



TOTAL PROJECT EXECUTIVE SUMMARY

Earlier this year, the City of Tempe (COT) selected APS Energy Services as an energy partner to promote fiscal responsibility, environmental stewardship and employee well-being. APS Energy Services is now delivering a 100% Investment Grade Audit Report.

This document is meant to provide an overall summary of the ESCO Building project, as well as, the Waste Water Treatment project.

INVESTMENT GRADE AUDIT PROGRESS

The combination of the willingness and enthusiasm shown by COT and the diligence of the APS Energy Services Team allows us to confidently say that the overall Audit is 'on-target'. Some of the advancements the APS Energy Services Team has made are as follows:

- Completion of Room Auditing
- Completion of Mechanical System Auditing
- Completion of Lighting System Auditing
- Mechanical Project Scopes Defined for Budget Pricing
- Information Gathering such as Electricity Usage Data and Equipment Schedules
- Completion of Preliminary Site Meetings with Plant Operators and Staff
- Compilation of Desired Projects
- Development of Energy Conservation Measures
- Development of Cost and Savings for Energy Conservation Measures

1.1. KEY MILESTONES

The preliminary findings from the Audit process indicate there are significant energy and operational efficiency cost reduction opportunities. The subsequent pages will outline the findings to-date.

To ensure success, the following *Table 1-0* lists key milestones for the Investment Grade Audit process.

Table 1-0. Investment Grade Audit Key Milestones	
Key Milestones	Date
Audit Contract Approved	06.10.10
30 % Review Report Submittal	09.07.10
60 % Review Report Submittal	10.05.10
90 % Review Report Submittal	11.02.10
Final Report Submittal	11.24.10
Finalize Contract Negotiations	TBD
Finalize Financing	TBD





1.2. POTENTIAL MAGNITUDE OF THE ENERGY COST REDUCTIONS

The utility cost reductions resulting from the project are expected to be 13% or greater annually, which will be used to substantially fund the debt service for the project.

Based on the utility data provided for the baseline period of July 2007 – June 2010 (Electricity) and August, 2008 – June 2010 (Gas), COT spends approximately \$3.8M for electricity and \$80K for natural gas annually to support the building facilities included in this Audit and \$28K for water/sewer annually to support water treatment, water reclamation and wells. This figure does not take into account any potential increases in electricity or natural gas spending which may result from any planned expansions or improvements. The Audit has uncovered many areas for operational efficiency cost reduction opportunities which will generate an annual stream of utility savings. It is this annual savings stream that will be used to pay for recommended upgrades and operational efficiency improvements for COT.

A funding source other than the savings stream mentioned above has been offered by COT. Specifically, **\$878,000** in Energy Efficiency and Conservation Block Grant (EECBG) funds have been obligated to this project. The impact of this obligation manifests itself in additional, positive cash flow. This positive cash flow has allowed COT and APS Energy Services to include additional projects while maintaining a significantly positive net cash flow in every year of the 15 year term.

1.3. FINANCIAL

The purpose of the IGA is to evaluate current energy usage and identify potential areas for improvement which form the basis of a fundamentally sound project. By identifying energy, water, operational efficiency cost reduction opportunities and renewable energy alternatives, this project has been specifically designed to assist COT in managing future utility and maintenance budgets, infrastructure improvements and equipment operations.

APS Energy Services recommends a portfolio of cost reduction opportunities. Highlights of the program are summarized below:

- Estimated Annual Utility Savings: **\$ 550,670**
- 15 Year Project Savings: **\$ 10,716,410**
- Estimated Project Cost: **\$ 8,261,474**
- EECBG Contribution: **\$ 878,000**
- Estimated Potential Rebates: **\$ 420,888**
- Financing Term Length: **15 Years**
- Annual Financing Rate: **4.50%**

1.4. ENVIRONMENTAL BENEFITS

COT will realize a carbon footprint reduction by implementing projects that reduce fossil fuel consumption. Various environmental benefits are associated with the implementation of energy cost savings projects. Less energy consumed translates into less power plant production and pollution into the air. The recommended project will achieve the following energy cost avoidances.

Table 1-1. Environmental Impact		
Type of Pollution	Pollutants Reduced	
Carbon Dioxide (CO ₂) Eliminated:	9,360,896	Pounds (lbs)
Sulfur Dioxide (SO ₂) Eliminated:	5,371	Pounds (lbs)
Nitric Oxide (NO _x) Eliminated:	8,614	Pounds (lbs)

Table 1-2. Reduction Equivalents	
Reduction is Equivalent to the...	
	annual greenhouse gas emissions from removing 804 passenger cars from the road, <i>or</i>
	CO ₂ emissions from 463,875 gallons of gasoline consumed per year, <i>or</i>
	CO ₂ emissions from the energy use of 574 typical American homes for one year, <i>or</i>
	planting and growing 114,821 trees per year for 10 years, <i>or</i>
	greenhouse gas emissions avoided by not landfilling 1,435 tons of waste.

Table 1-3 Environmental Benefits

By reducing your energy use it indirectly lowers energy production at the source. A great deal of the energy, which is consumed your facility(s), is produced by power plants burning fossil fuels. The burning of these fuels contributes to environmental contamination.

According to the United States Environmental Protection Agency, and other groups it can be calculated just how much of the pollutants can be reduced or eliminated based on the amount of energy that is saved. This information differs by area based on several conditions. Below are the most recent factors based on the current generating methods and fuels.

Annual kWh saved through project implementation: **5,617,499**
Annual therms saved through project implementation: **4,216**

Type Of Pollution	Health Effect	Environmental Effect	Reduction / kWh	Reduction / Therm	Pollutants Reduced
Greenhouse Gasses (CO ₂)	Can cause respiratory and other health problems, particularly in children and the elderly.	Climate change on a global scale has been attributed to increased emissions of carbon dioxide (CO ₂)	1,657 pounds / kWh	12.3 pounds / therm	9,360,896 lbs (CO ₂) reduced
Volatile Organic Compounds (VOC)	Ozone (smog) effects, cancer and other serious health problems	Ozone (smog) effects plants life included vegetation damage.	0.000081 pounds / kWh	.0005 pounds / therm	345 lbs (VOC) reduced
Nitrogen Oxides (NOx)	Lung damage, respiratory illness, ozone (smog) effects.	Acid rain also causes buildings, statues and monuments to deteriorate.	0.001523 pounds / kWh	.014 pounds / therm	8,614 lbs (NOx) reduced
Carbon Monoxide (CO)	Reduces ability of blood to bring oxygen to body cells and tissues.	One of the six "criteria pollutants" the US EPA tracks related to power production reduces environmental quality	0.00042 pounds / kWh	.0029 pounds / therm	2,311 lbs (CO) reduced
Sulfur Dioxide (SO ₂)	Respiratory illness, breathing problems, may cause permanent damage to lungs.	Precursor of acid rain, which can damage trees, lakes, and soil; aerosols can reduce visibility.	0.000956 pounds / kWh	.0001 pounds / therm	5,371 lbs (SO ₂) reduced
Particulates (PM10)	Eye, nose, and throat irritation; lung damage; bronchitis; cancer; early death	Source of haze which reduced visibility. Ashes, smoke, soot and dust can dirty and discolor structures	0.00002 pounds / kWh	.0004 pounds / therm	114 lbs (PM10) reduced
Mercury (Hg)	Liver, kidney, and brain damage; neurological damage	Accumulates in the food chain.	0.003404 milligrams / kWh	0 or negligible pounds / therm	19,122 lbs (Hg) reduced
<p>Removing 804 cars from the road / year</p> <p>Or Not Burning 463,875 Gallons of Gas / year</p> <p>Or saving enough energy to power 574 typical american homes for a year</p> <p>Or the annual environmental benefit of this project is equivalent to planting and growing for 10 years 114,821 trees / year</p> <p>Or Avoiding the greenhouse gas emissions by not landfilling 1,435 tons of waste / year</p>					

Source: www.dlaenergy.com
http://www.epr.com/energy/energy-services/coal-fuel-cell.html



1.5. CONCLUSION

The findings at this 100% mark indicate there are significant opportunities to conserve utility usage and reduce the carbon footprint in many of COT's facilities. This project will enable efficient operation of COT facilities and allow COT employees to operate their equipment in a more energy efficient manner.

The project will provide the following benefits:

- Capital improvements mostly paid for via a self-funding financial program
- Replacement of aging mechanical infrastructure
- Improved employee comfort and work environment
- Create a mechanism for energy policy accountability
- The implementation of the Facility Automation System (HVAC controls)



Table 4-1. FCM Matrix

Location	Lighting Retrofit Interior/Exterior Occupancy Sensors	HVAC Controls Retrofit to Networked Direct Digital Controls	Premium Efficiency Pump Motors	Water Fixture Upgrades	Chiller Plant Optimization with New Heat Exchanger	Retro- Commissioning	Rooftop Unit Replacement	Split System Replacement	Tempe Diablo Stadium Lighting	Compuer Power Management	Custom DDC	
											Web Platform with Whole Building Monitoring	
City-Wide											X	X
S25 City Office Building	X	X										
City Hall Building	X	X	X			X						
Courts/Police Building	X	X		X	X	X						
Edna Vihel Center	X	X		X			X					
Escalante Multi-Gen Facility	X	X					X					
Fire Station #1 & Admin Bldg	X	X					X					
Fire Station #3	X	X						X				
Fire Station #4	X	X										
Fire Station #5	X	X					X	X				
Fire Station #6	X	X										
Fire Training Facility	X	X						X				
Hardy Yard - Maintenance Facility	X	X					X					
Priest Yard - A - Admin Support Services	X	X						X				
Priest Yard - B - Solid Waste Services	X	X						X				
Priest Yard - C - Facilities Maint.	X	X						X				
Priest Yard - D - Vehicle Maintenance	X	X						X				
Priest Yard - E - Container Shop	X	X					X					
Priest Yard - E - Sweets Ofc Trailer 1	X	X										
Priest Yard - E - Streets Ofc Trailer 2	X	X										
Priest Yard - F - Fitness Center/Vehicle Wash	X	X										
Priest Yard - G - Communications	X	X										
Priest Yard - I - Assembly Hall	X	X										
Pyle Adult Rec Center	X	X										
South Police Substation	X	X		X				X				
Tempe Diablo Minor League Building	X	X										
Tempe Diablo Stadium	X	X					X	X	X			
Tempe Performing Arts Center	X	X										
Traffic Maint Shop & Warehouse Bldg	X	X										
Westside Multi-Gen Facility	X	X		X			X					

2.