

2016

PRELIMINARY ASSESSMENT



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Trane Building Advantage

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ORO VALLEY, *it's in our nature*

EXECUTIVE SUMMARY

Trane is pleased to deliver this *Preliminary Assessment* to the **Town of Oro Valley**. Trane has conducted onsite surveys, reviewed utility bills (some were unavailable due to property ownership changes) and reviewed the current HVAC, Lighting, Pools Systems, Domestic Hot Water Heaters, Irrigation Pumping System and PV Solar Parking Structures at the Oro Valley Recreation Center. Using the available utility information, Energy Star Portfolio Manager and a Trace 700 energy model of the facility, the current Energy Utilization Index (EUI) of the facility was calculated to be 200,472 BTU/SQFT-YR. Comparing the existing EUI with other properties in the region, there appears to be a substantial opportunity to reduce energy consumption at the Oro Valley Recreation Center. Trane believes the project described below can reduce the current EUI from 200,472 BTU/SQFT-YR to 80,043 BTU/SQFT-YR.

The Energy Conservation Measures (ECMs) to reduce the overall energy consumption of the Oro Valley Recreation Center are outlined below and will be thoroughly evaluated during Trane's *Detailed Assessment* phase of the project.

Preliminary Project's Energy Saving Summary:

Option A Description	Water Total (\$)	Electric Total (\$)	Natural Gas Total (\$)	Maintenance Savings Total (\$)	Total Savings (\$)	Project Cost (\$)
Energy Conservation Measures	\$90,000	\$63,594	\$12,974	\$10,000	\$176,568	\$1,555,060

Option B Description	Water Total (\$)	Electric Total (\$)	Natural Gas Total (\$)	Maintenance Savings Total (\$)	Total Savings (\$)	Project Cost (\$)
Energy Conservation Measures	\$90,000	\$98,384	\$12,974	\$10,000	\$211,359	\$2,719,546



Trane has prepared two projects - Option A and Option B. Plan A includes HVAC, Lighting, Pools Systems, Domestic Hot Water Heaters and Irrigation Pumping System. Plan B includes the ECM's from Plan A with the addition of PV Solar Parking Structures. Trane estimates there is approximately \$176,568 in energy and maintenance savings that could be realized with an investment of \$1,555,060 in Option A. The estimates for Option B are approximately \$211,359 in energy and maintenance savings that could be realized with an investment of \$2,719,546. An itemized description of the individual ECMs are outline below.

ECM 1 - HVAC UNIT RETROFIT

Trane has performed an analysis of the existing HVAC systems, their application and method of control. We have determined that the existing units have all surpassed their industry standard life cycle and propose to replace each with higher efficiency models. We also recognize an opportunity to consolidate multiple small capacity units serving common areas, reconfigure constant volume air distribution to variable air flow, and institute a universal control approach to the facility as a whole, given its multi-functional applications and time schedules, driven by activities, occupancy (CO2), heat load, all with user (facility personnel) friendly flexibility.

The existing kitchen ventilation system is presently comprised of evaporative coolers, which are also beyond their life cycle and do not meet standards that the facility requires. We propose to install mechanical cooling units with ambient sub cooling and economizing capabilities.

HVAC Unit Retrofits - Energy Saving Summary:

Description	Electric Total (\$)	Natural Gas Total (\$)	Water Total (\$)	Maintenance Total (\$)	Total Savings (\$)	Project Cost (\$)
ECM 1 – HVAC Unit Retrofit	\$30,133			\$6,000	\$36,133	\$500,814



ECM 2 - LIGHTING UPGRADE

Trane has performed a lighting audit on the Community Center and Pusch Ridge interior lighting and tennis courts. The existing lighting is a combination of T-12 fluorescent, T-8 fluorescent and incandescent fixtures. The exterior lighting is HID and metal halide.

Lighting Upgrade - Energy Saving Summary:

Description	Electric Total (\$)	Natural Gas Total (\$)	Water Total (\$)	Maintenance Total (\$)	Total Savings (\$)	Project Cost (\$)
ECM 2 – Lighting Upgrade	\$32,253			\$4,000	\$36,253	\$547,761

ECM 3 - POOL SYSTEMS

We have audited the existing pool heaters and pumps and are proposing to replace the heaters with 94% efficiency gas fired heaters, the pumps with variable speed high efficiency replacements, and install automated pool covers on both pools which would provide insulation during the unoccupied periods, reduce evaporation in summer months and provide a barrier from dirt and airborne particulars in monsoons and haboobs.

Pool Systems - Energy Saving Summary:

Description	Electric Total (\$)	Natural Gas Total (\$)	Water Total (\$)	Maintenance Total (\$)	Total Savings (\$)	Project Cost (\$)
ECM 3 – Pool Systems		\$12,240			\$12,240	\$71,394

ECM 4 - DOMESTIC HOT WATER HEATERS

The existing four (4) domestic hot water heaters have surpassed their life expectancy and given their usage we propose to install 95% efficient instantaneous type replacements that will respond to usage, but provide efficiency in unoccupied periods.



Domestic Hot Water Heaters - Energy Saving Summary:

Description	Electric Total (\$)	Natural Gas Total (\$)	Water Total (\$)	Maintenance Total (\$)	Total Savings (\$)	Project Cost (\$)
ECM 4 – Domestic Hot Water Heaters		\$735			\$735	\$31,654

ECM 5 – Irrigation Pumping System

Furnish and install a replacement irrigation pump station at the northern location. Inclusive in the package are high efficiency motors, variable frequency drives, flow meter, and programmable logic controller with remote control management.

Irrigation Pumping System - Energy Saving Summary:

Description	Electric Total (\$)	Natural Gas Total (\$)	Water Total (\$)	Maintenance Savings Total (\$)	Total Savings (\$)	Project Cost (\$)
ECM 5 – Irrigation Pumping System	\$1,209		\$90,000		\$91,209	\$190,855

ECM 6 – PV Solar Parking Structure

Provide a complete turnkey installation of a 418.88 kW Solar Photovoltaic covered parking system at the Community Center.

PV Solar Parking Structure - Energy Saving Summary:

Description	Electric Total (\$)	Natural Gas Total (\$)	Water Total (\$)	Maintenance Total (\$)	Total Savings (\$)	Project Cost (\$)
ECM 6 – PV Solar Parking Structure	\$34,790				\$34,790	\$1,164,486



PRO FORMA – OPTION A

Project Cost =	\$1,555,060
Utility Rebates =	\$46,222
First Cost =	\$1,508,839
O&M Cost Avoidance (per year) =	\$10,000
New O&M Costs (per year) =	\$0

Cost of Capital =	3.0%
Year 2-25 Utility Inflation Rate =	3.0%
Term =	10
Equipment Useful Life =	20
O&M Yearly Inflation Rate =	2.0%

CASH FLOW	Savings				Costs		Cash Flow	
	Projected Energy Savings	O&M Cost Avoidance	Total Annual Savings	Cumulative Savings	Project Cost	Total Annual Costs	Annual Net Cash Flow	Cumulative Cash Flow
Year 1	\$166,568	\$10,000	\$176,568		(\$176,431)	(\$176,431)	\$137	\$137
Year 2	\$171,565	\$10,200	\$181,765	\$358,333	(\$176,431)	(\$176,431)	\$5,334	\$5,472
Year 3	\$176,712	\$10,404	\$187,116	\$545,450	(\$176,431)	(\$176,431)	\$10,685	\$16,157
Year 4	\$182,014	\$10,612	\$192,626	\$738,075	(\$176,431)	(\$176,431)	\$16,195	\$32,352
Year 5	\$187,474	\$10,824	\$198,298	\$936,373	(\$176,431)	(\$176,431)	\$21,867	\$54,219
Year 6	\$193,098	\$11,041	\$204,139	\$1,140,512	(\$176,431)	(\$176,431)	\$27,708	\$81,927
Year 7	\$198,891	\$11,262	\$210,153	\$1,350,665	(\$176,431)	(\$176,431)	\$33,722	\$115,649
Year 8	\$204,858	\$11,487	\$216,345	\$1,567,010	(\$176,431)	(\$176,431)	\$39,914	\$155,563
Year 9	\$211,004	\$11,717	\$222,720	\$1,789,730	(\$176,431)	(\$176,431)	\$46,289	\$201,852
Year 10	\$217,334	\$11,951	\$229,285	\$2,019,015	(\$176,431)	(\$176,431)	\$52,854	\$254,706
Year 11	\$223,854	\$12,190	\$236,044	\$2,255,058	\$0	\$0	\$236,044	\$490,749
Year 12	\$230,569	\$12,434	\$243,003	\$2,498,061	\$0	\$0	\$243,003	\$733,752
Year 13	\$237,486	\$12,682	\$250,169	\$2,748,230	\$0	\$0	\$250,169	\$983,921
Year 14	\$244,611	\$12,936	\$257,547	\$3,005,777	\$0	\$0	\$257,547	\$1,241,468
Year 15	\$251,949	\$13,195	\$265,144	\$3,270,921	\$0	\$0	\$265,144	\$1,506,612
Year 16	\$259,508	\$13,459	\$272,966	\$3,543,888	\$0	\$0	\$272,966	\$1,779,579
Year 17	\$267,293	\$13,728	\$281,021	\$3,824,908	\$0	\$0	\$281,021	\$2,060,600
Year 18	\$275,312	\$14,002	\$289,314	\$4,114,223	\$0	\$0	\$289,314	\$2,349,914
Year 19	\$283,571	\$14,282	\$297,854	\$4,412,076	\$0	\$0	\$297,854	\$2,647,768
Year 20	\$292,078	\$14,568	\$306,646	\$4,718,723	\$0	\$0	\$306,646	\$2,954,414
Totals	\$4,475,748.99	\$242,973.70	\$4,718,723		(\$1,764,308.78)	(\$1,764,309)	\$2,954,414	



PRO FORMA – OPTION B

Project Cost = \$2,719,546
 Utility Rebates = \$46,222
 First Cost = \$2,673,325
 O&M Cost Avoidance (per year) = \$10,000
 New O&M Costs (per year) = \$0

Cost of Capital = 3.0%
 Year 2-25 Utility Inflation Rate = 3.0%
 Term = 16
 Equipment Useful Life = 30
 O&M Yearly Inflation Rate = 2.0%

CASH FLOW	Savings				Costs		Cash Flow	
	Projected Energy Savings	Solar Benefit	Total Annual Savings	Cumulative Savings	Project Cost	Total Annual Costs	Annual Net Cash Flow	Cumulative Cash Flow
Year 1	\$176,568	\$34,790	\$211,359		(\$210,979)	(\$210,979)	\$380	\$380
Year 2	\$181,865	\$36,355	\$218,221	\$429,579	(\$210,979)	(\$210,979)	\$7,242	\$7,622
Year 3	\$187,321	\$37,990	\$225,311	\$654,890	(\$210,979)	(\$210,979)	\$14,332	\$21,954
Year 4	\$192,941	\$39,697	\$232,638	\$887,528	(\$210,979)	(\$210,979)	\$21,659	\$43,613
Year 5	\$198,729	\$41,480	\$240,209	\$1,127,737	(\$210,979)	(\$210,979)	\$29,230	\$72,842
Year 6	\$204,691	\$43,341	\$248,032	\$1,375,769	(\$210,979)	(\$210,979)	\$37,053	\$109,896
Year 7	\$210,832	\$45,286	\$256,117	\$1,631,886	(\$210,979)	(\$210,979)	\$45,138	\$155,034
Year 8	\$217,157	\$47,316	\$264,472	\$1,896,358	(\$210,979)	(\$210,979)	\$53,494	\$208,528
Year 9	\$223,671	\$49,436	\$273,107	\$2,169,466	(\$210,979)	(\$210,979)	\$62,129	\$270,656
Year 10	\$230,381	\$51,650	\$282,032	\$2,451,498	(\$210,979)	(\$210,979)	\$71,053	\$341,709
Year 11	\$237,293	\$53,962	\$291,255	\$2,742,753	(\$210,979)	(\$210,979)	\$80,276	\$421,986
Year 12	\$244,412	\$56,377	\$300,789	\$3,043,542	(\$210,979)	(\$210,979)	\$89,810	\$511,795
Year 13	\$251,744	\$58,898	\$310,642	\$3,354,184	(\$210,979)	(\$210,979)	\$99,663	\$611,458
Year 14	\$259,296	\$61,531	\$320,827	\$3,675,011	(\$210,979)	(\$210,979)	\$109,848	\$721,307
Year 15	\$267,075	\$64,280	\$331,355	\$4,006,366	(\$210,979)	(\$210,979)	\$120,376	\$841,683
Year 16	\$275,087	\$67,150	\$342,238	\$4,348,603	(\$210,979)	(\$210,979)	\$131,259	\$972,942
Year 17	\$283,340	\$70,148	\$353,488	\$4,702,091	\$0	\$0	\$353,488	\$1,326,429
Year 18	\$291,840	\$73,277	\$365,117	\$5,067,208	\$0	\$0	\$365,117	\$1,691,547
Year 19	\$300,595	\$76,545	\$377,140	\$5,444,349	\$0	\$0	\$377,140	\$2,068,687
Year 20	\$309,613	\$79,957	\$389,570	\$5,833,919	\$0	\$0	\$389,570	\$2,458,257
Year 21	\$318,902	\$83,519	\$402,421	\$6,236,340	\$0	\$0	\$402,421	\$2,860,679
Year 22	\$328,469	\$87,239	\$415,708	\$6,652,048	\$0	\$0	\$415,708	\$3,276,386
Year 23	\$338,323	\$91,123	\$429,446	\$7,081,494	\$0	\$0	\$429,446	\$3,705,832
Year 24	\$348,473	\$95,178	\$443,650	\$7,525,144	\$0	\$0	\$443,650	\$4,149,482
Year 25	\$358,927	\$99,411	\$458,338	\$7,983,482	\$0	\$0	\$458,338	\$4,607,820
Year 26	\$369,695	\$103,831	\$473,526	\$8,457,007	\$0	\$0	\$473,526	\$5,081,345
Year 27	\$380,785	\$108,446	\$489,231	\$8,946,238	\$0	\$0	\$489,231	\$5,570,577
Year 28	\$392,209	\$113,264	\$505,473	\$9,451,711	\$0	\$0	\$505,473	\$6,076,049
Year 29	\$403,975	\$118,294	\$522,269	\$9,973,980	\$0	\$0	\$522,269	\$6,598,318
Year 30	\$416,094	\$123,545	\$539,639	\$10,513,619	\$0	\$0	\$539,639	\$7,137,957
Totals	\$8,400,304	\$2,113,315	\$10,513,619		(\$3,375,661.75)	(\$3,375,661.75)	\$7,137,957	

