

### Recommendations

The results of Stanley Consultants' review of the City of Rapid City's buildings and facilities for energy reduction and renewable energy opportunities are presented in the preceding sections. The City's benchmark was a payback of 15 years or less. The opportunities identified that meet or exceed this requirement are summarized in Table 5-1. These recommendations are prioritized by the estimated payback. These identified projects include electrical, mechanical, and renewable energy opportunities. The maximum capital cost of a single recommended project is \$525,000. It should be noted that fifty percent (50%) of the recommended projects require a project investment of \$10,000 or less. Eighty-two percent (82%) of the recommended projects require a project investment of less than \$50,000.

There are seven, energy saving and renewable energy opportunities (e.g., LED lighting, PV solar electricity generation, and solar water heating) that were technically feasible, but had estimated paybacks of greater than 15 years. These opportunities are presented in Table 5-2. For each of these projects the grant necessary to pay down the project capital in order to achieve a 15-year payback is presented. Alternatively, the energy rate necessary to achieve a 15-year backpack without a grant is also presented. The financial viability of these projects could change should carbon dioxide become regulated by the US EPA or managed under climate change legislation.

**Table 5-1 Energy Efficiency and Renewable Energy Recommendations**

Project		Project Description	Facility	Capital Cost	Annual Savings	Payback (years)
Elect	2d	Corridor Lighting	Rushmore Civic Center	\$1,000	\$3,326	0.3
Elect	4b	Occupancy Sensors - Restrooms/Locker Rooms	Multiple Facilities	\$2,800	\$1,327	0.4
Elect	2b	Rushmore/Lacroix Halls Lighting	Rushmore Civic Center	\$35,000	\$32,680	1.1
Elect	8	Refrigerated Vending Machine Control	Multiple Facilities	\$4,680	\$3,384	1.4
Elect	5b	Day Lighting Control	Airport	\$1,000	\$715	1.4
Elect	6	Replace Incandescent Lighting	Horace Mann Pool	\$700	\$456	1.5
Elect	2c	Decorative Lighting	Rushmore Civic Center	\$1,792	\$1,100	1.6
REO	5	Waste Vegetable Oil Recovery as Biodiesel	Rushmore Civic Center	\$10,000	\$6,102	1.6
Elect	2a	Arena Lighting	Rushmore Civic Center	\$19,200	\$9,861	1.9
Elect	5a	Day Lighting Control	Library	\$1,412	\$648	2.2
Elect	4a	Occupancy Sensors - Break Rooms	Multiple Facilities	\$500	\$216	2.3
Mech	3	Supply Fan VFDs	Rushmore Civic Center	\$48,625	\$17,254	2.8
Mech	2	Waste Oil Heater	Light Vehicle Maintenance Center	\$4,650	\$1,591	2.9
Elect	1a	Retrofit Kit for T12 Parabolic Light Fixtures (4 lamp)	City School Administration Center	\$36,200	\$10,151	3.6
REO	3	Biogas to Electricity	Water Reclamation Facility	\$525,000	\$114,000	4.6
Elect	7	Aeration Blower VFDs	Water Reclamation Facility	\$396,000	\$83,900	4.7
Mech	1	Heat Recovery System	Material Recovery Facility	\$169,950	\$34,502	4.9
Mech	4	Kitchen Ice Machine	Rushmore Civic Center	\$20,000	\$3,194	5.2
REO	1	Landfill Gas for Co-Composting Building Heating	Material Recovery Facility	\$378,000	\$58,300	6.5
Elect	1b	Retrofit Kit for T12 Parabolic Light Fixtures (2 Lamp)	City School Administration Center	\$28,900	\$3,570	8.1
Elect	3	Replace HID High Bay Lighting	Roosevelt Ice Arena	\$28,160	\$3,184	8.8
Mech	5	Roof Insulation	Halley Park Building	\$8,033	\$828	9.7
<b>TOTAL</b>				<b>\$1,721,602</b>	<b>\$390,289</b>	<b>4.4</b>

*Note: REO-1 does not include the cost of landfill gas collection.*

**Table 5-2 Energy Efficiency and Renewable Energy Projects with Greater Than 15-Year Payback**

Project	Project Description	Facility	Capital Cost	Annual Savings	15-Year Payback Requirements	
					Capital Buy Down Grant	Energy Price
Mech - 5	Roof Insulation	Executive Golf Course Clubhouse	\$2,625	\$169	\$90	\$21.34/mmBTU
App A - Mech Calcs.	Overhead Door Replacement	Roosevelt Ice Arena	\$2,634	\$93	\$1,239	\$73.17/mmBTU
App A - Mech Calcs.	Window Replacement	Main Fire Station	\$600	\$19	\$315	\$33.33/mmBTU
REO-4	Solar Water Heating	(10 Panel System - Typical any Indoor Pool) Roosevelt Aquatic Center	\$18,325	\$696	\$7,885	\$13.42/mmBTU
REO-2	PV Solar Power	(4 kW System - Typical any Bldg.) Main Fire Station	\$28,000	\$616	\$18,760	\$0.34/kWhr
Elect 9-1	LED Fixtures (per fixture)	Roadways and Parking	\$1,225	\$35	\$700	\$0.26/kWhr
Elect 9-3	Solar Lighting Fixtures (per fixture)	Roadways and Parking	\$1,525	\$76	\$385	\$0.15/kWhr

*Note: To get the project payback less than 15 years, only the capital buy down grant OR the higher energy price is required.*