



## **Salt Lake County Solar Initiative**

Salt Lake County Project No. NN08111C (GSBS)

### **Study – Solar Applications to Multiple County Buildings**

**September 9, 2008**



SALT LAKE COUNTY SOLAR INITIATIVE  
STUDY - SOLAR APPLICATIONS ON MULTIPLE COUNTY BUILDINGS

- I EXECUTIVE SUMMARY
- II METHODOLOGY
- III SUMMARY TABLE – SOLAR ELECTRICAL APPLICATIONS
- IV SUMMARY TABLE – SOLAR THERMAL APPLICATIONS
- V INDIVIDUAL BUILDING PROFILES

APPENDICES

- A SOLAR ELECTRIC – MASTER SPREADSHEET
- B SOLAR THERMAL – MASTER SPREADSHEET
- C EXPLANATORY NOTES

This study was requested by Salt Lake County in an effort to obtain a cursory overview of solar electric and solar thermal application possibilities on the rooftops of existing county buildings. The subject buildings represent various County Divisions: Aging Services, Community Services, County Health, County Library, Parks & Recreation, Public Works, County Sheriff and Youth Services. There are fifty-two buildings included in the study.

Direction given to the study team by the County was simple: estimate the available roof-top areas of the buildings using a combination of aerial survey and visual inspection; estimate the amount of solar electrical and solar thermal panels that might be installed on un-shaded, unobstructed portions of flat and sloped or curved roof areas; estimate the amount of renewable energy that might be produced; compare the energy production with energy consumption for each of the subject buildings. Salt Lake County provided the team with electrical and natural gas utility records.

Certain assumptions were made for the sake of this study:

- a) Roof structures are adequate to support the addition of solar collectors and associated hardware;
- b) Space within the buildings are adequate to support additional equipment necessary for the operation of the solar systems;
- c) Solar installations are acceptable to neighbors and local authorities having jurisdiction;
- d) Various quantitative assumptions were also made which are explained in detail in Appendix C and referenced in the spreadsheets in Appendix A and B.

The study also excluded certain important issues:

- a) Energy savings that could be realized by improvements to building energy efficiency in the form of systems commissioning, additional insulation, building orientation, reduction of heat gain, reduction of consumption habits, etc.;
- b) Costs related to building modifications including roofing, roof structure, addition of rooms, and repairs related to installation of solar equipment;
- c) Costs related to upgrades required by utility companies;
- d) Although some facilities have available vertical wall surfaces and/or ground space suitable for the addition of wall or ground-mount solar systems, these were not included in the study (however there is mention of alternate mounting possibilities in the individual building summaries where applicable);
- e) Future development that may shade or otherwise obstruct a solar installation.

Data used to estimate the production and cost of solar electrical or solar thermal energy was based on the performance of a standard systems: a poly-crystalline silicone multi-purpose solar photovoltaic panel for electrical production; a glazed flat-panel solar collector for domestic hot water; and an un-glazed solar collector system for heating outdoor pools.

The report begins with an explanation of the methodology used for the study followed by two tables – one for solar electrical and one for solar thermal. Each table lists all the buildings in the study and summarizes the solar energy applications, consumption history, costs and estimated savings for each building. Following this section is a building-by-building profile which includes the aerial diagram used for area take-off and identification of potential solar panel locations.

The following summarizes key results for all the buildings included in the study:

### ELECTRICAL

Total estimated potential Solar Electrical Production: 9.6 MW

Total estimated potential annual Production: 13,012 MWh

Cost of electricity based on utility records: \$4.9 Million

Total estimated cost of installing all of the estimated PV panels listed in the study: \$72 Million

Estimated annual cost savings: \$1.8 Million

Estimated annual CO2 Savings: 6,000 Tons

### NATURAL GAS

Total estimated annual amount of Natural Gas used for water heating: 133,492 DTH

Total estimated cost of Natural Gas used for water heating: \$1.1Million

Potential Annual Production using Solar Thermal: 97,484 DTH

Estimated Total Solar Thermal Systems Cost: \$19.2Million

Estimated Total Annual Cost Savings: \$910,000

Annual CO2 Savings: 5,878 Tons

Simple pay-back periods are indicated in the master spreadsheets in Appendix A and B but these computations do not include possible cost off-sets such as incentives, rebates or credits, nor do the costs include potential building-related improvements.

## METHODOLOGY

### INTRODUCTION

The following steps were taken to complete this study:

- a) Print an aerial image of each site using Google Pro;
- b) Visit each site to confirm roof configurations from ground level;
- c) Take key photographs of buildings at each site;
- d) Quantify available unobstructed roof areas using Google Pro;
- e) Create models (excel spreadsheet) for each application – solar electric and solar thermal - taking into account numerous factors to be used in the calculation of energy production, costs, etc. (these are explained below and in more detail in Appendix C)
- f) Input data for each building into the model and present the results.

Certain assumptions were made for the sake of this study:

- a) Roof structures are adequate to support the addition of solar collectors and associated hardware;
- b) Space within the buildings are adequate to support additional equipment necessary for the operation of the solar systems;
- c) Solar installations are acceptable to neighbors and local authorities having jurisdiction;
- d) Various quantitative assumptions were also made which are explained in detail in Appendix C and referenced in the spreadsheets in Appendix A and B.

The study also excluded certain important issues:

- a) Energy savings that could be realized by improvements to building energy efficiency in the form of systems commissioning, additional insulation, building orientation, reduction of heat gain, reduction of consumption habits, etc.;
- b) Costs related to building modifications including roofing, roof structure, addition of rooms, and repairs related to installation of solar equipment;
- c) Costs related to upgrades required by utility companies;
- d) Although some facilities have available vertical wall surfaces and/or ground space suitable for the addition of wall or ground-mount solar systems, these were not included in the study (however there is mention of alternate mounting possibilities in the individual building summaries where applicable);
- e) Future development that may shade or otherwise obstruct a solar installation.

### SOLAR ELECTRICAL DATA AND CALCULATIONS

#### Roof Area Determination

Aerial surveys were used as the basis for determining total roof area and identifying roof areas available for the installation of solar panels. The resolution of the aerial pictures is not fine enough to allow for precise measurement so the areas listed in the report are approximate. Visual inspections (from the ground level) were used to confirm locations and directions of roof slopes, obstructions, shading, etc. The estimated roof area available for solar was further reduced to take into account unknown conditions due to roof-top obstructions, geometry, equipment, etc. Area reduction factors were applied for flat roof, pitched roof and curved roof configurations.

#### Solar Electric Production

The basis for determining solar PV panel quantity and production capacity, was a standard polycrystalline silicon multi-purpose module approximately 64-in long X 39-in wide with a rated power output of 205W. The area of flat roof required per panel takes into account the size of the panels, tilt

angle, the spacing of panels required to avoid shading from one panel row to the next, and required circulation for maintenance. A Curved or Pitched Roof factor was derived from a sampling of test cases of placing rectangular flat-plate panels on triangular-shaped roofs; for curved roofs a higher efficiency factor was applied based on the assumption that panels can be directly applied to a standing-seam metal roof and allowing for some roof obstructions and service access. Quantities of panels that might be achieved on any given roof were determined by multiplying the available area times the efficiency factor and then dividing by the area required per panel. The total production estimate was then calculated based on panel quantities multiplied by factors derived from the DOE Advisory Model for the specified panel.

### Electric Consumption

The County provided the study team with last year's utility records which listed a monthly breakdown of peak electricity usage (kW); cumulative usage (kWh); and cost.

### Solar Electric System Costs & Cost Savings

PV System costs were determined using a \$/watt scaled to various system sizes based on various national averages. Costs do not include re-roofing, structural modifications or building or systems alterations required to accommodate new solar PV systems. Annual Electrical cost savings were computed by comparing the potential annual solar electrical production with the rates listed in Rocky Mountain Power (RMP) Electric Service Schedule No.6. The simple pay-backs listed in Appendix A are useful for comparison only and do not accurately reflect what might be achieved if various cost offsets are applied such as credits, incentives, etc. Also, system costs could be reduced by volume purchases or increased by building-specific alternations necessary for a given installation.

### CO2 Reduction

The assumption – in this study – is that for every unit of power produced by solar energy, a corresponding quantity of CO2 will NOT be introduced into the atmosphere. For solar electric production, the calculations are based on approximately .9 lbs CO2 per kWhr (source: climatetrust.org).

## SOLAR THERMAL DATA AND CALCULATIONS

For this study, solar thermal refers to water heating by means of flat plate solar collectors for domestic hot water and by means of unglazed polymer collectors for outdoor pool water heating.

### Roof Area Determination

Aerial surveys were used as the basis for determining total roof area and identifying roof areas available for the installation of solar panels. The resolution of the aerial pictures is not fine enough to allow for precise measurement so the areas listed in the report are approximate. Visual inspections (from the ground level) were used to confirm locations and directions of roof slopes, obstructions, shading, etc. The estimated roof area available for solar was further reduced to take into account unknown conditions due to roof-top obstructions, geometry, equipment, etc. Area reduction factors were applied for flat roof, pitched roof and curved roof configurations.

### Solar Thermal Production

The basis for determining solar water heating (SWH) panel quantity and production capacity for domestic hot water, is a glazed flat panel collector 42-in W x 94-in L with an annual production capacity of 8.1 DTH. For SWH applied to outdoor pool water heating only, an unglazed collector 48-in W x 102-in L was used with an estimated annual production capacity of 13.9 DTH. The area of flat roof required per panel takes into account the size of the panels, tilt angle, the spacing of panels required to avoid shading from one panel row to the next, and required circulation for maintenance. A Curved or Pitched

Roof factor was derived from a sampling of test cases of placing rectangular flat-plate panels on triangular-shaped roofs; for curved roofs a higher efficiency factor was applied based on the assumption that panels can be directly applied to a standing-seam metal roof and allowing for some roof obstructions and service access. Quantities of panels that might be achieved on any given roof were determined by multiplying the available area times the efficiency factor and then dividing by the area required per panel. Annual production is based on panel quantity multiplied by estimated production capacity per panel.

### Natural Gas Consumption

The County provided the study team with last year's utility records which listed a monthly breakdown of natural gas consumption (DTH).

### Solar Thermal System Costs & Cost Savings

Solar WHS costs were determined using a \$/DTH production capacity based on averaging the results of previous studies. Costs do not include re-roofing, structural modifications or building or systems alterations required to accommodate new solar systems. Annual Natural Gas cost savings were computed by comparing the potential annual solar production with the rates averaged from the utility records. The simple pay-backs listed in Appendix B are useful for comparison only and do not accurately reflect what might be achieved if various cost offsets are applied such as credits, incentives, etc. Also, system costs could be reduced by volume purchases or increased by building-specific alternations necessary for a given installation.

### CO2 Reduction

The assumption – in this study – is that for every unit of energy produced by solar collectors, a corresponding quantity of CO2 will NOT be introduced into the atmosphere. For solar thermal production the calculator multiplies the number of therms produced annually by 12.0593, the amount of pounds of CO2 that is emitted from burning one therm of natural gas (Ref. [www.climatetrust.org](http://www.climatetrust.org) and [www.carboncounter.org](http://www.carboncounter.org)).

Details of the variables and factors mentioned above and used in computations can be found in Appendix C – Explanatory Notes.



SOLAR STUDY FOR COUNTY BUILDINGS - ELECTRICAL (Rev. 9/8/2008)



AGENCY	FACILITY NAME	PV Array Size (kW) (4b)	Annual kWhrs produced (4c)	Peak Elec. Usage (kW) (5a)	Annual Elec. Usage (kWh) (5b)	Annual Elec. Cost (5c)	PV System Cost (6b)	Annual Energy Cost Savings (7)	CO2 Reduction (tons) (9)
AGING SERVICES	TENTH EAST SENIOR CENTER	75.9	102,855	N/A	238,640	\$14,922	\$682,667	\$14,079	47
AGING SERVICES	DRAPER CRESCENT SENIOR CENTER	6.6	8,888	12	37,800	\$3,469	\$65,547	\$1,217	4
AGING SERVICES	KEARNS SENIOR CENTER	37.1	50,272	130	98,386	\$11,051	\$333,664	\$6,881	23
AGING SERVICES	MT. OLYMPUS SENIOR CENTER	25.3	34,267	158	242,680	\$18,729	\$252,705	\$4,691	16
AGING SERVICES	NORTHWEST SENIOR CENTER	34.1	46,285	304	623,441	\$39,903	\$307,200	\$6,336	21
COMMUNITY SERVICES	CAPITOL THEATER	65.9	89,355	1,006	1,415,759	\$118,694	\$593,067	\$12,231	41
COMMUNITY SERVICES	CHILDREN'S MUSEUM	14.2	19,285	N/A	N/A	N/A	\$142,222	\$2,640	9
COMMUNITY SERVICES	ROSE WAGNER THEATER	125.6	170,354	1,030	1,413,600	\$101,332	\$1,130,667	\$23,319	78
COMMUNITY SERVICES	SALT PALACE & SYMPHONY HALL	3,332.7	4,519,196	7,021	16,978,200	\$1,277,094	\$21,662,815	\$618,607	2,081
COMMUNITY SERVICES	SOUTH TOWNE EXPO CENTER	1,213.6	1,645,682	3,034	6,628,800	\$423,103	\$8,495,407	\$225,268	758
GOVERNMENT CENTER	SLCo GOVERNMENT CENTER	355.1	481,490	4,450	8,655,740	\$592,105	\$3,018,193	\$65,909	222
HEALTH DEPARTMENT	ELLIS REYNOLDS SHIPP PUBLIC HEALTH C	82.5	111,855	240	331,640	\$25,064	\$742,400	\$15,311	52
HEALTH DEPARTMENT	ENVIRONMENTAL HEALTH	42.1	57,120	N/A	312,480	\$19,950	\$379,115	\$7,819	26
HEALTH DEPARTMENT	SOUTHEAST CLINIC	3.1	4,178	88	109,920	\$9,733	\$33,896	\$572	2
SLCo LIBRARY	BINGHAM CREEK LIBRARY	40.0	54,254	176	363,480	\$25,424	\$360,091	\$7,426	25
SLCo LIBRARY	DRAPER LIBRARY	79.8	108,231	160	415,001	\$26,101	\$718,347	\$14,815	50
SLCo LIBRARY	RIVERTON LIBRARY	12.9	17,487	176	383,560	\$25,404	\$128,960	\$2,394	8
SLCo LIBRARY	SANDY LIBRARY	82.7	112,176	252	499,840	\$34,145	\$744,533	\$15,355	52
SLCo LIBRARY	TAYLORSVILLE LIBRARY	23.4	31,794	114	201,446	\$15,205	\$234,471	\$4,352	15
SLCo LIBRARY	WHITMORE LIBRARY	31.0	42,040	726	1,456,480	\$88,704	\$310,027	\$5,755	19
PARKS & RECREATION	MEADOWBROOK GOLF COURSE	11.0	14,949	184	254,080	\$20,601	\$110,240	\$2,046	7
PARKS & RECREATION	MOUNTAIN VIEW GOLF COURSE	15.0	20,302	116	154,480	\$13,155	\$149,719	\$2,779	9
PARKS & RECREATION	OLD MILL GOLF COURSE	8.7	11,846	361	668,499	\$45,318	\$87,360	\$1,622	5
PARKS & RECREATION	RIVERBEND GOLF COURSE	12.9	17,487	178	199,812	\$17,267	\$128,960	\$2,394	8
PARKS & RECREATION	CENTENNIAL OUTDOOR POOL	20.9	28,285	N/A	203,360	\$14,344	\$208,593	\$3,872	13
PARKS & RECREATION	CRESTWOOD OUTDOOR POOL	19.4	26,357	error	13,765	\$1,041	\$194,370	\$3,608	12
PARKS & RECREATION	DRAPER OUTDOOR POOL	21.3	28,928	110	118,560	\$9,427	\$213,333	\$3,960	13
PARKS & RECREATION	KENNECOTT-MAGNA OUTDOOR POOL	27.3	36,996	0	0	\$0	\$272,830	\$5,064	17
PARKS & RECREATION	SOUTH COUNTY OUTDOOR POOL	2.3	3,103	0	0	\$0	\$27,456	\$425	1
PARKS & RECREATION	TAYLORSVILLE OUTDOOR POOL	23.0	31,177	126	204,720	\$15,836	\$229,920	\$4,268	14
PARKS & RECREATION	WEST JORDAN OUTDOOR POOL	20.4	27,642	62	83,277	\$6,535	\$203,852	\$3,784	13
PARKS & RECREATION	ACCORD ICE RECREATION CENTER	158.8	215,353	640	1,288,000	\$83,869	\$1,318,163	\$29,478	99
PARKS & RECREATION	CENTRAL CITY RECREATION CENTER	104.3	141,426	320	573,240	\$42,139	\$886,519	\$19,359	65
PARKS & RECREATION	COPPERVIEW RECREATION CENTER	135.6	183,854	268	512,480	\$35,027	\$1,152,474	\$25,167	85
PARKS & RECREATION	COUNTY ICE RECREATION CENTER	101.2	137,181	N/A	1,416,000	\$85,201	\$859,913	\$18,778	63
PARKS & RECREATION	KEARNS RECREATION CENTER	66.4	89,998	96	173,760	\$12,086	\$597,333	\$12,319	41
PARKS & RECREATION	MAGNA RECREATION CENTER	126.6	171,639	92	132,000	\$9,085	\$1,075,911	\$23,495	79
PARKS & RECREATION	REDWOOD COMMUNITY CENTER	107.6	145,926	396	747,919	\$50,635	\$914,726	\$19,975	67
PARKS & RECREATION	TAYLORSVILLE RECREATION CENTER	348.0	471,838	472	1,022,160	\$68,338	\$2,957,688	\$64,587	217
PARKS & RECREATION	DIMPLE DELL REC CENTER / INDOOR POOL	145.9	197,804	610	1,642,880	\$95,913	\$1,239,922	\$27,076	91
PARKS & RECREATION	FAIRMONT REC CENTER / INDOOR POOL	112.8	152,997	390	1,046,320	\$61,794	\$959,052	\$20,943	70
PARKS & RECREATION	GENE FULMER REC CENTER / INDOOR POOL	147.0	199,282	600	1,538,080	\$90,475	\$1,249,185	\$27,279	92
PARKS & RECREATION	HOLLADAY LIONS REC CENTER / INDOOR POOL	198.6	269,352	332	843,680	\$47,720	\$1,688,415	\$36,870	124
PARKS & RECREATION	MARV JENSEN REC CENTER / INDOOR POOL	113.8	154,283	284	636,560	\$40,097	\$967,111	\$21,119	71
PARKS & RECREATION	NORTHWEST REC CENTER / INDOOR POOL	161.2	218,567	304	623,441	\$39,903	\$1,370,074	\$29,918	101
PUBLIC WORKS	ANIMAL SHELTER	83.4	113,141	154	378,320	\$23,618	\$750,933	\$15,487	52
PUBLIC WORKS	EMERGENCY OPERATIONS CENTER	134.7	182,708	0	0	\$0	\$1,145,291	\$25,010	84
SLCo SHERIFF	ADULT DETENTION CENTER	1,080.9	1,465,685	5,752	19,646,400	\$1,025,772	\$7,566,222	\$200,629	675
SLCo SHERIFF	SHERIFF'S ADMINISTRATION	118.5	160,711	INCLUDED IN ADULT. DET. CENTER			\$1,007,407	\$21,999	74
SLCo SHERIFF	SHERIFF'S EVIDENCE & SPECIAL OPERATIONS	161.2	218,567	INCLUDED IN ADULT. DET. CENTER			\$1,370,074	\$29,918	101
YOUTH SERVICES	CHRISTMAS BOX HOUSE	23.0	31,210	264	722,481	\$42,298	\$230,163	\$4,272	14
YOUTH SERVICES	DIVISION OF YOUTH SERVICES	100.8	136,728	INCLUDED IN CHRISTMAS BOX HOUSE			\$857,072	\$18,716	63



SOLAR STUDY FOR COUNTY BUILDINGS - THERMAL (Rev. 9/5/08)



AGENCY	FACILITY NAME	ANNUAL NATURAL GAS USAGE for ALL USES (DTH) (14a)	ANNUAL NATURAL GAS COST for ALL USES (14b)	EST. OF GAS USAGE FOR HOT WATER (DTH) (15b)	EST. OF GAS COST FOR HOT WATER (15c)	QTY of PANELS PROPOSED (12f)	ANNUAL THERMAL PRODUCTION EST.(DTH) (13)	SWH Production as % of hot water usage (15d)	THERMAL (SWH) SYSTEM COST (17)	ANNUAL ENERGY SAVINGS (19)	CO2 REDUCTION (tons) (18)
AGING SERVICES	TENTH EAST SENIOR CENTER	1,293	\$12,465	323	\$3,116	40	323	100%	\$66,266	\$3,666	19
AGING SERVICES	DRAPER CRESCENT SENIOR CENTER	187	\$2,007	47	\$502	6	47	100%	\$9,584	\$590	3
AGING SERVICES	KEARNS SENIOR CENTER	187	\$2,007	47	\$502	6	47	100%	\$9,584	\$590	3
AGING SERVICES	MT. OLYMPUS SENIOR CENTER	1,083	\$10,125	271	\$2,531	33	271	100%	\$55,504	\$2,978	16
AGING SERVICES	NORTHWEST SENIOR CENTER	4,680	\$43,003	1,170	\$10,751	105	851	73%	\$174,353	\$9,194	51
COMMUNITY SERVICES	CAPITOL THEATER	5,914	\$54,529	887	\$8,179	110	887	100%	\$181,856	\$9,623	53
COMMUNITY SERVICES	CHILDREN'S MUSEUM	0	\$0	0	\$0	44	356		\$72,989		21
COMMUNITY SERVICES	ROSE WAGNER THEATER	873	\$8,811	131	\$1,322	16	131	100%	\$26,845	\$1,555	8
COMMUNITY SERVICES	SALT PALACE & SYMPHONY HALL	65,161	\$485,504	16,290	\$121,376	2,011	16,290	100%	\$3,339,501	\$142,795	982
COMMUNITY SERVICES	SOUTH TOWNE EXPO CENTER	17,056	\$126,410	4,264	\$31,603	526	4,264	100%	\$874,120	\$37,179	257
GOVERNMENT CENTER	SLCo GOVERNMENT CENTER	12,830	\$116,081	3,208	\$29,020	396	3,208	100%	\$657,538	\$34,141	193
HEALTH DEPARTMENT	ELLIS REYNOLDS SHIPP PUBLIC HEALTH	1,395	\$12,834	419	\$3,850	52	419	100%	\$85,793	\$4,530	25
HEALTH DEPARTMENT	ENVIRONMENTAL HEALTH	1,203	\$11,556	361	\$3,467	45	361	100%	\$73,985	\$4,079	22
HEALTH DEPARTMENT	SOUTHEAST CLINIC	356	\$3,899	107	\$1,170	10	81	76%	\$16,605	\$1,044	5
SLCo LIBRARY	BINGHAM CREEK LIBRARY	572	\$5,872	86	\$881	11	86	100%	\$17,589	\$1,036	5
SLCo LIBRARY	DRAPER LIBRARY	1,504	\$15,205	226	\$2,281	28	226	100%	\$46,248	\$2,683	14
SLCo LIBRARY	RIVERTON LIBRARY	641	\$6,856	96	\$1,028	12	96	100%	\$19,711	\$1,210	6
SLCo LIBRARY	SANDY LIBRARY	488	\$5,055	73	\$758	9	73	100%	\$15,006	\$892	4
SLCo LIBRARY	TAYLORSVILLE LIBRARY	236	\$2,295	35	\$344	4	35	100%	\$7,257	\$405	2
SLCo LIBRARY	WHITMORE LIBRARY	2,936	\$25,125	440	\$3,769	54	440	100%	\$90,282	\$4,434	27
PARKS & RECREATION	MEADOWBROOK GOLF COURSE	1,091	\$10,338	218	\$2,068	24	194	89%	\$39,852	\$2,167	12
PARKS & RECREATION	MOUNTAIN VIEW GOLF COURSE	837	\$8,306	167	\$1,661	21	167	100%	\$34,317	\$1,954	10
PARKS & RECREATION	OLD MILL GOLF COURSE	1,965	\$18,430	393	\$3,686	19	154	39%	\$31,550	\$1,698	9
PARKS & RECREATION	RIVERBEND GOLF COURSE	3,872	\$33,705	774	\$6,741	28	227	29%	\$46,494	\$2,323	14
PARKS & RECREATION	CENTENNIAL OUTDOOR POOL	2,861	\$23,994	2,432	\$20,395	70	979	40%	\$58,714	\$9,655	59
PARKS & RECREATION	CRESTWOOD OUTDOOR POOL	1,166	\$9,967	991	\$8,472	66	912	92%	\$54,710	\$9,170	55
PARKS & RECREATION	DRAPER OUTDOOR POOL	5,943	\$48,248	5,052	\$41,011	72	1,001	20%	\$60,048	\$9,559	60
PARKS & RECREATION	KENNECOTT-MAGNA OUTDOOR POOL	0	\$0	0	\$0	74	1,029		\$61,716		62
PARKS & RECREATION	SOUTH COUNTY OUTDOOR POOL	21	\$err	18		2	28	156%	\$1,668		2
PARKS & RECREATION	TAYLORSVILLE OUTDOOR POOL	4,068	\$35,465	3,458	\$30,145	55	767	22%	\$46,037	\$7,870	46
PARKS & RECREATION	WEST JORDAN OUTDOOR POOL	2,077	\$17,753	1,765	\$15,090	69	956	54%	\$57,379	\$9,617	58
PARKS & RECREATION	ACCORD ICE RECREATION CENTER	6,554	\$55,052	1,966	\$16,516	243	1,966	100%	\$403,071	\$19,430	119
PARKS & RECREATION	CENTRAL CITY RECREATION CENTER	172	\$1,873	52	\$562	6	52	100%	\$10,578	\$661	3
PARKS & RECREATION	COPPERVIEW RECREATION CENTER	1,410	\$13,775	423	\$4,133	52	423	100%	\$86,715	\$4,862	26
PARKS & RECREATION	COUNTY ICE RECREATION CENTER	5,024	\$43,940	1,507	\$13,182	186	1,507	100%	\$308,976	\$15,508	91
PARKS & RECREATION	KEARNS RECREATION CENTER	711	\$6,696	213	\$2,009	26	213	100%	\$43,727	\$2,363	13
PARKS & RECREATION	MAGNA RECREATION CENTER	2,969	\$26,477	891	\$7,943	110	891	100%	\$182,594	\$9,345	54
PARKS & RECREATION	REDWOOD COMMUNITY CENTER	3,501	\$31,159	1,050	\$9,348	130	1,050	100%	\$215,312	\$10,997	63
PARKS & RECREATION	TAYLORSVILLE RECREATION CENTER	4,491	\$34,736	1,347	\$10,421	166	1,347	100%	\$276,197	\$12,260	81
PARKS & RECREATION	DIMPLE DELL REC CENTER / INDOOR P	11,725	\$98,879	8,794	\$74,159	429	3,475	40%	\$712,355	\$34,476	210
PARKS & RECREATION	FAIRMONT REC CENTER / INDOOR POC	11,528	\$97,825	8,646	\$73,369	349	2,825	33%	\$579,046	\$28,199	170
PARKS & RECREATION	GENE FULMER REC CENTER / INDOOR	9,956	\$82,858	7,467	\$62,144	454	3,679	49%	\$754,220	\$36,023	222
PARKS & RECREATION	HOLLADAY LIONS REC CENTER / INDOO	12,201	\$99,137	9,151	\$74,353	614	4,973	54%	\$1,019,413	\$47,535	300
PARKS & RECREATION	MARV JENSEN REC CENTER / INDOOR	5,543	\$48,239	4,157	\$36,179	352	2,848	69%	\$583,912	\$29,163	172
PARKS & RECREATION	NORTHWEST REC CENTER / INDOOR P	4,680	\$43,003	3,510	\$32,252	433	3,510	100%	\$719,550	\$37,944	212
PUBLIC WORKS	ANIMAL SHELTER	3,156	\$28,261	1,578	\$14,131	195	1,578	100%	\$323,490	\$16,624	95
PUBLIC WORKS	EMERGENCY OPERATIONS CENTER	0	\$0	0	\$0	363	2,940		\$602,762		177
SLCo SHERIFF	ADULT DETENTION CENTER	74,532	\$631,116	37,266	\$315,558	3,341	27,062	73%	\$5,547,731	\$269,593	1,632
SLCo SHERIFF	SHERIFF'S ADMINISTRATION	3,904	\$35,520	976	\$8,880	120	976	100%	\$200,080	\$10,447	59
SLCo SHERIFF	SHERIFF'S EVIDENCE & SPECIAL OPER	747	\$7,840	187	\$1,960	23	187	100%	\$38,284	\$2,306	11
YOUTH SERVICES	CHRISTAS BOX HOUSE	2,247	\$21,270	562	\$5,318	63	510	91%	\$104,612	\$5,683	31
YOUTH SERVICES	DIVISION OF YOUTH SERVICES	INCLUDED ABOVE	\$0	INCLUDED ABOVE	\$0	70	567	101%	\$116,235		34

**TENTH EAST SENIOR CENTER**

**AGING SERVICES**

237 S. 1000 E., Salt Lake City



Aerial View (potential solar areas shaded blue)

North-west view (top) South-west view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 238, 640	Annual Natural Gas Usage for Bldg (DTH): 1,293
Annual Electrical Cost: \$ 14,922	Annual Natural Gas Usage for HW (DTH): 323
Peak Power Usage (W): N/A	Annual Natural Gas Cost for HW: \$ 3,116
PV Array (kW): 75.9	Potential SHW Array: 40 Panels
PV Annual Production (kWh): 102,855	Potential SHW Annual Production (DTH): 323
Potential PV vs. Usage: 43 %	Production vs. Usage: 100 %
PV System Cost: \$ 682,667	SHW System Cost: \$ 66,266
Annual Energy Savings: \$ 14,079	Annual Energy Cost Savings: \$ 3,666
CO2 Reduction: 47.4 TONS	CO2 Reduction: 19 TONS

**NOTES:**

- Estimated Total Roof Area (sf): 19,400
- Estimated Flat Roof Area available for Solar (sf): 16,000
- Estimate Pitched or Curved Area Available for Solar (sf): 0
- Future design to be coordinated with HVAC re-design



# DRAPER CRESCENT SENIOR CENTER

12350 S. 800 E., Draper



Aerial View (potential solar areas shaded blue)



East view (top); South view (bottom)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 37,800	Annual Natural Gas Usage for Bldg (DTH): 187
Annual Electrical Cost: \$ 3,469	Annual Natural Gas Usage for HW (DTH): 47
Peak Power Usage (kW): 12	Annual Natural Gas Cost for HW: \$ 502
PV Array (kW): 6.6	Potential SHW Array: 6 Panels
PV Annual Production (kWh): 8,888	Potential SHW Annual Production (DTH): 47
Potential PV vs. Usage: 24 %	Production vs. Usage: 100%
PV System Cost: \$ 65,547	SHW System Cost: \$ 9,584
Annual Energy Savings: \$ 1,217	Annual Energy Cost Savings: \$ 590
CO2 Reduction: 4 TONS	CO2 Reduction: 3 TONS

### NOTES:

Estimated Total Roof Area (sf): 4,185

Estimated Flat Roof Area available for Solar (sf): 900

Estimate Pitched or Curved Area Available for Solar (sf): 500

Roof partially shaded by mature trees

# KEARNS SENIOR CENTER

# AGING SERVICES

4850 W. 4715 S., Salt Lake City



Aerial View (potential solar areas shaded blue)



North view (top); South view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 98,386	Annual Natural Gas Usage for Bldg (DTH): 187
Annual Electrical Cost: \$ 11,051	Annual Natural Gas Usage for HW (DTH): 47
Peak Power Usage (W): 130	Annual Natural Gas Cost for HW: \$ 502
PV Array (kW): 37	Potential SHW Array: 6 Panels
PV Annual Production (kWh): 50,272	Potential SHW Annual Production (DTH): 47
Potential PV vs. Usage: 51 %	Production vs. Usage: 100 %
PV System Cost: \$ 333,664	SHW System Cost: \$ 9,584
Annual Energy Savings: \$ 6,882	Annual Energy Cost Savings: \$ 590
CO2 Reduction: 23 TONS	CO2 Reduction: 3 TONS

### NOTES:

Estimated Total Roof Area (sf): 12,300

Estimated Flat Roof Area available for Solar (sf): 5,100

Estimate Pitched or Curved Area Available for Solar (sf): 2,800

1635 E. Murray-Holladay Road, Salt Lake City



Aerial View (potential solar areas shaded blue)



North-east view (top); South-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 242,680	Annual Natural Gas Usage for Bldg (DTH): 1,083
Annual Electrical Cost: \$ 18,729	Annual Natural Gas Usage for HW (DTH): 271
Peak Power Usage (W): 158	Annual Natural Gas Cost for HW: \$ 2,531
PV Array (kW): 25.3	Potential SHW Array: 33 Panels
PV Annual Production (kWh): 34,267	Potential SHW Annual Production (DTH): 271
Potential PV vs. Usage: 14 %	Production vs. Usage: 100%
PV System Cost: \$ 252,705	SHW System Cost: \$ 55,504
Annual Energy Savings: \$ 4,691	Annual Energy Cost Savings: \$2,978
CO2 Reduction: 16	CO2 Reduction: 16 TONS

**NOTES:**

Estimated Total Roof Area (sf): 22,180

Estimated Flat Roof Area available for Solar (sf): 3,400

Estimate Pitched or Curved Area Available for Solar (sf): 2,000

Avail. Area includes both flat & pitched portions; roof obstructions to be determined

**TENTH EAST SENIOR CENTER**

**AGING SERVICES**

1300 W. 300 N., Salt Lake City



Aerial View (potential solar areas shaded blue)



North-east view (top); South-east view (bottom)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 623,441*	Annual Natural Gas Usage for Bldg (DTH): 4,680*
Annual Electrical Cost: \$ 39,903*	Annual Natural Gas Usage for HW (DTH): 1,170*
Peak Power Usage (kW): 304*	Annual Natural Gas Cost for HW: \$ 10,751
PV Array (kW): 34	Potential SHW Array: 105 Panels
PV Annual Production (kWh): 46,285	Potential SHW Annual Production (DTH): 851
Potential PV vs. Usage: 7.4%	Production vs. Usage: 73 %
PV System Cost: \$ 307,200	SHW System Cost: \$ 174,353
Annual Energy Savings: \$ 6,336	Annual Energy Cost Savings: \$ 9,194
CO2 Reduction: 21 TONS	CO2 Reduction: 51 TONS

**NOTES:**

Estimated Total Roof Area (sf): 7,200

Estimated Flat Roof Area available for Solar (sf): 7,200

Estimate Pitched or Curved Area Available for Solar (sf): 0

\*This building is joined to the Northwest Recreation Center; consumption figures include both buildings; solar applications are indicated separately.

**CAPITOL THEATER**

**COMMUNITY SERVICES**

46 W. 200 South, Salt Lake City



Aerial View (potential solar areas shaded blue)



\South View (top); South-East view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,415,759	Annual Natural Gas Usage for Bldg (DTH): 5,914
Annual Electrical Cost: \$ 118,694	Annual Natural Gas Usage for HW (DTH): 887
Peak Power Usage (kW): 1,006	Annual Natural Gas Cost for HW: \$ 8,179
PV Array (kW): 65.9	Potential SHW Array: 110 Panels
PV Annual Production (kWh): 89,355	Potential SHW Annual Production (DTH): 887
Potential PV vs. Usage: 6.3 %	Production vs. Usage: 100 %
PV System Cost: \$ 593,067	SHW System Cost: \$ 181,856
Annual Energy Savings: \$ 12,231	Annual Energy Cost Savings: \$ 9,623
CO2 Reduction: 41 TONS	CO2 Reduction: 53 TONS

**NOTES:**

Estimated Total Roof Area (sf): 25,000

Estimated Flat Roof Area available for Solar (sf): 13,900

Estimate Pitched or Curved Area Available for Solar (sf): 0

Coodinate solar installation w/ HVAC redesign; portion of pitched roof included in calculations.

**CHILDREN'S MUSEUM**

**COMMUNITY SERVICES**

Gateway, Salt Lake City



Aerial View (potential solar areas shaded blue)

North-west view (top); South-west view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): Not available	Annual Natural Gas Usage for Bldg (DTH): Not avail.
Annual Electrical Cost: \$ Not available	Annual Natural Gas Usage for HW (DTH): Not avail.
Peak Power Usage (kW): Not available	Annual Natural Gas Cost for HW: Not available
PV Array (kW): 14	Potential SHW Array: 44 Panels
PV Annual Production (kWh): 19,285	Potential SHW Annual Production (DTH): 356
Potential PV vs. Usage: Not available	Production vs. Usage: Not available
PV System Cost: \$ 126,000	SHW System Cost: \$ 72,989
Annual Energy Savings: \$ 2,640	Annual Energy Cost Savings: \$ Not available
CO2 Reduction: 9 TONS	CO2 Reduction: 21 TONS

**NOTES:**

Estimated Total Roof Area (sf): 6,500

Estimated Flat Roof Area available for Solar (sf): 3,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

Possible additional installation on outdoor trellis (not included above)

**ROSE WAGNER THEATER**

**COMMUNITY SERVICES**

138 W. 300 S., Salt Lake City



Aerial View (potential solar areas shaded blue)

South-east view (top); South-west view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,413,600	Annual Natural Gas Usage for Bldg (DTH): 873
Annual Electrical Cost: \$ 101,332	Annual Natural Gas Usage for HW (DTH): 131
Peak Power Usage (kW): 1,030	Annual Natural Gas Cost for HW: \$ 1,322
PV Array (kW): 126	Potential SHW Array: 16 Panels
PV Annual Production (kWh): 170,354	Potential SHW Annual Production (DTH): 131
Potential PV vs. Usage: 12%	Production vs. Usage: 100 %
PV System Cost: \$ 1,130,667	SHW System Cost: \$ 26,845
Annual Energy Savings: \$ 23,319	Annual Energy Cost Savings: \$ 1,555
CO2 Reduction: 79 TONS	CO2 Reduction: 8 TONS

**NOTES:**

Estimated Total Roof Area (sf): 40,500

Estimated Flat Roof Area available for Solar (sf): 26,500

Estimate Pitched or Curved Area Available for Solar (sf): 0

South-facing wall on tall building is good location for panels (not included in this analysis but estimate 125 to 150 additional solar PV or solar WHS panels.

100 S. West Temple, Salt Lake City



Aerial View (potential solar areas shaded blue)

South-east corner (top); West end (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 16,978,200	Annual Natural Gas Usage for Bldg (DTH): 65,161
Annual Electrical Cost: \$ 1,277,094	Annual Natural Gas Usage for HW (DTH): 16,290
Peak Power Usage (kW): 7,021	Annual Natural Gas Cost for HW: \$ 121,376
PV Array (kW): 3,332	Potential SHW Array: 2,011 Panels
PV Annual Production (kWh): 4,519,196	Potential SHW Annual Production (DTH): 16,290
Potential PV vs. Usage: 27 %	Production vs. Usage: 100 %
PV System Cost: \$ 21,662,815	SHW System Cost: \$ 3,339,501
Annual Energy Savings: \$ 618,607	Annual Energy Cost Savings: \$ 142,795
CO2 Reduction: 2,081 TONS	CO2 Reduction: 982 TONS

**NOTES:**

Estimated Total Roof Area (sf): 960,000

Estimated Flat Roof Area available for Solar (sf): 703,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

Horizontal wall surfaces also available but not included in computations

# SOUTH TOWNE EXPO CENTER

# COMMUNITY SERVICES

9575 S. State, Sandy



Aerial View (potential solar areas shaded blue)

North-east corner(top); South-west view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 6,628,800	Annual Natural Gas Usage for Bldg (DTH): 17,056
Annual Electrical Cost: \$ 423,103	Annual Natural Gas Usage for HW (DTH): 4,264
Peak Power Usage (kW): 3,034	Annual Natural Gas Cost for HW: \$ 31,603
PV Array (kW): 1214	Potential SHW Array: 526 Panels
PV Annual Production (kWh): 1,645,682	Potential SHW Annual Production (DTH): 4,264
Potential PV vs. Usage: 24.8 %	Production vs. Usage: 100 %
PV System Cost: \$ 8,495,407	SHW System Cost: \$ 874,120
Annual Energy Savings: \$ 225,268	Annual Energy Cost Savings: \$ 37,179
CO2 Reduction: 758 TONS	CO2 Reduction: 257 TONS

### NOTES:

Estimated Total Roof Area (sf): 261,500

Estimated Flat Roof Area available for Solar (sf): 256,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

Pitched roof elements highly visible & architectural; flat roof area best for solar applications

2001 South State, Salt Lake City



Aerial View (potential solar areas shaded blue)



South view (top); Partial view from north-east (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 8,655,740	Annual Natural Gas Usage for Bldg (DTH): 12,830
Annual Electrical Cost: \$ 592,105	Annual Natural Gas Usage for HW (DTH): 3,208
Peak Power Usage (kW): 4,450	Annual Natural Gas Cost for HW: \$ 29,020
PV Array (kW): 355.08148148	Potential SHW Array: 396 Panels
PV Annual Production (kWh): 481,490	Potential SHW Annual Production (DTH): 3,208
Potential PV vs. Usage: 5.6 %	Production vs. Usage: 100 %
PV System Cost: \$ 3,018,193	SHW System Cost: \$ 657,538
Annual Energy Savings: \$ 65,909	Annual Energy Cost Savings: \$ 34,141
CO2 Reduction: 222 TONS	CO2 Reduction: 193 TONS

**NOTES:**

Estimated Total Roof Area (sf): 100,000

Estimated Flat Roof Area available for Solar (sf): 74,900

Estimate Pitched or Curved Area Available for Solar (sf):0

Additional panels could be considered on some horizontal surfaces and used as shading canopies on roof of adjacent garage

4535 S. 5600 W., Salt Lake City



Aerial View (potential solar areas shaded blue)



East – partial view (top); South-east view(bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 331,640	Annual Natural Gas Usage for Bldg (DTH): 1,395
Annual Electrical Cost: \$ 25,064	Annual Natural Gas Usage for HW (DTH): 418.5
Peak Power Usage (kW): 240	Annual Natural Gas Cost for HW: \$ 3,850
PV Array (kW): 83	Potential SHW Array: 52 Panels
PV Annual Production (kWh): 111,855	Potential SHW Annual Production (DTH): 419
Potential PV vs. Usage: 33.7%	Production vs. Usage: 100 %
PV System Cost: \$ 742,400	SHW System Cost: \$ 85,793
Annual Energy Savings: \$ 15,311	Annual Energy Cost Savings: \$ 4,530
CO2 Reduction: 52 TONS	CO2 Reduction: 25 TONS

**NOTES:**

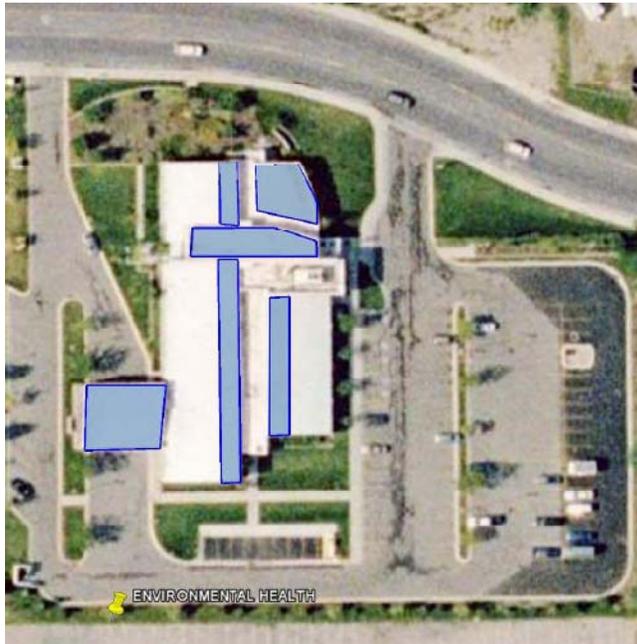
Estimated Total Roof Area (sf): 17,400

Estimated Flat Roof Area available for Solar (sf): 17,400

Estimate Pitched or Curved Area Available for Solar (sf): 0

Adjacent to County Archives Building which was not included in survey (see building to right at partial view above)

788 E. Woodoak Lane, Salt Lake City



Aerial View (potential solar areas shaded blue)

North-west view (top); South-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 312,480	Annual Natural Gas Usage for Bldg (DTH): 1,203
Annual Electrical Cost: \$ 19,950	Annual Natural Gas Usage for HW (DTH): 361
Peak Power Usage (kW): Not available	Annual Natural Gas Cost for HW: \$ 3,467
PV Array (kW): 42	Potential SHW Array: 45 Panels
PV Annual Production (kWh): 57,120	Potential SHW Annual Production (DTH): 361
Potential PV vs. Usage: 18.3 %	Production vs. Usage: 100 %
PV System Cost: \$ 379,115	SHW System Cost: \$ 73,985
Annual Energy Savings: \$ 7,818	Annual Energy Cost Savings: \$ 4,079
CO2 Reduction: 26 TONS	CO2 Reduction: 22 TONS

**NOTES:**

Estimated Total Roof Area (sf): 21,600

Estimated Flat Roof Area available for Solar (sf): 5,200

Estimate Pitched or Curved Area Available for Solar (sf): 1,800

Flat solar area includes top portion of curved roof at almost flat condition; curved area is south-facing

**SOUTHEAST CLINIC**

**HEALTH DEPARTMENT**

9340 S. 700 E., Sandy



Aerial View (potential solar areas shaded blue)



North-east view (top); South-east view (bottom)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 109,920	Annual Natural Gas Usage for Bldg (DTH): 356
Annual Electrical Cost: \$ 9,733	Annual Natural Gas Usage for HW (DTH): 107
Peak Power Usage (kW): 88	Annual Natural Gas Cost for HW: \$ 1,170
PV Array (kW): 3	Potential SHW Array: 10 Panels
PV Annual Production (kWh): 4,178	Potential SHW Annual Production (DTH): 81
Potential PV vs. Usage: 04 %	Production vs. Usage: 76 %
PV System Cost: \$ 33,896	SHW System Cost: \$ 16,605
Annual Energy Savings: \$ 572	Annual Energy Cost Savings: \$ 1,044
CO2 Reduction: 2 TONS	CO2 Reduction: 5 TONS

**NOTES:**

Estimated Total Roof Area (sf): 11,000

Estimated Flat Roof Area available for Solar (sf): 650

Estimated Pitched or Curved Area Available for Solar (sf): 0

Pitched roof areas are either in tree shade or non-south-facing; cutting back trees would open up south-facing pitched roof area.



# BINGHAM CREEK LIBRARY

# SLCo LIBRARY

4834 W. 9000 S., West Jordan



Aerial View (potential solar areas shaded blue)



East view (top); South view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 363,480	Annual Natural Gas Usage for Bldg (DTH): 572
Annual Electrical Cost: \$ 25,424	Annual Natural Gas Usage for HW (DTH): 86
Peak Power Usage (kW): 176	Annual Natural Gas Cost for HW: \$ 881
PV Array (kW): 40	Potential SHW Array: 11 Panels
PV Annual Production (kWh): 54,253	Potential SHW Annual Production (DTH): 86
Potential PV vs. Usage: 14.9 %	Production vs. Usage: 100 %
PV System Cost: \$ 360,090	SHW System Cost: \$ 17,589
Annual Energy Savings: \$ 7,426	Annual Energy Cost Savings: \$ 1,036
CO2 Reduction: 25 TONS	CO2 Reduction: 5 TONS

### NOTES:

Estimated Total Roof Area (sf): 21,000

Estimated Flat Roof Area available for Solar (sf): 5,500

Estimate Pitched or Curved Area Available for Solar (sf): 3,000

Good potential; highly visible from street & residential.

## DRAPER LIBRARY

## SLCo LIBRARY

1136 East Pioneer Road, Draper



Aerial View (potential solar areas shaded blue)

North view (top); South view (bottom)

### SOLAR ELECTRIC

### SOLAR THERMAL

Annual Electrical Usage (kWh): 415,001	Annual Natural Gas Usage for Bldg (DTH): 1,504
Annual Electrical Cost: \$ 26,101	Annual Natural Gas Usage for HW (DTH): 227
Peak Power Usage (kW): 160	Annual Natural Gas Cost for HW: \$ 2,281
PV Array (kW): 80	Potential SHW Array: 28 Panels
PV Annual Production (kWh): 108,231	Potential SHW Annual Production (DTH): 226
Potential PV vs. Usage: 26 %	Production vs. Usage: 100 %
PV System Cost: \$ 718,347	SHW System Cost: \$ 46,248
Annual Energy Savings: \$ 14,815	Annual Energy Cost Savings: \$ 2,683
CO2 Reduction: 50 TONS	CO2 Reduction: 14 TONS

### NOTES:

Estimated Total Roof Area (sf): 22,000

Estimated Flat Roof Area available for Solar (sf): 8,500

Estimated Pitched or Curved Area Available for Solar (sf): 8,500

Curved roof is architectural and very visible but good potential for solar installation if designed to carry additional weight.

**RIVERTON LIBRARY**

**SLCo LIBRARY**

12877 South 1830 West, Riverton



Aerial View (potential solar areas shaded blue)

East view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 383,560	Annual Natural Gas Usage for Bldg (DTH): 641
Annual Electrical Cost: \$ 25,404	Annual Natural Gas Usage for HW (DTH): 96
Peak Power Usage (kW): 176	Annual Natural Gas Cost for HW: \$ 1,028
PV Array (kW): 13	Potential SHW Array: 12 Panels
PV Annual Production (kWh): 17,487	Potential SHW Annual Production (DTH): 96
Potential PV vs. Usage: 4.6 %	Production vs. Usage: 100 %
PV System Cost: \$ 128,960	SHW System Cost: \$ 19,711
Annual Energy Savings: \$ 2,394	Annual Energy Cost Savings: \$ 1,210
CO2 Reduction: 8 TONS	CO2 Reduction: 6 TONS

**NOTES:**

Estimated Total Roof Area (sf): 13,900

Estimated Flat Roof Area available for Solar (sf): 0

Estimate Pitched or Curved Area Available for Solar (sf): 2,800

**SANDY LIBRARY**

**SLCo LIBRARY**

10100 S. Petunia Way, Sandy



Aerial View (potential solar areas shaded blue)

South-east view (top); North-east view (bottom)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 499,840	Annual Natural Gas Usage for Bldg (DTH): 488
Annual Electrical Cost: \$ 34,145	Annual Natural Gas Usage for HW (DTH): 73.2
Peak Power Usage (kW): 252	Annual Natural Gas Cost for HW: \$ 758
PV Array (kW): 83	Potential SHW Array: 9 Panels
PV Annual Production (kWh): 112,176	Potential SHW Annual Production (DTH): 73
Potential PV vs. Usage: 22.4 %	Production vs. Usage: 100 %
PV System Cost: \$ 744,533	SHW System Cost: \$ 15,006
Annual Energy Savings: \$ 15,355	Annual Energy Cost Savings: \$ 892
CO2 Reduction: 52 TONS	CO2 Reduction: 4 TONS

**NOTES:**

Estimated Total Roof Area (sf): 30,840

Estimated Flat Roof Area available for Solar (sf): 17,450

Estimate Pitched or Curved Area Available for Solar (sf): 0

Flat roof areas should be good for solar; would not be visible to nearby residences

**TAYLORSVILLE LIBRARY**

**SLCo LIBRARY**

4870 S. 2700 W., Taylorsville



Aerial View (potential solar areas shaded blue)

East view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 201,446	Annual Natural Gas Usage for Bldg (DTH): 236
Annual Electrical Cost: \$ 15,205	Annual Natural Gas Usage for HW (DTH): 35
Peak Power Usage (kW): 114	Annual Natural Gas Cost for HW: \$ 344
PV Array (kW): 23	Potential SHW Array: 4 Panels
PV Annual Production (kWh): 31,794	Potential SHW Annual Production (DTH): 35
Potential PV vs. Usage: 16 %	Production vs. Usage: 100 %
PV System Cost: \$ 234,471	SHW System Cost: \$ 7,257
Annual Energy Savings: \$ 4,352	Annual Energy Cost Savings: \$ 405
CO2 Reduction: 15 TONS	CO2 Reduction: 2 TONS

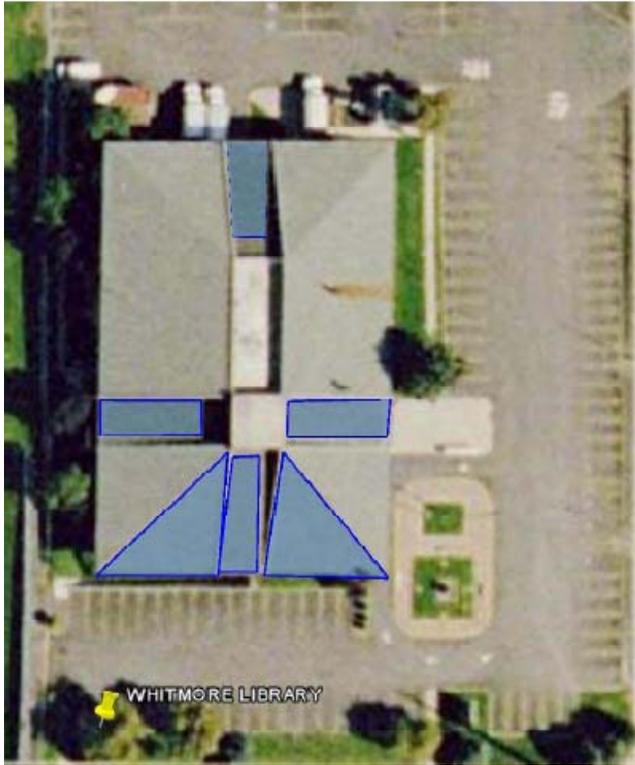
**NOTES:**

- Estimated Total Roof Area (sf): 13,000
- Estimated Flat Roof Area available for Solar (sf): 4,200
- Estimate Pitched or Curved Area Available for Solar (sf): 800
- Pitched roof areas are south-west facing

**WHITMORE LIBRARY**

**SLCo LIBRARY**

2197 Ft. Union Blvd., Salt Lake City



Aerial View (potential solar areas shaded blue)

East view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,456,480	Annual Natural Gas Usage for Bldg (DTH): 2,936
Annual Electrical Cost: \$ 88,704	Annual Natural Gas Usage for HW (DTH): 440
Peak Power Usage (kW): 726	Annual Natural Gas Cost for HW: \$ 3,769
PV Array (kW): 31	Potential SHW Array: 54 Panels
PV Annual Production (kWh): 42,040	Potential SHW Annual Production (DTH): 440
Potential PV vs. Usage: 2.9 %	Production vs. Usage: 100 %
PV System Cost: \$ 310,026	SHW System Cost: \$ 90,282
Annual Energy Savings: \$ 5,755	Annual Energy Cost Savings: \$ 4,434
CO2 Reduction: 19 TONS	CO2 Reduction: 27 TONS

**NOTES:**

- Estimated Total Roof Area (sf): 26,690
- Estimated Flat Roof Area available for Solar (sf): 3,600
- Estimate Pitched or Curved Area Available for Solar (sf): 3,000
- Coordinate solar system installation with HVAC redesign.

4197 S. 1300 W., Salt Lake City



Aerial View (potential solar areas shaded blue)



South view (clubhouse) (top);  
South view Carhouse (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 254,080	Annual Natural Gas Usage for Bldg (DTH): 1,091
Annual Electrical Cost: \$ 20,601	Annual Natural Gas Usage for HW (DTH): 218
Peak Power Usage (kW): 184	Annual Natural Gas Cost for HW: \$ 2,068
PV Array (kW): 11	Potential SHW Array: 24 Panels
PV Annual Production (kWh): 14,949	Potential SHW Annual Production (DTH): 194
Potential PV vs. Usage: 5.9 %	Production vs. Usage: 89 %
PV System Cost: \$ 110,240	SHW System Cost: \$ 39,852
Annual Energy Savings: \$ 2,046	Annual Energy Cost Savings: \$ 2,167
CO2 Reduction: 7 TONS	CO2 Reduction: 12 TONS

**NOTES:**

Estimated Total Roof Area (sf): 15,868

Estimated Flat Roof Area available for Solar (sf): 0

Estimate Pitched or Curved Area Available for Solar (sf): 2,400

Area of pitched roof includes both Main Clubhouse & Cart Service Bldg.

2400 W. 8660 S., West Jordan



Aerial View (potential solar areas shaded blue)



South-west view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 154,480	Annual Natural Gas Usage for Bldg (DTH): 837
Annual Electrical Cost: \$ 13,155	Annual Natural Gas Usage for HW (DTH): 167
Peak Power Usage (kW): 116	Annual Natural Gas Cost for HW: \$ 1,661
PV Array (kW): 15	Potential SHW Array: 21 Panels
PV Annual Production (kWh): 20,302	Potential SHW Annual Production (DTH): 167
Potential PV vs. Usage: 13.1 %	Production vs. Usage: 100 %
PV System Cost: \$ 149,719	SHW System Cost: \$ 34,317
Annual Energy Savings: \$ 2,779	Annual Energy Cost Savings: \$ 1,954
CO2 Reduction: 9 TONS	CO2 Reduction: 10 TONS

**NOTES:**

Estimated Total Roof Area (sf): 9,500

Estimated Flat Roof Area available for Solar (sf): 2,500

Estimate Pitched or Curved Area Available for Solar (sf): 700

Verify if obstructions exist on flat roof area.

6080 S. Wasatch, Salt Lake City



Aerial View (potential solar areas shaded blue)

North-east view (top); South-west view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 668,499	Annual Natural Gas Usage for Bldg (DTH): 1,965
Annual Electrical Cost: \$ 45,318	Annual Natural Gas Usage for HW (DTH): 393
Peak Power Usage (kW): 361	Annual Natural Gas Cost for HW: \$ 3,686
PV Array (kW): 90	Potential SHW Array: 19 Panels
PV Annual Production (kWh): 11,846	Potential SHW Annual Production (DTH): 154
Potential PV vs. Usage: 1.8 %	Production vs. Usage: 39 %
PV System Cost: \$ 87,360	SHW System Cost: \$ 31,550
Annual Energy Savings: \$ 1,621	Annual Energy Cost Savings: \$ 1,698
CO2 Reduction: 5.5 TONS	CO2 Reduction: 9 TONS

**NOTES:**

Estimated Total Roof Area (sf): 12,000

Estimated Flat Roof Area available for Solar (sf): 0

Estimate Pitched or Curved Area Available for Solar (sf): 1,900

Small portion of roof is flat and would likely hide arrays however, most of the space is taken up by roof top equipment; pitched roofs are highly visible; architectural considerations.

# RIVERBEND GOLF COURSE

# PARKS & RECREATION

12765 S. 1100 W., Riverton



Aerial View (potential solar areas shaded blue)



North view (top); South view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 199,812	Annual Natural Gas Usage for Bldg (DTH): 3,872
Annual Electrical Cost: \$ 17,267	Annual Natural Gas Usage for HW (DTH): 774
Peak Power Usage (kW): 178	Annual Natural Gas Cost for HW: \$ 6,741
PV Array (kW): 13	Potential SHW Array: 28 Panels
PV Annual Production (kWh): 17,487	Potential SHW Annual Production (DTH): 336
Potential PV vs. Usage: 8.8 %	Production vs. Usage: 43 %
PV System Cost: \$ 128,960	SHW System Cost: \$ 47,040
Annual Energy Savings: \$ 2,394	Annual Energy Cost Savings: \$ 3,441
CO2 Reduction: 8 TONS	CO2 Reduction: 20 TONS

### NOTES:

Estimated Total Roof Area (sf): 6,500

Estimated Flat Roof Area available for Solar (sf): 0

Estimate Pitched or Curved Area Available for Solar (sf): 2,800

Sloped roofs are S-W & S-E facing.

**CENTENNIAL OUTDOOR POOL**

**PARKS & RECREATION**

3100 S 5600 W, West Valley City



Aerial View (potential solar areas shaded blue)



North-east view (top); South-west view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 203,360	Annual Natural Gas Usage for Bldg (DTH): 2,861
Annual Electrical Cost: \$ 14,344	Annual Natural Gas Usage for HW (DTH): 2,432
Peak Power Usage (kW): N/A	Annual Natural Gas Cost for HW: \$ 20,395
PV Array (kW): 20.9	Potential SHW Array: 70 Panels
PV Annual Production (kWh): 28,285	Potential SHW Annual Production (DTH): 979
Potential PV vs. Usage: 14%	Production vs. Usage: 40%
PV System Cost: \$ 208,592	SHW System Cost: \$ 58,714
Annual Energy Savings: \$ 3,872	Annual Energy Cost Savings: \$ 9,655
CO2 Reduction: 13 TONS	CO2 Reduction: 59 TONS

**NOTES:**

Estimated Total Roof Area (sf): 6,500

Estimated Flat Roof Area available for Solar (sf): 4,400

Estimate Pitched or Curved Area Available for Solar (sf): 0

Wall-mount or canopy systems should also be considered but are not part of this study.

**CRESTWOOD OUTDOOR POOL**

**PARKS & RECREATION**

1700 E. Siesta Drive, Sandy



Aerial View (potential solar areas shaded blue)



South view (top); North view (bottom)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 13,765	Annual Natural Gas Usage for Bldg (DTH): 1,166
Annual Electrical Cost: \$ 1,041	Annual Natural Gas Usage for HW (DTH): 991
Peak Power Usage (kW): Not available	Annual Natural Gas Cost for HW: \$ 8,472
PV Array (kW): 19.4	Potential SHW Array: 66 Panels
PV Annual Production (kWh): 26,357	Potential SHW Annual Production (DTH): 912
Potential PV vs. Usage: 191 %	Production vs. Usage: 92 %
PV System Cost: \$ 194,370	SHW System Cost: \$ 54,710
Annual Energy Savings: \$ 3,607	Annual Energy Cost Savings: \$ 9,170
CO2 Reduction: 12 TONS	CO2 Reduction: 55 TONS

**NOTES:**

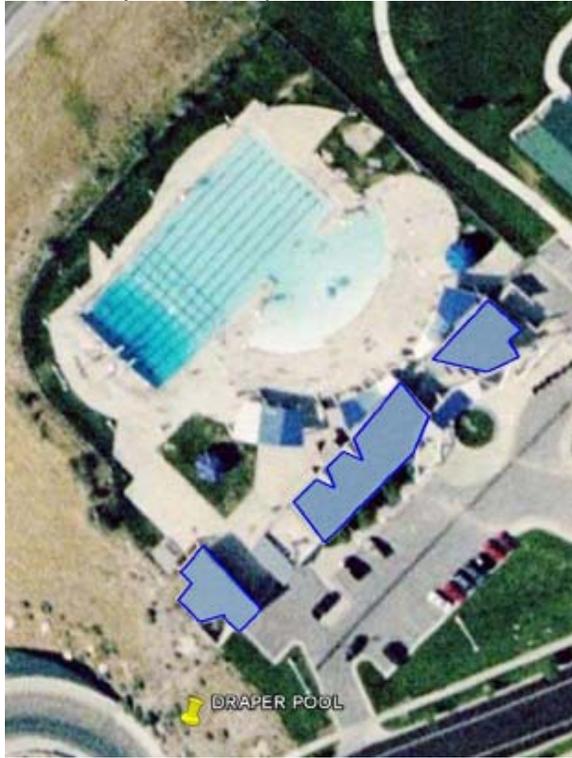
Estimated Total Roof Area (sf): 4,848

Estimated Flat Roof Area available for Solar (sf): 4,100

Estimate Pitched or Curved Area Available for Solar (sf): 0

Roof may have some tree shading late afternoon – particularly in winter months; facility hidden from view of local residences; facility in need of upgrade

657 E. Vestry Road, Draper



Aerial View (potential solar areas shaded blue)



East view (top); North view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 118,560	Annual Natural Gas Usage for Bldg (DTH): 5,943
Annual Electrical Cost: \$ 9,427	Annual Natural Gas Usage for HW (DTH): 5,052
Peak Power Usage (kW): 110	Annual Natural Gas Cost for HW: \$ 41,011
PV Array (kW): 21	Potential SHW Array: 72 Panels
PV Annual Production (kWh): 28,928	Potential SHW Annual Production (DTH): 1,001
Potential PV vs. Usage: 24.4 %	Production vs. Usage: 20 %
PV System Cost: \$ 213,333	SHW System Cost: \$ 60,048
Annual Energy Savings: \$ 3,960	Annual Energy Cost Savings: \$ 9,559
CO2 Reduction: 13 TONS	CO2 Reduction: 60 TONS

**NOTES:**

Estimated Total Roof Area (sf): 6,300

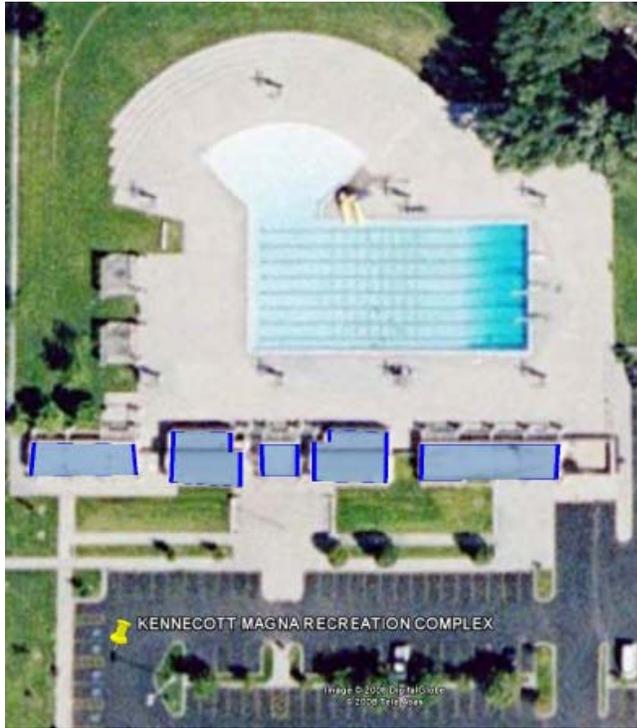
Estimated Flat Roof Area available for Solar (sf): 4,500

Estimate Pitched or Curved Area Available for Solar (sf): 0

Roof is visible to local residences; outdoor canopys slope toward the north; other opportunities for ground-mount and/or canopy systems exist on site but not included in this study.

# KENNECOTT-MAGNA OUTDOOR POOL

3250 S 8400 W, Magna



Aerial View (potential solar areas shaded blue)



South-east view (top); North-east view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): Not available	Annual Natural Gas Usage for Bldg (DTH): Not avail.
Annual Electrical Cost: \$ Not available	Annual Natural Gas Usage for HW (DTH): Not avail.
Peak Power Usage (kW): Not available	Annual Natural Gas Cost for HW: \$ Not available
PV Array (kW): 27	Potential SHW Array: 74 Panels
PV Annual Production (kWh): 36,996	Potential SHW Annual Production (DTH): 1,029
Potential PV vs. Usage: % Not available	Production vs. Usage: % Not available
PV System Cost: \$ 272,830	SHW System Cost: \$ 61,716
Annual Energy Savings: \$ 5,064	Annual Energy Cost Savings: \$ Not available
CO2 Reduction: 17 TONS	CO2 Reduction: 62 TONS

### NOTES:

Estimated Total Roof Area (sf): 5,850

Estimated Flat Roof Area available for Solar (sf): 4,000

Estimate Pitched or Curved Area Available for Solar (sf): 1,800

Utility information not available at time of study; opportunity exists for ground-mount / canopy solar installations.

12765 S. 1125 W., Riverton



Aerial View (potential solar areas shaded blue)



V

West view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): Not available	Annual Natural Gas Usage for Bldg (DTH): 21
Annual Electrical Cost: \$ Not available	Annual Natural Gas Usage for HW (DTH): 18
Peak Power Usage (kW): Not available	Annual Natural Gas Cost for HW: \$ Not available
PV Array (kW): 2.3	Potential SHW Array: 2 Panels
PV Annual Production (kWh): 3,103	Potential SHW Annual Production (DTH): 28
Potential PV vs. Usage: % Not available	Production vs. Usage: 156 %
PV System Cost: \$ 27,456	SHW System Cost: \$ 1,668
Annual Energy Savings: \$ 425	Annual Energy Cost Savings: \$ Not available
CO2 Reduction: 1.4 TONS	CO2 Reduction: 2 TONS

**NOTES:**

Estimated Total Roof Area (sf): 2,800

Estimated Flat Roof Area available for Solar (sf): 0

Estimate Pitched or Curved Area Available for Solar (sf): 500

Roof adjacent to maintenance building faces south-west; potential for ground-mounted / canopy installation of solar panels.

4915 S 2700 W, Taylorsville



Aerial View (potential solar areas shaded blue)

North-west view (top); South-west view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 204,720	Annual Natural Gas Usage for Bldg (DTH): 4,068
Annual Electrical Cost: \$ 15,836	Annual Natural Gas Usage for HW (DTH): 3,458
Peak Power Usage (kW): 126	Annual Natural Gas Cost for HW: \$ 30,145
PV Array (kW): 23	Potential SHW Array: 55 Panels
PV Annual Production (kWh): 31,177	Potential SHW Annual Production (DTH): 767
Potential PV vs. Usage: 15.2 %	Production vs. Usage: 22 %
PV System Cost: \$ 229,920	SHW System Cost: \$ 46,037
Annual Energy Savings: \$ 4,268	Annual Energy Cost Savings: \$ 7,870
CO2 Reduction: 14.4 TONS	CO2 Reduction: 46 TONS

**NOTES:**

Estimated Total Roof Area (sf): 7,000

Estimated Flat Roof Area available for Solar (sf): 2,700

Estimate Pitched or Curved Area Available for Solar (sf): 2,200

Opportunities for ground-mount / canopy solar installations may also exist.

# WEST JORDAN OUTDOOR POOL

# PARKS & RECREATION

8125 S 2200 W, West Jordan



Aerial View (potential solar areas shaded blue)



North-west view (top); South view (bottom)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 83,277	Annual Natural Gas Usage for Bldg (DTH): 2,077
Annual Electrical Cost: \$ 6,535	Annual Natural Gas Usage for HW (DTH): 1,765
Peak Power Usage (kW): 62	Annual Natural Gas Cost for HW: \$ 15,090
PV Array (kW): 20	Potential SHW Array: 69 Panels
PV Annual Production (kWh): 27,642	Potential SHW Annual Production (DTH): 956
Potential PV vs. Usage: 33 %	Production vs. Usage: 54 %
PV System Cost: \$ 203,852	SHW System Cost: \$ 57,379
Annual Energy Savings: \$ 3,784	Annual Energy Cost Savings: \$ 9,617
CO2 Reduction: 13 TONS	CO2 Reduction: 58 TONS

### NOTES:

Estimated Total Roof Area (sf): 4,300

Estimated Flat Roof Area available for Solar (sf): 4,300

Estimated Pitched or Curved Area Available for Solar (sf): 0

240-ft long wall faces S-E and could provide additional vertical mounting surface for solar assembly; opportunities for solar ground-mount / canopy installations also exist.

# ACCORD ICE RECREATION CENTER

# PARKS & RECREATION

5353 W 3100 S, Salt Lake City



Aerial View (potential solar areas shaded blue)



South-east view (top); North-east view (bottom)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 1,288,000	Annual Natural Gas Usage for Bldg (DTH): 6,554
Annual Electrical Cost: \$ 83,869	Annual Natural Gas Usage for HW (DTH): 1,966
Peak Power Usage (kW): 640	Annual Natural Gas Cost for HW: \$ 16,516
PV Array (kW): 158.8	Potential SHW Array: 243 Panels
PV Annual Production (kWh): 215,353	Potential SHW Annual Production (DTH): 1,966
Potential PV vs. Usage: 16.7%	Production vs. Usage: 100 %
PV System Cost: \$ 1,318,163	SHW System Cost: \$ 403,071
Annual Energy Savings: \$ 29,478	Annual Energy Cost Savings: \$ 19,430
CO2 Reduction: 99 TONS	CO2 Reduction: 119 TONS

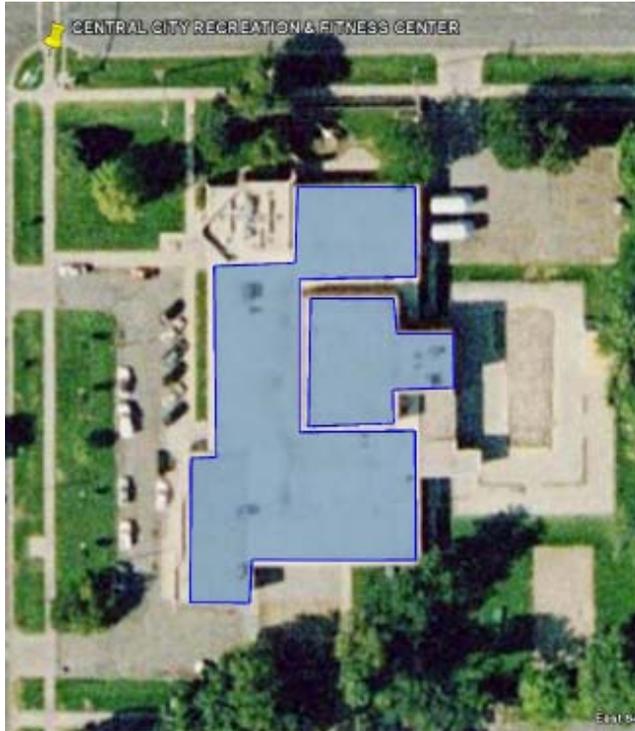
### NOTES:

- Estimated Total Roof Area (sf): 44,400
- Estimated Flat Roof Area available for Solar (sf): 33,500
- Estimate Pitched or Curved Area Available for Solar (sf): 0
- Coordinate solar installations w/ HVAC redesign

# CENTRAL CITY RECREATION CENTER

# PARKS & RECREATION

615 S. 300 E., Salt Lake City



Aerial View (potential solar areas shaded blue)



West view (top); North-east view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 573,240	Annual Natural Gas Usage for Bldg (DTH): 172
Annual Electrical Cost: \$ 42,139	Annual Natural Gas Usage for HW (DTH): 52
Peak Power Usage (kW): 320	Annual Natural Gas Cost for HW: \$ 562
PV Array (kW): 104.3	Potential SHW Array: 6 Panels
PV Annual Production (kWh): 141,426	Potential SHW Annual Production (DTH): 52
Potential PV vs. Usage: 24.7 %	Production vs. Usage: 100 %
PV System Cost: \$ 886,519	SHW System Cost: \$ 10,578
Annual Energy Savings: \$ 19,359	Annual Energy Cost Savings: \$ 661
CO2 Reduction: 65 TONS	CO2 Reduction: 3 TONS

### NOTES:

Estimated Total Roof Area (sf): 30,000

Estimated Flat Roof Area available for Solar (sf): 22,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

8446 S. Harrison (300 W), Midvale



Aerial View (potential solar areas shaded blue)



South-east view (top); East view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 512,480	Annual Natural Gas Usage for Bldg (DTH): 1,410
Annual Electrical Cost: \$ 35,027	Annual Natural Gas Usage for HW (DTH): 423
Peak Power Usage (kW): 268	Annual Natural Gas Cost for HW: \$ 4,133
PV Array (kW): 136	Potential SHW Array: 52 Panels
PV Annual Production (kWh): 183,854	Potential SHW Annual Production (DTH): 423
Potential PV vs. Usage: 35.9 %	Production vs. Usage: 100 %
PV System Cost: \$ 1,152,474	SHW System Cost: \$ 86,715
Annual Energy Savings: \$ 25,167	Annual Energy Cost Savings: \$ 4,862
CO2 Reduction: 85 TONS	CO2 Reduction: 26 TONS

**NOTES:**

Estimated Total Roof Area (sf): 30,000

Estimated Flat Roof Area available for Solar (sf): 28,600

Estimate Pitched or Curved Area Available for Solar (sf): 0

Construction underway on west side; some shading from adjacent trees on lower roofs

5201 S Murray Park Ln, Murray



Aerial View (potential solar areas shaded blue)



Partial west view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,416,000	Annual Natural Gas Usage for Bldg (DTH): 5,024
Annual Electrical Cost: \$ 85,201	Annual Natural Gas Usage for HW (DTH): 1,507
Peak Power Usage (kW): Not available	Annual Natural Gas Cost for HW: \$ 13,182
PV Array (kW): 101	Potential SHW Array: 186 Panels
PV Annual Production (kWh): 137,181	Potential SHW Annual Production (DTH): 1,507
Potential PV vs. Usage: 9.7 %	Production vs. Usage: 100 %
PV System Cost: \$ 859,913	SHW System Cost: \$ 308,976
Annual Energy Savings: \$ 18,778	Annual Energy Cost Savings: \$ 15,508
CO2 Reduction: 63 TONS	CO2 Reduction: 91 TONS

**NOTES:**

Estimated Total Roof Area (sf): 50,500

Estimated Flat Roof Area available for Solar (sf): 3,000

Estimate Pitched or Curved Area Available for Solar (sf): 18,725

Roof-mounting of solar panels on curved standing seam metal roof subject to structural verification

# KEARNS RECREATION CENTER

# PARKS & RECREATION

5670 S. 4800 W., Kearns



Aerial View (potential solar areas shaded blue)

East view (top); South view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 173,760	Annual Natural Gas Usage for Bldg (DTH): 711
Annual Electrical Cost: \$ 12,086	Annual Natural Gas Usage for HW (DTH): 213
Peak Power Usage (kW): 96	Annual Natural Gas Cost for HW: \$ 2009
PV Array (kW): 66	Potential SHW Array: 26 Panels
PV Annual Production (kWh): 89,998	Potential SHW Annual Production (DTH): 213
Potential PV vs. Usage: 52%	Production vs. Usage: 100 %
PV System Cost: \$ 597,333	SHW System Cost: \$ 43,727
Annual Energy Savings: \$ 12,319	Annual Energy Cost Savings: \$ 2,363
CO2 Reduction: 41 TONS	CO2 Reduction: 13 TONS

### NOTES:

- Estimated Total Roof Area (sf): 16,000
- Estimated Flat Roof Area available for Solar (sf): 14,000
- Estimate Pitched or Curved Area Available for Solar (sf): 0
- Older building; subject to future renovation?

# MAGNA RECREATION CENTER

# PARKS & RECREATION

3270 S. 8400 W., Magna



Aerial View (potential solar areas shaded blue)



East view (top); South-east view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 132,000	Annual Natural Gas Usage for Bldg (DTH): 2,969
Annual Electrical Cost: \$ 9,085	Annual Natural Gas Usage for HW (DTH): 890.7
Peak Power Usage (kW): 92	Annual Natural Gas Cost for HW: \$ 7,943
PV Array (kW): 126.6	Potential SHW Array: 110 Panels
PV Annual Production (kWh): 171,639	Potential SHW Annual Production (DTH): 891
Potential PV vs. Usage: 130 %	Production vs. Usage: 100 %
PV System Cost: \$ 1,075,911	SHW System Cost: \$ 182,594
Annual Energy Savings: \$ 23,495	Annual Energy Cost Savings: \$ 9,345
CO2 Reduction: 79 TONS	CO2 Reduction: 54 TONS

### NOTES:

- Estimated Total Roof Area (sf): 42,000
- Estimated Flat Roof Area available for Solar (sf): 26,700
- Estimate Pitched or Curved Area Available for Solar (sf): 0
- Coordinate w/ Kennecott-Magna outdoor pool

## REDWOOD COMMUNITY CENTER

## PARKS & RECREATION

3060 S. Lester St. (1585 W.), West Valley City



East view (top); South-west view (bottom)

### SOLAR ELECTRIC

### SOLAR THERMAL

Annual Electrical Usage (kWh): 747,919	Annual Natural Gas Usage for Bldg (DTH): 3,501
Annual Electrical Cost: \$ 50,635	Annual Natural Gas Usage for HW (DTH): 1,050
Peak Power Usage (kW): 396	Annual Natural Gas Cost for HW: \$ 9,348
PV Array (kW): 107.6	Potential SHW Array: 130 Panels
PV Annual Production (kWh): 145,926	Potential SHW Annual Production (DTH): 1,050
Potential PV vs. Usage: 19.5 %	Production vs. Usage: 100 %
PV System Cost: \$ 914,726	SHW System Cost: \$ 215,312
Annual Energy Savings: \$ 19,975	Annual Energy Cost Savings: \$ 10,997
CO2 Reduction: 67 TONS	CO2 Reduction: 63 TONS

### NOTES:

Estimated Total Roof Area (sf): 32,800

Estimated Flat Roof Area available for Solar (sf): 22,700

Estimated Pitched or Curved Area Available for Solar (sf): 0

Confirm if small outdoor pool is on same meters as recreation center

4948 S. 2700 W., Taylorsville



Aerial View (potential solar areas shaded blue)



East view (top); South view (bottom)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,022,160	Annual Natural Gas Usage for Bldg (DTH): 4,491
Annual Electrical Cost: \$ 68,338	Annual Natural Gas Usage for HW (DTH): 1,347
Peak Power Usage (kW): 472	Annual Natural Gas Cost for HW: \$ 10,421
PV Array (kW): 348	Potential SHW Array: 166 Panels
PV Annual Production (kWh): 471,838	Potential SHW Annual Production (DTH): 1,347
Potential PV vs. Usage: 46.2 %	Production vs. Usage: 100 %
PV System Cost: \$ 2,957,688	SHW System Cost: \$ 276,197
Annual Energy Savings: \$ 64,587	Annual Energy Cost Savings: \$ 12,260
CO2 Reduction: 217 TONS	CO2 Reduction: 81 TONS

**NOTES:**

Estimated Total Roof Area (sf): 52,400

Estimated Flat Roof Area available for Solar (sf): 12,500

Estimated Pitched or Curved Area Available for Solar (sf): 29,500

Large, unobstructed standing seam metal curved roof could handle large amounts of panels if structure is adequate.

10670 S. 1000 E., Draper



DIMPLE DELL FITNESS AND RECREATION CENTER



Aerial View (potential solar areas shaded blue)

East view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,642,880	Annual Natural Gas Usage for Bldg (DTH): 11,725
Annual Electrical Cost: \$ 95,913	Annual Natural Gas Usage for HW (DTH): 8,794
Peak Power Usage (kW): 610	Annual Natural Gas Cost for HW: \$ 74,159
PV Array (kW): 145	Potential SHW Array: 429 Panels
PV Annual Production (kWh): 197,804	Potential SHW Annual Production (DTH): 3,475
Potential PV vs. Usage: 12 %	Production vs. Usage: 40 %
PV System Cost: \$ 1,239,922	SHW System Cost: \$ 712,355
Annual Energy Savings: \$ 27,076	Annual Energy Cost Savings: \$ 34,476
CO2 Reduction: 91 TONS	CO2 Reduction: 210 TONS

**NOTES:**

Estimated Total Roof Area (sf): 62,000

Estimated Flat Roof Area available for Solar (sf): 25,900

Estimate Pitched or Curved Area Available for Solar (sf): 5,000

Available area computed for flat roof; possible additional installation on curved roofs but very visible; architectural considerations; some high walls may be possible; ground mount also at south gated area.

1044 E. Sugarmont (2225 S), Salt Lake City



Aerial View (potential solar areas shaded blue)



North-west view (top); South view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,046,320	Annual Natural Gas Usage for Bldg (DTH): 11,528
Annual Electrical Cost: \$ 61,794	Annual Natural Gas Usage for HW (DTH): 8,646
Peak Power Usage (kW): 390	Annual Natural Gas Cost for HW: \$ 73,369
PV Array (kW): 112.8	Potential SHW Array: 349 Panels
PV Annual Production (kWh): 152,997	Potential SHW Annual Production (DTH): 2,825
Potential PV vs. Usage: 15 %	Production vs. Usage: 33 %
PV System Cost: \$ 959,052	SHW System Cost: \$ 579,046
Annual Energy Savings: \$ 20,943	Annual Energy Cost Savings: \$ 28,199
CO2 Reduction: 70 TONS	CO2 Reduction: 170 TONS

**NOTES:**

Estimated Total Roof Area (sf): 36,000

Estimated Flat Roof Area available for Solar (sf): 23,800

Estimate Pitched or Curved Area Available for Solar (sf): 0

8015 S. 2200 W., West Jordan



Aerial View (potential solar areas shaded blue)

South view (top); North-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 1,538,080	Annual Natural Gas Usage for Bldg (DTH): 9,956
Annual Electrical Cost: \$ 90,475	Annual Natural Gas Usage for HW (DTH): 7,467
Peak Power Usage (kW): 600	Annual Natural Gas Cost for HW: \$ 62,144
PV Array (kW): 146	Potential SHW Array: 454 Panels
PV Annual Production (kWh): 199,281	Potential SHW Annual Production (DTH): 3,679
Potential PV vs. Usage: 13 %	Production vs. Usage: 49 %
PV System Cost: \$ 1,249,186	SHW System Cost: \$ 754,220
Annual Energy Savings: \$ 27,279	Annual Energy Cost Savings: \$ 36,023
CO2 Reduction: 92 TONS	CO2 Reduction: 222 TONS

**NOTES:**

Estimated Total Roof Area (sf): 46,000

Estimated Flat Roof Area available for Solar (sf): 31,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

1661 E. Murray-Holladay Road, Salt Lake City



Roof Plan / Shading Diagram

South-west view (top); North-west view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 843,680	Annual Natural Gas Usage for Bldg (DTH): 12,201
Annual Electrical Cost: \$ 47,720	Annual Natural Gas Usage for HW (DTH): 9,151
Peak Power Usage (kW): 332	Annual Natural Gas Cost for HW: \$ 74,353
PV Array (kW): 198	Potential SHW Array: 614 Panels
PV Annual Production (kWh): 269,352	Potential SHW Annual Production (DTH): 4,973
Potential PV vs. Usage: 32 %	Production vs. Usage: 81 %
PV System Cost: \$ 1,688,415	SHW System Cost: \$ 1,019,413
Annual Energy Savings: \$ 36,870	Annual Energy Cost Savings: \$ 47,535
CO2 Reduction: 124 TONS	CO2 Reduction: 300 TONS

**NOTES:**

Estimated Total Roof Area (sf): 54,438

Estimated Flat Roof Area available for Solar (sf): 41,900

Estimate Pitched or Curved Area Available for Solar (sf): 0

Roof areas include new fitness center currently under construction; array placement subject to further structural analysis.

10300 S. Redwood Road, South Jordan



Aerial View (potential solar areas shaded blue)



North-east view (top); South-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 636,560	Annual Natural Gas Usage for Bldg (DTH): 5,543
Annual Electrical Cost: \$ 40,097	Annual Natural Gas Usage for HW (DTH): 4,157
Peak Power Usage (kW): 284	Annual Natural Gas Cost for HW: \$ 36,179
PV Array (kW): 113	Potential SHW Array: 352 Panels
PV Annual Production (kWh): 154,283	Potential SHW Annual Production (DTH): 2,848
Potential PV vs. Usage: 24 %	Production vs. Usage: 69 %
PV System Cost: \$ 967,111	SHW System Cost: \$ 583,912
Annual Energy Savings: \$ 21,119	Annual Energy Cost Savings: \$ 29,163
CO2 Reduction: 71 TONS	CO2 Reduction: 172 TONS

**NOTES:**

Estimated Total Roof Area (sf): 29,350

Estimated Flat Roof Area available for Solar (sf): 24,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

1300 W. 300 N., Salt Lake City



Aerial View (potential solar areas shaded blue

North-east view (top); South-west view (bott)

See also, pictures of Northwest Senior Center

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 623,441	Annual Natural Gas Usage for Bldg (DTH): 4,680
Annual Electrical Cost: \$ 39,903	Annual Natural Gas Usage for HW (DTH): 3,510
Peak Power Usage (kW): 304	Annual Natural Gas Cost for HW: \$ 32,252
PV Array (kW): 161	Potential SHW Array: 433 Panels
PV Annual Production (kWh): 218,567	Potential SHW Annual Production (DTH): 3,510
Potential PV vs. Usage: 35%	Production vs. Usage: 100 %
PV System Cost: \$ 1,370,074	SHW System Cost: \$ 719,550
Annual Energy Savings: \$ 29,918	Annual Energy Cost Savings: \$ 37,944
CO2 Reduction: 101 TONS	CO2 Reduction: 212 TONS

**NOTES:**

Estimated Total Roof Area (sf): 41,000

Estimated Flat Roof Area available for Solar (sf): 34,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

Coordinate with Northwest Senior Center; verify new construction

**ANIMAL SHELTER**

**PUBLIC WORKS**

511 W. 3900 S., Salt Lake City



Aerial View (potential solar areas shaded blue)



North view (top); South-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 378,320	Annual Natural Gas Usage for Bldg (DTH): 3,156
Annual Electrical Cost: \$ 23,618	Annual Natural Gas Usage for HW (DTH): 1,578
Peak Power Usage (kW): 154	Annual Natural Gas Cost for HW: \$ 14,131
PV Array (kW): 83	Potential SHW Array: 195 Panels
PV Annual Production (kWh): 113,140	Potential SHW Annual Production (DTH): 1,578
Potential PV vs. Usage: 30%	Production vs. Usage: 100 %
PV System Cost: \$ 750,933	SHW System Cost: \$ 323,490
Annual Energy Savings: \$ 15,487	Annual Energy Cost Savings: \$ 16,624
CO2 Reduction: 52 TONS	CO2 Reduction: 95 TONS

**NOTES:**

Estimated Total Roof Area (sf): 21,100  
 Estimated Flat Roof Area available for Solar (sf): 17,600  
 Estimate Pitched or Curved Area Available for Solar (sf): 0  
 24-hr/day facility

**EMERGENCY OPERATIONS CENTER**

**PUBLIC WORKS**

3380 S 900 W, West Valley City



Aerial View (potential solar areas shaded blue)



South-east view (top); North-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): not available	Annual Natural Gas Usage for Bldg (DTH): not avail.
Annual Electrical Cost: \$ not available	Annual Natural Gas Usage for HW (DTH): not avail.
Peak Power Usage (kW): not available	Annual Natural Gas Cost for HW: \$ not available
PV Array (kW): 135	Potential SHW Array: 363 Panels
PV Annual Production (kWh): 182,708	Potential SHW Annual Production (DTH): 2,940
Potential PV vs. Usage: % not available	Production vs. Usage: % not available
PV System Cost: \$ 1,145,291	SHW System Cost: \$ 602,762
Annual Energy Savings: \$ 25,010	Annual Energy Cost Savings: \$ not available
CO2 Reduction: 84 TONS	CO2 Reduction: 177 TONS

**NOTES:**

Estimated Total Roof Area (sf): 19,000

Estimated Flat Roof Area available for Solar (sf): 16,400

Estimate Pitched or Curved Area Available for Solar (sf): 12,300

# ADULT DETENTION CENTER

SLC<sub>o</sub> SHERIFF

3415 S. 900 W, West Valley City



Aerial View (potential solar areas shaded blue)



South-west view (top); West view (bott)

## SOLAR ELECTRIC

## SOLAR THERMAL

Annual Electrical Usage (kWh): 19,646,400	Annual Natural Gas Usage for Bldg (DTH): 74,532
Annual Electrical Cost: \$ 1,025,772	Annual Natural Gas Usage for HW (DTH): 37,266
Peak Power Usage (kW): 5,752	Annual Natural Gas Cost for HW: \$ 315,558
PV Array (kW): 1,081	Potential SHW Array: 3,341 Panels
PV Annual Production (kWh): 1,465,685	Potential SHW Annual Production (DTH): 27,062
Potential PV vs. Usage: 7.5 %	Production vs. Usage: 73%
PV System Cost: \$ 7,566,222	SHW System Cost: \$ 5,547,731
Annual Energy Savings: \$ 200,629	Annual Energy Cost Savings: \$ 269,593
CO2 Reduction: 675 TONS	CO2 Reduction: 1,632 TONS

### NOTES:

Estimated Total Roof Area (sf): 456,000

Estimated Flat Roof Area available for Solar (sf): 228,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

24-hr/day facility; the usage data includes the Sheriff's Administration Building [to be confirmed] (see below)

3365 S. 900 W., West Valley City



Aerial View (potential solar areas shaded blue)



South-west view (top); North-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): Included in Adult Det.	Annual Natural Gas Usage for Bldg (DTH): 3,904
Annual Electrical Cost: \$ Included in Adult Det.	Annual Natural Gas Usage for HW (DTH): 976
Peak Power Usage (kW): Included in Adult Detention	Annual Natural Gas Cost for HW: \$ 8,880
PV Array (kW): 119	Potential SHW Array: 120 Panels
PV Annual Production (kWh): 160,71	Potential SHW Annual Production (DTH): 976
Potential PV vs. Usage: 1 %	Production vs. Usage: 100 %
PV System Cost: \$ 1,007,407	SHW System Cost: \$ 200,080
Annual Energy Savings: \$ 21,999	Annual Energy Cost Savings: \$ 10,447
CO2 Reduction: 74 TONS	CO2 Reduction: 59 TONS

**NOTES:**

Estimated Total Roof Area (sf): 40,300

Estimated Flat Roof Area available for Solar (sf): 25,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

## SHERIFF'S EVIDENCE & SPECIAL OPERATIONS

3510 S. 700 W., West Valley City



Aerial View (potential solar areas shaded blue)



South-east view (top); East view (bott)

### SOLAR ELECTRIC

### SOLAR THERMAL

Annual Electrical Usage (kWh): not available	Annual Natural Gas Usage for Bldg (DTH): 747
Annual Electrical Cost: \$ not available	Annual Natural Gas Usage for HW (DTH): 187
Peak Power Usage (kW): not available	Annual Natural Gas Cost for HW: \$ 1,960
PV Array (kW): 161	Potential SHW Array: 23 Panels
PV Annual Production (kWh): 218,567	Potential SHW Annual Production (DTH): 187
Potential PV vs. Usage: not available	Production vs. Usage: 100 %
PV System Cost: \$ 1,370,074	SHW System Cost: \$ 38,284
Annual Energy Savings: \$ 29,918	Annual Energy Cost Savings: \$ 2,306
CO2 Reduction: 101 TONS	CO2 Reduction: 11 TONS

### NOTES:

Estimated Total Roof Area (sf): 39,500

Estimated Flat Roof Area available for Solar (sf): 34,000

Estimate Pitched or Curved Area Available for Solar (sf): 0

**CHRISTMAS BOX HOUSE**

**YOUTH SERVICES**

3660 S West Temple, Salt Lake City



Aerial View (potential solar areas shaded blue)

South view (top); North-east view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): 722,481	Annual Natural Gas Usage for Bldg (DTH): 2,247
Annual Electrical Cost: \$ 42,298	Annual Natural Gas Usage for HW (DTH): 562
Peak Power Usage (kW): 264	Annual Natural Gas Cost for HW: \$ 5,318
PV Array (kW): 23	Potential SHW Array: 63 Panels
PV Annual Production (kWh): 31,210	Potential SHW Annual Production (DTH): 510
Potential PV vs. Usage: 4.3 %	Production vs. Usage: 91 %
PV System Cost: \$ 230,163	SHW System Cost: \$ 104,612
Annual Energy Savings: \$ 4,272	Annual Energy Cost Savings: \$ 5,683
CO2 Reduction: 14 TONS	CO2 Reduction: 31 TONS

**NOTES:**

Estimated Total Roof Area (sf): 20,400  
 Estimated Flat Roof Area available for Solar (sf): 3,100  
 Estimate Pitched or Curved Area Available for Solar (sf): 1,800  
 24-hr/day facility; See Division of Youth Services

177 W. Price Ave. (3610 S.), Salt Lake City



Aerial View (potential solar areas shaded blue)

North partial view (top); South partial view (bott)

**SOLAR ELECTRIC**

**SOLAR THERMAL**

Annual Electrical Usage (kWh): See Christmas Box House	Annual Natural Gas Usage for Bldg (DTH): See Christmas Box House
Annual Electrical Cost: \$ See Christmas Box House	Annual Natural Gas Usage for HW (DTH): See Christmas Box House
Peak Power Usage (kW): See Christmas Box House	Annual Natural Gas Cost for HW: See Christmas Box House
PV Array (kW): 101	Potential SHW Array: 70 Panels
PV Annual Production (kWh): 136,728	Potential SHW Annual Production (DTH): 567
Potential PV vs. Usage: 19 %	Production vs. Usage: 100 %
PV System Cost: \$ 857,072	SHW System Cost: \$ 116,235
Annual Energy Savings: \$ 18,716	Annual Energy Cost Savings:
CO2 Reduction: 63 TONS	CO2 Reduction: 34 TONS

**NOTES:**

Estimated Total Roof Area (sf): 38,500

Estimated Flat Roof Area available for Solar (sf): 18,900

Estimate Pitched or Curved Area Available for Solar (sf): 2,450

24-hr/day facility; utility information included with Christmas Box House





SLCo Solar Study Master Spreadsheet

AGENCY	FACILITY NAME	ADDRESS	Roof Area (est. s.f.)	Est. Available for Solar (FLAT) (1)	Est. Available for Solar (PITCHED or CURVED) (1)	FLAT ROOF (factor) (2a)	FLAT ROOF (sf/panel) (2b)	FLAT ROOF PV Panel Qty (2c)	CURVED or PITCHED ROOF (eff. factor) (3a)	CURVED or PITCHED ROOF (sf/panel) (3b)	CURVED or PITCHED panel qty calc (3c)	CURVED or PITCHED ROOF PV Panel Qty (3d)	WATTS per Panel (4a)	PV Array Size (kW) (4b)	Annual kWhrs produced (4c)	Peak Elec. Usage (kW) (5a)	Annual Elec. Usage (kWh) (5b)	Annual Elec. Cost (5c)	PV as % of Usage	PV Sys Cost/Watt (6a)	PV System Cost (6b)	Annual Energy Cost Savings (7)	Simple Pay-Back (YRS) (8)	CO2 Reduction (tons) (9)
AGING SERVICES	TENTH EAST SENIOR CENTER	237 S. 1000 E.	19,400	16,000	0	80.0%	35.1	365	38.0%	17	0.00	0	208	75.9	102,855	N/A	238,640	\$14,922	43%	\$9.00	\$682,667	\$14,079	48	47.37
AGING SERVICES	DRAPER CRESCENT SENIOR CENTER	12350 S. 800 E.	4,185	900	500	80.0%	35.1	21	38.0%	17	11.18	11	208	6.6	8,888	12	37,800	\$3,469	24%	\$10.00	\$65,547	\$1,217	54	4.09
AGING SERVICES	KEARNS SENIOR CENTER	4850 W. 4715 S.	12,300	5,100	2,800	80.0%	35.1	116	38.0%	17	62.59	62	208	37.1	50,272	130	98,386	\$11,051	51%	\$9.00	\$333,664	\$6,881	48	23.15
AGING SERVICES	MT. OLYMPUS SENIOR CENTER	1635 E. Murray-Holladay Road	22,180	3,400	2,000	80.0%	35.1	77	38.0%	17	44.71	44	208	25.3	34,267	158	242,680	\$18,729	14%	\$10.00	\$252,705	\$4,691	54	15.78
AGING SERVICES	NORTHWEST SENIOR CENTER	1300 W. 300 N.	7,200	7,200	0	80.0%	35.1	164	38.0%	17	0.00	0	208	34.1	46,285	304	623,441	\$39,903	7%	\$9.00	\$307,200	\$6,336	48	21.32
COMMUNITY SERVICES	CAPITOL THEATER	46 W. 200 South	25,000	13,900	0	80.0%	35.1	317	38.0%	17	0.00	0	208	65.9	89,355	1,006	1,415,759	\$118,694	6%	\$9.00	\$593,067	\$12,231	48	41.15
COMMUNITY SERVICES	CHILDREN'S MUSEUM	Gateway	6,500	3,000	0	80.0%	35.1	68	38.0%	17	0.00	0	208	14.2	19,285	N/A	N/A	N/A	#VALUE!	\$10.00	\$142,222	\$2,640	54	8.88
COMMUNITY SERVICES	ROSE WAGNER THEATER	138 W. 300 S.	40,500	26,500	0	80.0%	35.1	604	38.0%	17	0.00	0	208	125.6	170,354	1,030	1,413,600	\$101,332	12%	\$9.00	\$1,130,667	\$23,319	48	78.46
COMMUNITY SERVICES	SALT PALACE & SYMPHONY HALL	100 S. West Temple	960,000	703,000	0	80.0%	35.1	16,023	38.0%	17	0.00	0	208	3,332.7	4,519,196	7,021	16,978,200	\$1,277,094	27%	\$6.50	\$21,662,815	\$618,607	35	2,081.32
COMMUNITY SERVICES	SOUTH TOWNE EXPO CENTER	9575 S. State	261,500	256,000	0	80.0%	35.1	5,835	38.0%	17	0.00	0	208	1,213.6	1,645,682	3,034	6,628,800	\$423,103	25%	\$7.00	\$8,495,407	\$225,268	38	757.92
GOVERNMENT CENTER	SLCo GOVERNMENT CENTER	2001 South State	100,000	74,900	0	80.0%	35.1	1,707	38.0%	17	0.00	0	208	355.1	481,490	4,450	8,655,740	\$592,105	6%	\$8.50	\$3,018,193	\$65,909	46	221.75
HEALTH DEPARTMENT	ELLIS REYNOLDS SHIPP PUBLIC HEALTH	4535 S. 5600 W.	17,400	17,400	0	80.0%	35.1	397	38.0%	17	0.00	0	208	82.5	111,855	240	331,640	\$25,064	34%	\$9.00	\$742,400	\$15,311	48	51.52
HEALTH DEPARTMENT	ENVIRONMENTAL HEALTH	788 E. Woodoak Lane	21,600	5,200	1,800	80.0%	35.1	119	80.0%	17	84.71	84	208	42.1	57,120	N/A	312,480	\$19,950	18%	\$9.00	\$379,115	\$7,819	48	26.31
HEALTH DEPARTMENT	SOUTHEAST CLINIC	9340 S. 700 E.	11,000	650	0	80.0%	35.1	15	38.0%	17	0.00	0	208	3.1	4,178	88	109,920	\$9,733	4%	\$11.00	\$33,896	\$5,727	59	1.92
SLCo LIBRARY	BINGHAM CREEK LIBRARY	4834 W. 9000 S.	21,000	5,500	3,000	80.0%	35.1	125	38.0%	17	67.06	67	208	40.0	54,254	176	363,480	\$25,424	15%	\$9.00	\$360,091	\$7,426	48	24.99
SLCo LIBRARY	DRAPER LIBRARY	1136 East Pioneer Road	22,000	8,500	8,500	80.0%	35.1	194	38.0%	17	190.00	190	208	79.8	108,231	160	415,001	\$26,101	26%	\$9.00	\$718,347	\$14,815	48	49.85
SLCo LIBRARY	RIVERTON LIBRARY	12877 South 1830 West	13,900	0	2,800	80.0%	35.1	0	38.0%	17	62.59	62	208	12.9	17,487	176	383,560	\$25,404	5%	\$10.00	\$128,960	\$2,394	54	8.05
SLCo LIBRARY	SANDY LIBRARY	10100 S. Petunia Way	30,840	17,450	0	80.0%	35.1	398	38.0%	17	0.00	0	208	82.7	112,176	252	499,840	\$34,145	22%	\$9.00	\$744,533	\$15,355	48	51.66
SLCo LIBRARY	TAYLORSVILLE LIBRARY	4870 S. 2700 W.	13,000	4,200	800	80.0%	35.1	96	38.0%	17	17.88	17	208	23.4	31,794	114	201,446	\$15,205	16%	\$10.00	\$234,471	\$4,352	54	14.64
SLCo LIBRARY	WHITMORE LIBRARY	2197 Ft. Union Blvd.	26,690	3,600	3,000	80.0%	35.1	82	38.0%	17	67.06	67	208	31.0	42,040	726	1,456,480	\$88,704	3%	\$10.00	\$310,027	\$5,755	54	19.36
PARKS & RECREATION	MEADOWBROOK GOLF COURSE	4197 S. 1300 W.	15,868	0	2,400	80.0%	35.1	0	38.0%	17	53.65	53	208	11.0	14,949	184	254,080	\$20,601	6%	\$10.00	\$110,240	\$2,046	54	6.88
PARKS & RECREATION	MOUNTAIN VIEW GOLF COURSE	2400 W. 8660 S.	9,500	2,500	700	80.0%	35.1	57	38.0%	17	15.65	15	208	15.0	20,302	116	154,480	\$13,155	13%	\$10.00	\$149,719	\$2,779	54	9.35
PARKS & RECREATION	OLD MILL GOLF COURSE	6080 S. Wasatch	12,000	0	1,900	80.0%	35.1	0	38.0%	17	42.47	42	208	8.7	11,846	361	668,499	\$45,318	2%	\$10.00	\$87,360	\$1,622	54	5.46
PARKS & RECREATION	RIVERBEND GOLF COURSE	12765 S. 1100 W.	6,500	0	2,800	80.0%	35.1	0	38.0%	17	62.59	62	208	12.9	17,487	178	199,812	\$17,267	9%	\$10.00	\$128,960	\$2,394	54	8.05
PARKS & RECREATION	CENTENNIAL OUTDOOR POOL	3100 S 5600 W	6,500	4,400	0	80.0%	35.1	100	38.0%	17	0.00	0	208	20.9	28,285	N/A	203,360	\$14,344	14%	\$10.00	\$208,593	\$3,872	54	13.03
PARKS & RECREATION	CRESTWOOD OUTDOOR POOL	1700 E. Siesta Drive	4,848	4,100	0	80.0%	35.1	93	38.0%	17	0.00	0	208	19.4	26,357	error	13,765	\$1,041	191%	\$10.00	\$194,370	\$3,608	54	12.14
PARKS & RECREATION	DRAPER OUTDOOR POOL	657 E. Vestry Road	6,300	4,500	0	80.0%	35.1	103	38.0%	17	0.00	0	208	21.3	28,928	110	118,560	\$9,427	24%	\$10.00	\$213,333	\$3,960	54	13.32
PARKS & RECREATION	KENNECOTT-MAGNA OUTDOOR POOL	3250 S 8400 W	5,850	4,000	1,800	80.0%	35.1	91	38.0%	17	40.24	40	208	27.3	36,996				#DIV/0!	\$10.00	\$272,830	\$5,064	54	17.04
PARKS & RECREATION	SOUTH COUNTY OUTDOOR POOL	12765 S. 1125 W.	2,800	0	500	80.0%	35.1	0	38.0%	17	11.18	11	208	2.3	3,103				#DIV/0!	\$12.00	\$72,456	\$425	65	1.43
PARKS & RECREATION	TAYLORSVILLE OUTDOOR POOL	4915 S 2700 W	7,000	2,700	2,200	80.0%	35.1	62	38.0%	17	49.18	49	208	23.0	31,177	126	204,720	\$15,836	15%	\$10.00	\$229,920	\$4,268	54	14.36
PARKS & RECREATION	WEST JORDAN OUTDOOR POOL	8125 S 2200 W	4,300	4,300	0	80.0%	35.1	98	38.0%	17	0.00	0	208	20.4	27,642	62	83,277	\$6,535	33%	\$10.00	\$203,852	\$3,784	54	12.73
PARKS & RECREATION	ACCORD ICE RECREATION CENTER	5353 W 3100 S	44,400	33,500	0	80.0%	35.1	764	38.0%	17	0.00	0	208	158.8	215,353	640	1,288,000	\$83,869	17%	\$8.30	\$1,318,163	\$29,478	45	99.18
PARKS & RECREATION	CENTRAL CITY RECREATION CENTER	615 S. 300 E.	30,000	22,000	0	80.0%	35.1	501	38.0%	17	0.00	0	208	104.3	141,426	320	573,240	\$42,139	25%	\$8.50	\$886,519	\$19,359	46	65.13
PARKS & RECREATION	COPPERVIEW RECREATION CENTER	8446 S. Harrison (300 W)	30,000	28,600	0	80.0%	35.1	652	38.0%	17	0.00	0	208	135.6	183,854	268	512,480	\$35,027	36%	\$8.50	\$1,152,474	\$25,167	46	84.67
PARKS & RECREATION	COUNTY ICE RECREATION CENTER	5201 S Murray Park Ln	50,500	3,000	18,725	80.0%	35.1	68	38.0%	17	418.56	418	208	101.2	137,181	N/A	1,416,000	\$85,201	10%	\$8.50	\$859,913	\$18,778	46	63.18
PARKS & RECREATION	KEARNS RECREATION CENTER	5670 S. 4800 W.	16,000	14,000	0	80.0%	35.1	319	38.0%	17	0.00	0	208	66.4	89,998	96	173,760	\$12,086	52%	\$9.00	\$597,333	\$12,319	48	41.45
PARKS & RECREATION	MAGNA RECREATION CENTER	3270 S. 8400 W.	42,000	26,700	0	80.0%	35.1	609	38.0%	17	0.00	0	208	126.6	171,639	92	132,000	\$9,085	130%	\$8.50	\$1,075,911	\$23,495	46	79.05
PARKS & RECREATION	REDWOOD COMMUNITY CENTER	3060 S. Lester St. (1585 W.)	32,800	22,700	0	80.0%	35.1	517	38.0%	17	0.00	0	208	107.6	145,926	396	747,919	\$50,635	20%	\$8.50	\$914,726	\$19,975	46	67.21
PARKS & RECREATION	TAYLORSVILLE RECREATION CENTER	4948 S. 2700 W.	52,400	12,500	29,500	80.0%	35.1	285	80.0%	17	1,388.24	1,388	208	348.0	471,838	472	1,022,160	\$68,338	46%	\$8.50	\$2,957,688	\$64,587	46	217.31
PARKS & RECREATION	DIMPLE DELL REC CENTER / INDOOR POOL	10670 S. 1000 E.	62,000	25,900	5,000	80.0%	35.1	590	38.0%	17	111.76	111	208	145.9	197,804	610	1,642,880	\$95,913	12%	\$8.50	\$1,239,922	\$27,076	46	91.10
PARKS & RECREATION	FAIRMONT REC CENTER / INDOOR POOL	1044 E. Sugarmont (2225 S)	36,000	23,800	0	80.0%	35.1	542	38.0%	17	0.00	0	208	112.8	152,997	390	1,046,320	\$61,794	15%	\$8.50	\$959,052	\$20,943	46	70.46
PARKS & RECREATION	GENE FULMER REC CENTER / INDOOR POOL	8015 S. 2200 W.	46,000	31,000	0	80.0%	35.1	707	38.0%	17	0.00	0	208	147.0	199,282	600	1,538,080	\$90,475	13%	\$8.50	\$1,249,185	\$27,279	46	91.78
PARKS & RECREATION	HOLLADAY LIONS REC CENTER / INDOOR POOL	1661 E. Murray-Holladay Road	54,438	41,900	0	80.0%	35.1	955	38.0%	17	0.00	0	208	198.6	269,352	332	843,680	\$47,720	32%	\$8.50	\$1,688,415	\$36,870	46	124.05
PARKS & RECREATION	MARV JENSEN REC CENTER / INDOOR POOL	10300 S. Redwood Road	29,350	24,000	0	80.0%	35.1	547																



SLCo Solar Study Master Spreadsheet

AGENCY	FACILITY NAME	ADDRESS	Roof Area (est. s.f.)	Est. Available for Solar (FLAT) (1)	Est. Available for Solar (PITCHED or CURVED) (1)	FLAT ROOF (factor) (10)	FLAT ROOF (sf/panel) (11a)	FLAT ROOF SHW Panel Qty (11b)	CURVED or PITCHED ROOF (factor) (12a)	CURVED or PITCHED ROOF (sf/panel) (12b)	Panel Qty calc (12c)	CURVED or PITCHED ROOF SHW Panel Qty (12d)	MAX. TOTAL PANELS POSSIBLE (12e)	QTY of PANELS PROPOSED (12f)	ANNUAL THERMAL PRODUCTION EST.(DTH) (13)	ANNUAL NATURAL GAS USAGE FOR ALL USES (DTH) (14a)	ANNUAL NATURAL GAS COST FOR ALL USES (14b)	EST. OF PORTION USED FOR HOT WATER (15a)	EST. OF GAS USAGE FOR HOT WATER (DTH) (15b)	EST. OF GAS COST FOR HOT WATER (15c)	SWH Production as % of hot water usage (15d)	SHW SYS Cost/DTH (16)	THERMAL (SWH) SYSTEM COST (17)	CO2 REDUCTION (tons) (18)	ANNUAL ENERGY SAVINGS (19)	Simple Pay-Back (20)
AGING SERVICES	TENTH EAST SENIOR CENTER	237 S. 1000 E.	19,400	16,000	0	80.0%	54.6	234	28.0%	28	0.00	0	234	40	323	1,293	\$12,465	25%	323	\$3,116	100.0%	\$205.00	\$66,266	19.5	\$3,666	18
AGING SERVICES	DRAPER CRESCENT SENIOR CENTER	12350 S. 800 E.	4,185	900	500	80.0%	54.6	13	28.0%	28	5.00	5	18	6	47	187	\$2,007	25%	47	\$502	100.0%	\$205.00	\$9,584	2.8	\$590	16
AGING SERVICES	KEARNS SENIOR CENTER	4850 W. 4715 S.	12,300	5,100	2,800	80.0%	54.6	75	28.0%	28	28.00	28	103	6	47	187	\$2,007	25%	47	\$502	100.0%	\$205.00	\$9,584	2.8	\$590	16
AGING SERVICES	MT. OLYMPUS SENIOR CENTER	1635 E. Murray-Holladay Road	22,180	3,400	2,000	80.0%	54.6	50	28.0%	28	20.00	20	70	33	271	1,083	\$10,125	25%	271	\$2,531	100.0%	\$205.00	\$55,504	16.3	\$2,978	19
AGING SERVICES	NORTHWEST SENIOR CENTER	1300 W. 300 N.	7,200	7,200	0	80.0%	54.6	105	28.0%	28	0.00	0	105	105	851	4,680	\$43,003	25%	1,170	\$10,751	72.7%	\$205.00	\$174,353	51.3	\$9,194	19
COMMUNITY SERVICES	CAPITOL THEATER	46 W. 200 South	25,000	13,900	0	80.0%	54.6	204	28.0%	28	0.00	0	204	110	887	5,914	\$54,529	15%	887	\$8,179	100.0%	\$205.00	\$181,856	53.5	\$9,623	19
COMMUNITY SERVICES	CHILDREN'S MUSEUM	Gateway	6,500	3,000	0	80.0%	54.6	44	28.0%	28	0.00	0	44	44	356			15%	0	\$0		\$205.00	\$72,989	21.5		
COMMUNITY SERVICES	ROSE WAGNER THEATER	138 W. 300 S.	40,500	26,500	0	80.0%	54.6	388	28.0%	28	0.00	0	388	16	131	873	\$8,811	15%	131	\$1,322	100.0%	\$205.00	\$26,845	7.9	\$1,555	17
COMMUNITY SERVICES	SALT PALACE & SYMPHONY HALL	100 S. West Temple	960,000	703,000	0	80.0%	54.6	10300	28.0%	28	0.00	0	10,300	2,011	16,290	65,161	\$485,504	25%	16,290	\$121,376	100.0%	\$205.00	\$3,339,501	98.2	\$142,795	23
COMMUNITY SERVICES	SOUTH TOWNE EXPO CENTER	9575 S. State	261,500	256,000	0	80.0%	54.6	3751	28.0%	28	0.00	0	3,751	526	4,264	17,056	\$126,410	25%	4,264	\$31,603	100.0%	\$205.00	\$874,120	257.1	\$37,179	24
GOVERNMENT CENTER	SLCo GOVERNMENT CENTER	2001 South State	100,000	74,900	0	80.0%	54.6	1097	28.0%	28	0.00	0	1,097	396	3,208	12,830	\$116,081	25%	3,208	\$29,020	100.0%	\$205.00	\$657,538	193.4	\$34,141	19
HEALTH DEPARTMENT	ELLIS REYNOLDS SHIPP PUBLIC HEALTH C	4535 S. 5600 W.	17,400	17,400	0	80.0%	54.6	255	28.0%	28	0.00	0	255	52	419	1,395	\$12,834	30%	419	\$3,850	100.0%	\$205.00	\$85,793	25.2	\$4,530	19
HEALTH DEPARTMENT	ENVIRONMENTAL HEALTH	788 E. Woodoak Lane	21,600	5,200	1,800	80.0%	54.6	76	28.0%	28	18.00	18	94	45	361	1,203	\$11,556	30%	361	\$3,467	100.0%	\$205.00	\$73,985	21.8	\$4,079	18
HEALTH DEPARTMENT	SOUTHEAST CLINIC	9340 S. 700 E.	11,000	650	0	80.0%	54.6	10	28.0%	28	0.00	0	10	10	81	356	\$3,899	30%	107	\$1,170	75.8%	\$205.00	\$16,605	4.9	\$1,044	16
SLCo LIBRARY	BINGHAM CREEK LIBRARY	4834 W. 9000 S.	21,000	5,500	3,000	80.0%	54.6	81	28.0%	28	30.00	30	111	11	86	572	\$5,872	15%	86	\$881	100.0%	\$205.00	\$17,589	5.2	\$1,036	17
SLCo LIBRARY	DRAPER LIBRARY	1136 East Pioneer Road	22,000	8,500	8,500	80.0%	54.6	125	80.0%	28	242.86	242	367	28	226	1,504	\$15,205	15%	226	\$2,281	100.0%	\$205.00	\$46,248	13.6	\$2,683	17
SLCo LIBRARY	RIVERTON LIBRARY	12877 South 1830 West	13,900	0	2,800	80.0%	54.6	0	28.0%	28	28.00	28	28	12	96	641	\$6,856	15%	96	\$1,028	100.0%	\$205.00	\$19,711	5.8	\$1,210	16
SLCo LIBRARY	SANDY LIBRARY	10100 S. Petunia Way	30,840	17,450	0	80.0%	54.6	256	28.0%	28	0.00	0	256	9	73	488	\$5,055	15%	73	\$758	100.0%	\$205.00	\$15,006	4.4	\$892	17
SLCo LIBRARY	TAYLORSVILLE LIBRARY	4870 S. 2700 W.	13,000	4,200	800	80.0%	54.6	62	28.0%	28	8.00	8	70	4	35	236	\$2,295	15%	35	\$344	100.0%	\$205.00	\$7,257	2.1	\$405	18
SLCo LIBRARY	WHITMORE LIBRARY	2197 Ft. Union Blvd.	26,690	3,600	3,000	80.0%	54.6	53	28.0%	28	30.00	30	83	54	440	2,936	\$25,125	15%	440	\$3,769	100.0%	\$205.00	\$90,282	26.6	\$4,434	20
PARKS & RECREATION	MEADOWBROOK GOLF COURSE	4197 S. 1300 W.	15,868	0	2,400	80.0%	54.6	0	28.0%	28	24.00	24	24	24	194	1,091	\$10,338	20%	218	\$2,068	89.1%	\$205.00	\$39,852	11.7	\$2,167	18
PARKS & RECREATION	MOUNTAIN VIEW GOLF COURSE	2400 W. 8660 S.	9,500	2,500	700	80.0%	54.6	37	28.0%	28	7.00	7	44	21	167	837	\$8,306	20%	167	\$1,661	100.0%	\$205.00	\$34,317	10.1	\$1,954	18
PARKS & RECREATION	OLD MILL GOLF COURSE	6080 S. Wasatch	12,000	0	1,900	80.0%	54.6	0	28.0%	28	19.00	19	19	19	154	1,965	\$18,430	20%	393	\$3,686	39.2%	\$205.00	\$31,550	9.3	\$1,698	19
PARKS & RECREATION	RIVERBEND GOLF COURSE	12765 S. 1100 W.	6,500	0	2,800	80.0%	54.6	0	28.0%	28	28.00	28	28	28	227	3,872	\$33,705	20%	774	\$6,741	29.3%	\$205.00	\$46,494	13.7	\$2,323	20
PARKS & RECREATION	CENTENNIAL OUTDOOR POOL	3100 S 5600 W.	6,500	4,400	0	80.0%	50	70	28.0%	50	0.00	0	70	70	979	2,861	\$23,994	85%	2,432	\$20,395	40.2%	\$60.00	\$58,714	59.0	\$9,655	6
PARKS & RECREATION	CRESTWOOD OUTDOOR POOL	1700 E. Siesta Drive	4,848	4,100	0	80.0%	50	66	28.0%	50	0.00	0	66	66	912	1,166	\$9,967	85%	991	\$8,472	92.0%	\$60.00	\$54,710	55.0	\$9,170	6
PARKS & RECREATION	DRAPER OUTDOOR POOL	657 E. Vestry Road	6,300	4,500	0	80.0%	50	72	28.0%	50	0.00	0	72	72	1,001	5,943	\$48,248	85%	5,052	\$41,011	19.8%	\$60.00	\$60,048	60.3	\$9,559	6
PARKS & RECREATION	KENNECOTT-MAGNA OUTDOOR POOL	3250 S 8400 W.	5,850	4,000	1,800	80.0%	50	64	28.0%	50	10.08	10	74	74	1,029			85%	0	\$0		\$60.00	\$61,716	62.0		
PARKS & RECREATION	SOUTH COUNTY OUTDOOR POOL	12765 S. 1125 W.	2,800	0	500	80.0%	50	0	28.0%	50	2.80	2	2	2	28	21		85%	18		155.7%	\$60.00	\$1,668	1.7		
PARKS & RECREATION	TAYLORSVILLE OUTDOOR POOL	4915 S 2700 W.	7,000	2,700	2,200	80.0%	50	43	28.0%	50	12.32	12	55	55	767	4,068	\$35,465	85%	3,458	\$30,145	22.2%	\$60.00	\$46,037	46.3	\$7,870	6
PARKS & RECREATION	WEST JORDAN OUTDOOR POOL	8125 S 2200 W.	4,300	4,300	0	80.0%	50	69	28.0%	50	0.00	0	69	69	956	2,077	\$17,753	85%	1,765	\$15,090	54.2%	\$60.00	\$57,379	57.7	\$9,617	6
PARKS & RECREATION	ACCORD ICE RECREATION CENTER	5353 W 3100 S	44,400	33,500	0	80.0%	54.6	491	28.0%	28	0.00	0	491	243	1,966	6,554	\$55,052	30%	1,966	\$16,516	100.0%	\$205.00	\$403,071	118.6	\$19,430	21
PARKS & RECREATION	CENTRAL CITY RECREATION CENTER	615 S. 300 E.	30,000	22,000	0	80.0%	54.6	322	28.0%	28	0.00	0	322	6	52	172	\$1,873	30%	52	\$562	100.0%	\$205.00	\$10,578	3.1	\$661	16
PARKS & RECREATION	COPPERVIEW RECREATION CENTER	8446 S. Harrison (300 W)	30,000	28,600	0	80.0%	54.6	419	28.0%	28	0.00	0	419	52	423	1,410	\$13,775	30%	423	\$4,133	100.0%	\$205.00	\$86,715	25.5	\$4,862	18
PARKS & RECREATION	COUNTY ICE RECREATION CENTER	5201 S Murray Park Ln	50,500	3,000	18,725	80.0%	54.6	44	28.0%	28	187.25	187	231	186	1,507	5,024	\$43,940	30%	1,507	\$13,182	100.0%	\$205.00	\$308,976	90.9	\$15,508	20
PARKS & RECREATION	KEARNS RECREATION CENTER	5670 S. 4800 W.	16,000	14,000	0	80.0%	54.6	205	28.0%	28	0.00	0	205	26	213	711	\$6,696	30%	213	\$2,009	100.0%	\$205.00	\$43,727	12.9	\$2,363	19
PARKS & RECREATION	MAGNA RECREATION CENTER	3270 S. 8400 W.	42,000	26,700	0	80.0%	54.6	391	28.0%	28	0.00	0	391	110	891	2,969	\$26,477	30%	891	\$7,943	100.0%	\$205.00	\$182,594	53.7	\$9,345	20
PARKS & RECREATION	REDWOOD COMMUNITY CENTER	3060 S. Lester St. (1585 W.)	32,800	22,700	0	80.0%	54.6	333	28.0%	28	0.00	0	333	130	1,050	3,501	\$31,159	30%	1,050	\$9,348	100.0%	\$205.00	\$215,312	63.3	\$10,997	20
PARKS & RECREATION	TAYLORSVILLE RECREATION CENTER	4948 S. 2700 W.	52,400	12,500	29,500	80.0%	54.6	183	80.0%	28	842.86	842	1,025	166	1,347	4,491	\$34,736	30%	1,347	\$10,421	100.0%	\$205.00	\$276,197	81.2	\$12,260	23
PARKS & RECREATION	DIMPLE DELL REC CENTER / INDOOR POOL	10670 S. 1000 E.	62,000	25,900	5,000	80.0%	54.6	379	28.0%	28	50.00	50	429	429	3,475	11,725	\$98,879	75%	8,794	\$74,159	39.5%	\$205.00	\$712,355	209.5	\$34,476	21
PARKS & RECREATION	FAIRMONT REC CENTER / INDOOR POOL	1044 E. Sugarmont (2225 S)	36,000	23,800	0	80.0%	54.6	349	28.0%	28	0.00	0	349	349	2,825	11,528	\$97,825	75%	8,646	\$73,369	32.7%	\$205.00	\$579,046	170.3	\$28,199	21
PARKS & RECREATION	GENE FULMER REC CENTER / INDOOR POOL	8015 S. 2200 W.	46,000	31,000	0	80.0%	54.6	454	28.0%	28	0.00	0	454													

The following notes are referenced on the 'master' spreadsheets for Solar Electric in Appendix A and for Solar Thermal in Appendix B.

### SOLAR ELECTRIC CALCULATION - NOTES

- (1) Roof areas are based on visual observation and aerial area take-offs; see (2a) for reduced area factor.
- (2a) Factor assumes something less than 100% use of available area due to vents, skylights, rooftop equipment, etc.
- (2b) Area of flat roof required per panel takes into account the size of the panels, the tilt angle, the spacing of panels required to avoid shading from one panel row to the next, and required circulation for maintenance; the PV panel size is based on the Sharp Model ND-208U1 Multi-Purpose Module (64.6"-L x 39.1"-W x 1.8"-D).
- (2c) Flat Roof PV Panel Quantity:  $(\text{Flat Roof Area (1)} \times \text{Flat Roof Reduction Factor (2a)}) / \text{Flat Roof panel area (2b)}$
- (3a) Curved or Pitched Roof (efficiency factor): for pitched roofs, we use 38% of the total south-facing, unobstructed pitched roof to determine the amount of area available for solar panels. This is derived from a sampling of test cases of placing rectangular flat-plate panels on triangular-shaped roofs; for curved roofs we use 80% based on the assumption that panels can be directly applied to a standing-seam metal roof and allowing for some roof obstructions and service access.
- (3b) Curved or Pitched Roof (sf/panel): the figures related to PV in this study are based on a polycrystalline silicon PV module that measures approximately 17 s.f.; we assume that on pitched or curved surfaces, the module will be directly attached so the area/module is the same as the module size.
- (3c) Curved or Pitched Panel Quantity:  $(\text{available roof area (sf)} \times \text{efficiency factor (\%)}) / (\text{area (sf) per panel})$ .
- (3d) Item (3c) rounded down.
- (4a) Watts per panel: this study uses the Sharp Model ND-208U1 Multi-Purpose Module (208 W) as the basis for calculations.
- (4b) PV Array Size:  $((\text{Flat Roof PV panel Quantity} + \text{Curved or Pitched Roof PV panel Quantity}) \times (\text{Watts / Panel})) / 1000$ .
- (4c) Annual kWh produced:  $\text{PV Array Size (kW)} (4b) \times 1356 (\text{hrs/year})$ . The number 1356 is an average taken from the DOE Advisory Model run for various configurations using the Sharp module listed above.
- (5a) Peak Electricity Usage (kW): per utility records.
- (5b) Annual Electricity Usage (kWh): per utility records.

- (5c) Annual Electricity Cost: per utility records.
- (6a) PV System Cost / Watt: Estimated solar PV installed system cost factor based on the following:
 

System Size	Cost / Watt
< 2kW	\$12.00
2 to 5kW	\$11.00
10 to 30kW	\$10.00
>30kW	\$ 9.00
>100kW	\$ 8.50
>500kW	\$ 7.00
- (6b) PV System Total Cost: PV Array Size (kW)(4b) X 1000(W/kW) X PV System (\$/Watt) (6a).  
NOTE – Costs do not include re-roofing, structural modifications or building renovations required to accommodate the new system.
- (7) Annual Electrical cost savings:  
Ref.: Rocky Mountain Power (RMP) Electric Service Schedule No. 6  
Formula Basis: Annual Savings = Power Charge + Energy Charge (per RMP Schedule 6)  
Formula Used: Annual Savings (\$) =  
((Power Rating of Solar Array (kW) x \$12.31/kWh-mo) x 12 mos) + (Annual Production kWh x \$.0279463/kWh)  
Where: \$12.31 is the average monthly Power Charge based on ((\$13.91 x 5-mo) + (\$11.16 x 7-mo))/12-mo; and \$.0279463 is the average monthly Energy Charge based on ((\$.029271 x 5-mo)+(\$.027 x 7-mo))/12-mo  
Example: Solar Array with estimated Power Rating of 218.4 kW and annual production of 293,218 kWh  
Estimated annual savings = ((218.4 kW x \$12.31/kW x 12)) + (293,218 kWh x \$.0279463/kWh)  
= \$40,456
- (8) Simple Payback (yrs): System Cost (6b) / Annual Cost Savings (7). NOTE no cost offsets (credits, incentives, etc) are included in this calculation.
- (9) CO2 Reduction (tons): Based on 0.921104 lbs CO2 per kWhr (source: climatetrust.org)

**SOLAR THERMAL CALCULATIONS - NOTES**

- (10) Flat Roof (factor): see (2a) above
- (11a) Flat Roof Area per Panel (sf): Based on panel size, tilt angle, etc. Based on panel listed in note (12b) below.
- (11b) Flat roof SHW panel quantity (formula): Ref. Footnotes ((1)\*(10)) / (11a)
- (12a) See (3a) above. The difference in factors is related to the larger size of the solar hot water panels.
- (12b) Curved or Pitched Roof (sf/panel): 28 sf / panel is based on the Viessmann Vitosol 100 Flat Plat Solar Collector (42-in x 94-in) used for domestic hot water; 50 sf / panel is based on the Heliocol HC-50 solar collector (48-in x 102-in) used for outdoor pool water heating.

- (12c) Panel Quantity Calculation – Curved or Pitched roof quantity: See footnotes above  
Quantity =-  $((1) \times (12a))/(12b)$ .
- (12d) Panel Quantity Calculation - Curved or Pitched roof quantity of solar water heating panels The calculated number in (12c) rounded down.
- (12e) Maximum total SHW panels possible: flat roof panel quantity + curved or pitched roof panel quantity (11b)+(12d).
- (12f) Quantity of panels proposed: this is automatically the same number as (12e) OR manually adjusted down such that the amount of SHW energy produced is approximately equal to the amount of hot water energy consumed (see (15d) below).
- (13) Annual thermal production estimate (DTH): Quantity of panels proposed (12F) x 8.1 DTH/panel for domestic hot water or x13.9 DTH/panel for outdoor pool hot water. 8.1DTH is the estimated annual yield for a Viessmann Vitosol VT-100 flat plate solar collector; 13.9 DTH is the estimated annual yield for a Heliocol HC-50 unglazed collector.
- (14a) Annual Natural Gas Usage for ALL uses (DTH): figures taken from utility records for the entire facility provided by Salt Lake County.
- (14b) Annual Natural Gas Cost for ALL uses: same as (14a).
- (15a) An estimate of the portion of total natural gas usage (14a and b above) that is used for heating water. This is an estimated guess (%). A more precise percentage would require a close examination of the mechanical and plumbing systems of the building which is beyond the scope of this study. This factor directly relates the solar hot water production possibilities to the hot water consumption requirements of the building.
- (15b) Estimate of Natural Gas usage for hot water only (DTH): Footnotes (14a) x (15a).
- (15c) Estimate of Natural Gas cost for hot water only: Footnotes (14b) x (15a).
- (15d) Solar Water Heating production as a percentage of estimated hot water useage: this percentage is linked to the proposed number of solar panels (12f).
- (16) Solar water heating system (for domestic hot water) cost (\$/DTH): This cost factor is based on the Viessmann Vitosol 100 flat plate solar collector and associated system components as stated in the Domestic Water Analysis for the Holladay-Lions Recreation & Fitness Center. The cost does not necessarily take into account economies of scale or potentially more complicated infrastructure requirements for large systems. Similarly, the system cost for (for outdoor pool hot water) is based on the Heliocol HC-50 unglazed collector.
- (17) Thermal (Solar Water Heating) system cost: Footnotes (13) x (16).
- (18) CO2 Reduction (tons): To calculate the amount of pounds of carbon dioxide saved - attributable to the solar water heating collectors - the calculator multiplies the number of therms produced annually by 12.0593, the amount of pounds of CO2 that is emitted from burning one therm of natural gas (Ref. [www.climatetrust.org](http://www.climatetrust.org) and [www.carboncounter.org](http://www.carboncounter.org)).

- (19)  $\text{Annual Energy Savings} \div \text{Cost of Natural Gas used (per utility records) / Quantity of Natural Gas used (per utility records)} \times \text{Estimated annual production of SHW panels. Footnotes (14b/14a)} \times (13)$ . This number will increase if the produced energy is more efficiently used than that of the existing equipment. This study does not take into account the existing equipment.
- (20) Simple Pay-Back Period:  $\text{System Cost (17)} / \text{Annual Energy Savings (19)}$ .  
NOTE: Systems costs do not include potential building costs associated with installation of solar assemblies; and no cost offsets (credits, incentives, etc) are included in this calculation.