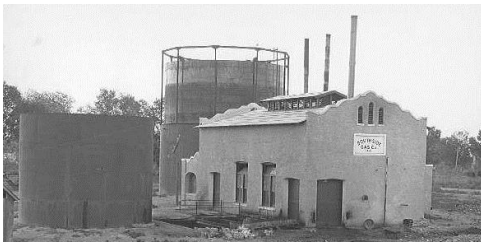
- As part of the budget process bring projects forward
- Future funding needs
- Solar without incentives
- Work with Mesa Solar Group to Set Goals for Conservation and Solar

# Energy Resources Department Renewable Energy Programs

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**Providing safe, reliable and efficient  
natural gas and electric utility  
services since 1917**





# BACKGROUND



- Mesa purchased the gas and electric utility systems from Dr. AJ Chandler in 1917.
- 12th largest publicly owned gas utility.
- Top 15% of publicly owned electric utilities & Electric Customers.
  - ❖ 13,300 Residential Customers
  - ❖ 2,300 Commercial Customers
  - ❖ City of Mesa is our largest customer
    - ❖ Mesa City Plaza
    - ❖ District Cooling System
- Stable source of revenue funding city services.
- Strive for superior service to our customers.



# ALIGNMENT OF COUNCIL'S STRATEGIC INITIATIVES & DEPARTMENT'S GOALS

	Economic Development	Quality of Life	Community Engagement	Financial Stability	Regional Leadership
Safety		X	X	X	X
Reliability	X	X		X	X
Efficiency	X	X	X	X	X

## **American Public Power Association**

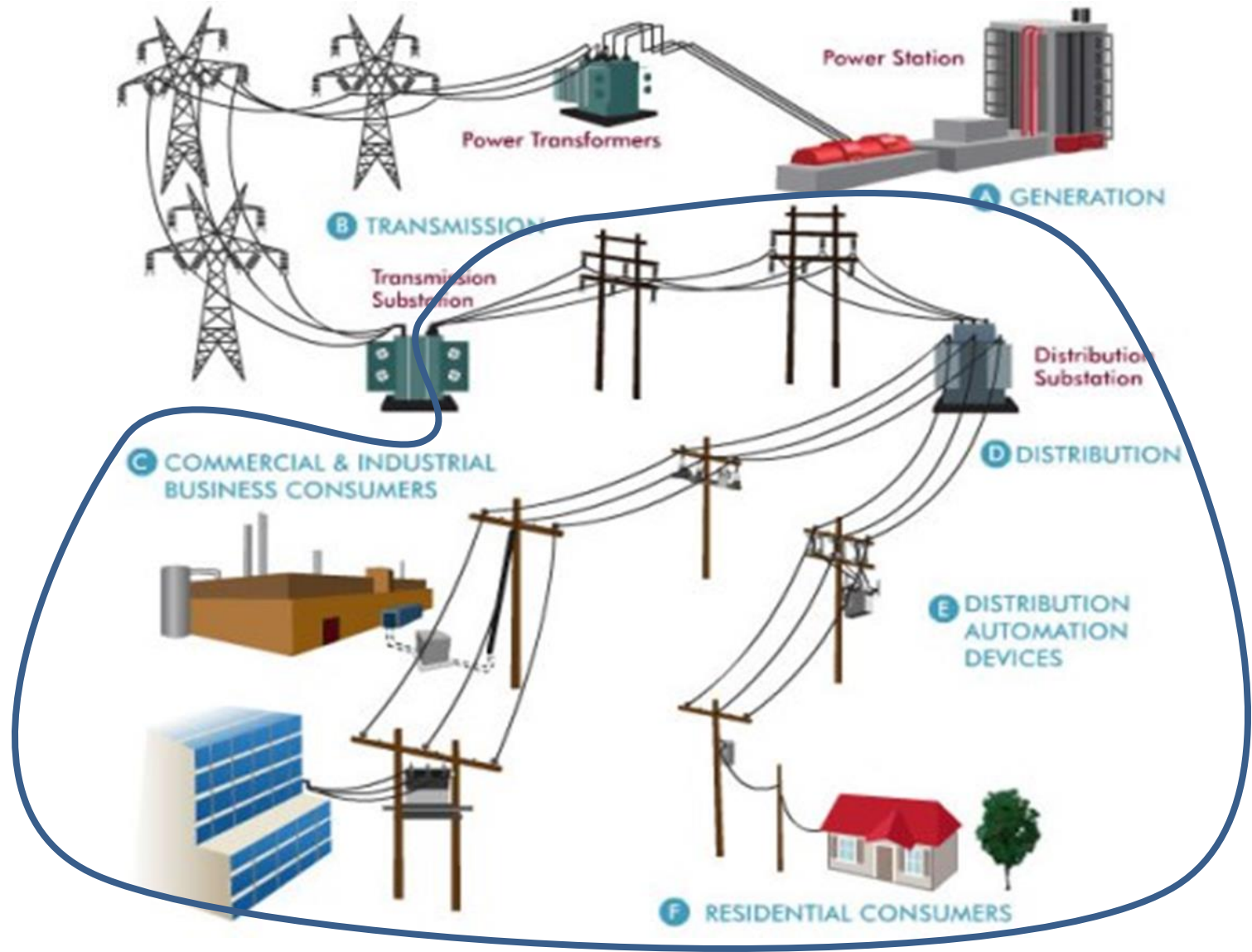
- ❖ 2012 Gold Reliable Public Power Provider (RP3)
- ❖ 2012 Electric Utility Safety Award
- ❖ 2014 Platinum Reliable Public Power Provider (RP3)

## **Public Technology Institute**

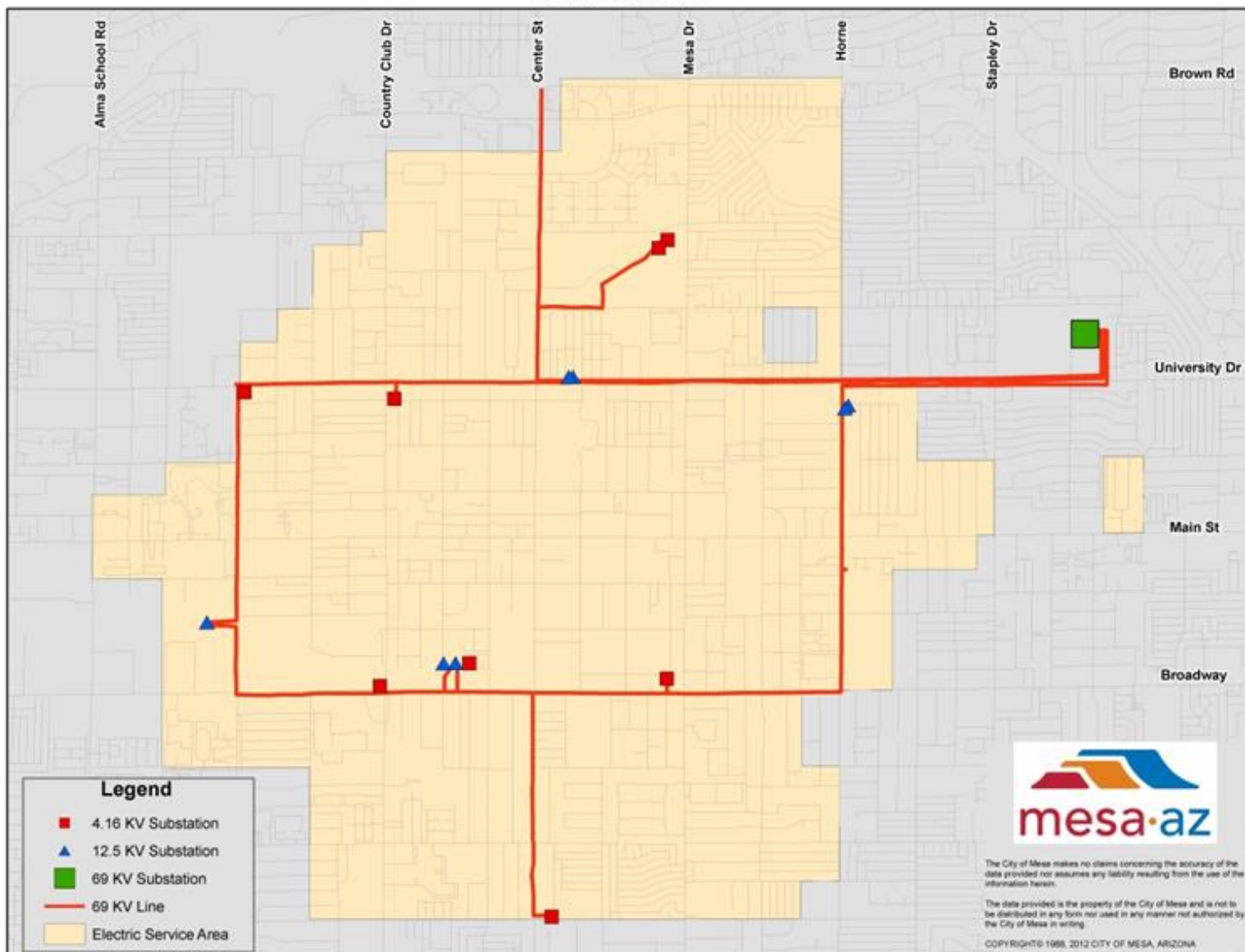
- ❖ 2012/2013 – Solutions Award - Solar Dusk to Dawn Lighting

# ELECTRIC UTILITY NETWORK

## GENERATION / TRANSMISSION / DISTRIBUTION



# CITY OF MESA ELECTRIC SERVICE AREA 69 KV CIRCUIT



# IRP = INTEGRATED ELECTRIC RESOURCE PLANNING

- Electric Industry Best Practice.
- Planning & acquisition of energy supplies – a balance of meeting our customers' energy requirements
  - ❖ Reliably;
  - ❖ At least cost; and
  - ❖ Be stewards of the environment.
- A “Level Playing Field” to identify & evaluate technically and economically viable resource options.
- An Action Plan is developed and implemented to acquire the resources and implement the programs selected through the process.



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## 2012 Integrated Resource Plan

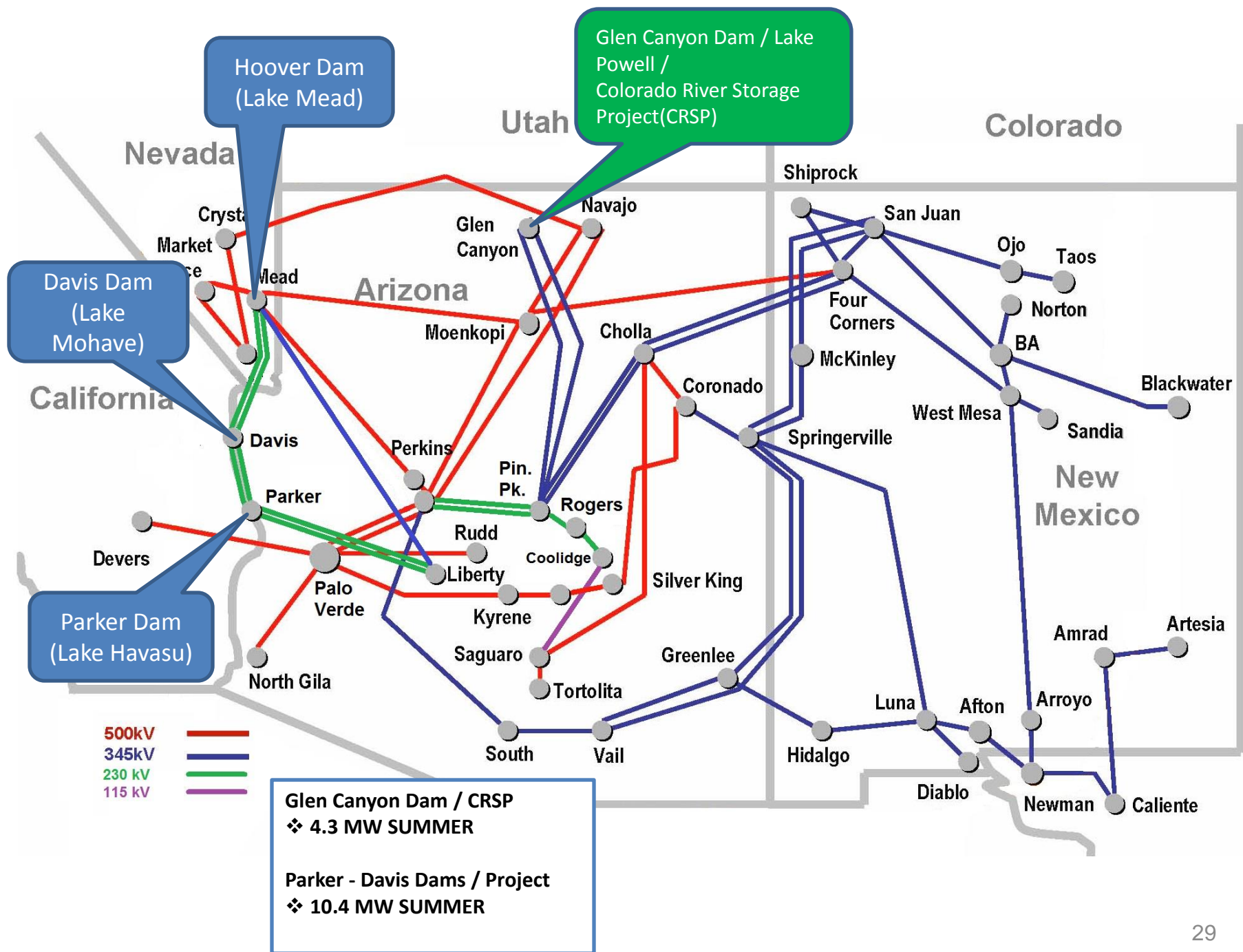
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City of Mesa Energy Resources Department  
Maricopa County  
State of Arizona

# IRP RESULTS

- Reliability
- Economic and Efficient
- Resource Portfolio:
  - ❖ 20% - Renewable Hydro & Customer Owned Solar
  - ❖ 76% - Fixed & Advantageous prices
    - ❖ Competitive Solicitations
    - ❖ Portfolio of long & short term contract supplies
    - ❖ Highly Efficient Generation
  - ❖ 4% - from Real-Time market
- Solicitation for Renewable Resources
- Solar Pilot Program
- Commercial Energy Audits





# ENERGY RESOURCES' PILOT SOLAR CUSTOMER PROGRAM

- Began July 2012
- \$/Watt incentive for REC's for Solar kWh produced
- FY2012/2013
  - ❖ \$1.00/Watt Up-Front Incentive
  - ❖ \$100,000 Program Budget for incentives
- FY2013/2014
  - ❖ \$0.50/Watt Up-Front Incentive
  - ❖ \$100,000 Program Budget for incentives
- FY 2014/2015
  - ❖ \$0.20/Watt Up-Front Incentive
  - ❖ Residential - \$50,000 or 50 kW, max 5 kW/\$1,000 per installation
  - ❖ Commercial - \$100,000 or 450 kW, max 75 kW/\$15,000 per installation
- Net Metering
  - ❖ PV systems installed prior to Pilot are also eligible
- Results:
  - ❖ 11 Residential – 37 kW
  - ❖ 8 Commercial – 216 kW

# ENERGY RESOURCES'

## ADDITIONAL PROGRAMS

- Solar Powered Natural Gas SCADA installations
- Efficient Natural Gas Appliances (Space & Water Heating)
- Natural Gas Cogeneration at Water Reclamation Plants, Banner Desert Hospital
- Electric Vehicle Charging Stations
- Master planning & Business Development for District Cooling Utility System
- Compressed Natural Gas (CNG) Stations & Vehicles
- Solar Powered SCADA installations



Vehicle powered by compressed natural gas



Mesa's Fleet Is  
Going GREEN



Vehicle powered by  
compressed natural gas



# ELECTRIC VEHICLE CHARGING STATIONS

- Partnership with Car Charging Group
- Chargers paid for through DOE grant
- 11 Car Charging Stations
  - ❖ Library
  - ❖ Mesa Arts Center
  - ❖ Convention Center
  - ❖ Main St. – Pepper Pl Parking Lot





# QUESTIONS ?

