In a Nutshell…2015 Energy and Water Facts for Pima County

ELECTRICITY

Conversions: 1 MWh = 1000 kWh, average 2012 Tucson household used 10,375 kWh/10.2¢ or $1,053 (TEP, 2013); average 2010 household used 10,580 kWh/9.6¢ or $ 1,018 (TEP 2011)

County's Conventional Electricity Use & Costs FY 2014/15:

- 128,238,900.04 kWh; rate .11₵/kWh; total cost $14,166,400.32/yr (Energy CAP, 2015)
- Average cost increase 8% since 2012 year

County's Solar PV Use & Costs FY 2014/15:

- 13,979,760 kWh; rate 9.58 ₵/kWh; total cost $1,338,583.59 (Energy CAP, 2015).

County's Solar Capacity FY14/15:

- 9.6 MW; generates more than 14,000,000 KWh/year (currently meets an est.11% of County's electricity needs.) This figure is expected to grow to 14.7 MW and will up the percentage of electricity generated by solar to more than 15% once projects currently underway have been completed. However, because of increased demand, this percentage is expected to drop to 12% by 2018/19, therefore, under the current scenario, the County is <u>not</u> expected to meet the SAPCO target of 15% kWh/year by 2019).

POTABLE WATER

Conversions: 1 AF=325,851 gallons or the needs of two average families per year (Chavez, 2015)

County's Potable Water Use FY 2014/15:

- 1,270,818,900 K/gal/3,900 AF; rate $1.4871 Kgal; total cost FY 2014/15 $2,546,239.28/yr (Energy CAP, 2015).

County's Six Largest Potable Water Consumers:

- Main Jail (133.25 AF/yr); McDonald Park (39.34 – 28.23 AF/yr); Adult Detention Complex (1300 W Silverlake Rd) (37.8 - 34.87 AF); Thomas Jay Community Center (37.1-32.6 AF); Arthur Pack Regional Park (31.8-26.17), Central Plant (23.9-22 AF/yr) (Note: Consumption must be considered relative to operations and may not necessarily indicate waste.)

Tucson Water Deliveries:

- 56% single family homes, 19% multi-family homes, 25% commercial and industrial (Megdal & Forrest, 2015)
- Pima County is Tucson Water's second largest customer after the City of Tucson (Tucson Water, 2014)

Tucson Water Rates Increases (residential):

- Approx.11-12% since 2013 (Circle Blue, 2014)

CAP Shortages/Mandatory Supply Reductions:

- Tier 1 - 320,000 AF (11% reduction), Tier 2 - 400,000 AF (14% reduction), Tier 3 - 480,000 AF (17% reduction) (CAP, 2015). These reductions affect excess CAP water and potential non-Indian agricultural water.

AZ Water Composition:

- 40% CAP, 40% groundwater, 17% state rivers and 3% reclaimed water (ADWR, 2015).

AZ's Net Water Consumption:

- 1.8 to 3.2 MAF by 2060 (Water Resource Development Commission, 2011).

STORMWATER HARVESTING

The Kino Environmental Restoration Project (KERP) collects runoff from 17.7 mile watershed into basins, in 2014, KERP harvested nearly 50 million gallons of water (153.44 AF which, varies annually based on rainfall). This system supports flood control, but is used additionally for irrigation and environmental restoration.

Cumulatively, KERP has Saved Taxpayers 4.16 million dollars (an average of $350,000/yr) in irrigation costs and will have paid for the share of construction costs ($6 million) by 2018. (RFCD, 2015).

RECLAIMED WATER

RWRD Reclaimed Water Production:

- RWRD produces approximately 62,120 AF per year in metro plants plus 3,704 AF per year at non-metro plants (RWRD Effluent Generation Report, 2014)

RWRD Reclaimed Water Ownership:

- 45% of treated effluent is owned by SAWRSA, 49% goes to regional water providers (i.e. Tucson Water), 5% or approximately 3392 AF/year is retained by the County (RWRD Effluent Generation Report, 2014)

County Use of Reclaimed Water:

- Direct irrigation (1105 AF/year, at a cost of $292/AF), aquifer replenishment (9,882 AF stored to date), and ecosystem restoration (600 AF/year).RWRD Effluent Generation Report, 2014

RWRD Reclaimed Water Energy Costs:

- Approximately $6 million dollars/yr (RWRD, 2015)

RWRD Reclaimed Water Percentage Electricity Provided by Solar PV:

- 9.60% of power for all RWRD facilities is provided by Solar PV (RWRD, 2015)

RISKS

Electricity Rates & Surcharges:

- TEP base rates rose 9% in 2013 (after a 5-year freeze) (Wichner, 2015); overall, AZ utility revenues have increased 4.8% per year over the last ten years with last three exceeding that average (FEIA, 2015), TEP has indicated that complying with the Federal Clean Power Plan would add an additional 5-15% cost increase to utility bills (Reynolds, 2015).
- In 2013, TEP added surcharges (approximate 5% increase) to offset lower demand from energy efficiency programs and future environmental costs

Proposed 2015/16 TEP and Trico Utility Rate Cases Could Impact Pima County – Risks to future Solar Installation: The proposed changes in NM would affect *how* utilities calculate solar credits, the *amount* of the credit and *when* the change would take effect by:

1. Changes in Net Metering (NM is the billing mechanism that credits solar energy system owners for excess electricity they export to the grid): The County currently receives a billing credit of approximately 13¢/kWh for *excess* net generation (solar electricity) produced and supplied to the grid. The proposed change would affect the "true-up" period for the calculating net generation vs. net consumption (electricity pulled from the grid) from an annual reconciliation to one based on 15-minute increments, resulting in a net loss benefit for customers. For example, "banking" or "roll-over" credits would be eliminated, reflecting a "use it (within 15 min.) or lose it" type of accounting lar produced during low onsite demand periods (weekends or at empty facilities) would be eliminated,
2. The amount of the credit paid to solar customers would also change from 13¢/kWh to 5.8¢/kWh (TEP) and 3.6¢/kwh (Trico) a decrease by more than half the retail rate and thus, for future County solar projects the loss of NM would result in an equivalent loss of millions of dollars of savings.
3. The retroactive grandfathering date for connection agreements as posed in the rate case applications, June 1, 2015 (TEP) and Feb. 28, 2015 (Trico), effectively stall future solar installations through lease agreements (no up-front after these dates due to the uncertainty to return dividends.

Climate Variability & Environmental Impacts:

- Warming will continue, with longer and hotter heat waves in summer; average precipitation will decrease (southern Southwest); precipitation extremes in winter will become more frequent and more intense; late season snowpack (supply to rivers) will continue to decrease; declines in river flow and soil moisture will continue; flooding will become more frequent and intense; droughts in in parts of the Southwest will become hotter, more severe, and more frequent; the distributions of plant and animal species will be affected by climate change; ecosystem function and the functional roles of resident species will be affected; changes in land cover will be substantial; ecosystems along the U.S. – Mexico border will be affected and water availability could be further limited (Overpeck et al., 2013).

Climate Model Variability & Public Health & Infrastructure:

- Increases in heat-related morbidity and a range of diseases; increases in allergies and asthma; variability in agriculture production (crops and livestock); energy supplies will become less reliable; transportation systems will also be less reliable; frequency of wildfires will increase; disadvantaged and Native American populations will suffer most; impacts on urban areas (heat island effect, pollution, water supplies) will vary depending on the local capacity including governmental and institutional factors, to build resilience (Overpeck et al., 2013).

Climate Variability & Adaptation Strategies:

- Remove barriers to optimize community adaptation; connect adaptation and mitigation efforts; assess and adapt water management strategies to conserve resources; change energy policies to support shift from fossil fuels (Overpeck et al., 2013).

ELEMENTS OF A MASTER ENERGY AND WATER PLAN

Why:

- The primary motivations for energy planning are the following: 1.) Enhance economic development, 2.) Reduce greenhouse gas (GHG) emissions and mitigate climate change, 3.) Conserve limited water resources, and 4.) Enhance energy security and reliability.

What:

- A core element of these Plans is the presentation of the economic, energy and water foundations that underpin a regional economy and set forth key steps that ensure a more robust and sustainable economy over the long-term – typically to the year 2050.

How: While each plan has unique components, a Master Energy and Water Plan for Pima County Operations might include the following elements:

- An Energy & Water vision and ambition;
- A gap assessment of current plans and policies relative to threats, identification of internal needs, resources and research;
- Performance Contracting;
- A set of energy and water goals and integrated strategies, along the identification of partners in success;
- Key steps for further implementation, costs and funding mechanisms; and future outlook forecasting.
- An analysis of the full range of benefits including social, environmental and economic, and avoided costs.

Who:

- The US Department of Energy (2014) has in fact, been urging local governments to integrate energy, water and climate planning to proactively reduce the broader and deeper risks associated with compounded stresses. As of 2014, 36 states have active energy plans (with 18 additional in progress) (NASEO, 2015).
- Pima County local government including Deputy County Administrators, Key Directors and Deputy Directors, along with critical staff supported in part through the services of an expert consultant.

Pima County's Master Energy and Water Plan will seek to integrate and build on the existing and substantial work already undertaken by County staff.