

Municipal Energy Manager (MEM)

Program Completion Report (May 2021 – May 2023)

Pincher Creek Partnership

(May 11, 2023)

Municipal Energy Manager Start Date: April 11, 2022

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Municipal Energy Manager Location: Pincher Creek, AB

Prepared for



**Municipal
Climate Change
Action Centre**

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1 Executive Summary

This report outlines the different steps, accomplishments, and experiences lived since the onboarding/enrollment of the Municipal Energy Manager (MEM) in the Town and Municipal District of Pincher Creek. The MEM program in the Town and Municipal District of Pincher Creek started on May 11, 2021 (onboarding date) and is completing two years on May 11, 2023 (end date). The program is funded by the Municipal Climate Change Action Centre (MCCAC) and is administered by CLEAResult Canada Inc. Highlights from this program are broken up into three parts; Energy efficiency measures implemented, plans created, and community engagement.

“The Municipal Energy Program was a huge success for our municipalities. It was a showcase example of how municipalities can cooperate and we are building on that cooperation into the future. Having the expertise in-house to access the funding available through MCCAC along with the Municipal Energy Managers detailed knowledge of potential energy savings for different projects made project discussions a breeze. Programs like this will be very important over the coming years as energy management becomes a part of our everyday lives” – Manager, Utilities and Infrastructure Dept, MD Pincher Creek

The estimated GHG reductions from implemented projects was 284 Tonnes/year with plans to implement projects for another 140 Tonnes/year. Upon utility bill review the total reduction in GHG emissions eclipsed 318 Tonnes per year. When only analysing in scope facilities and removing facilities that saw higher usage due to increase capacity the total estimated reductions are approximately 435 tonnes/year.

Parameters		Values
Program duration		May 2021 – May 2023
GHG inventory	Baseline year	Jan 2019 – Dec 2019
	tonnes [A]	3986
GHG savings target (%)		5.25%
GHG savings target (tonnes)		209.4
Total influenced savings (tonnes) [B]		435
GHG target achieved (%) $\frac{[B]}{[A]}$		10.9%

- Annual GHG savings of **435 tonnes/year** is roughly equivalent to the annual emissions of 114.5 homes worth of energy, 96 passenger vehicles driven for one year, and 191 barrels of oil. An equivalency calculator can be found at <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.
- Achieved an estimated annual cost savings of **\$91,000/year** across all completed projects
- Successfully received approval for **18** grant applications worth total of **\$502k** in 4 facilities. **\$3.5 million** worth of grant application(s) are under review with GICB, Federation of Canadian Municipalities, and Co-op.

- Conducted energy scan on 13 facilities.
- Identified total of 212 energy conservation measures (ECMs) and implemented a total of **94 ECMs** across 13 facilities.
- The Multipurpose Facility and Arena saw the highest energy savings of **18%** among all the in-scope facilities.
- Energy management assessment (EMA) score improved from **41%** in year 1 to **69%** in year 2.
- Created/revised and deployed the Clean Energy Improvement Program bylaw
- Developed a Climate Resiliency and Adaptation Plan including a risk assessment, climate projection report, and economic analysis.

2 Organizational Assessment

This project is being undertaken in partnership between the Town and Municipal District (MD) of Pincher Creek.

2.1 Municipality Overview

The MD of Pincher Creek No. 9 covers a land area of ~3,500 km² (Government of Canada, n.d.) in the southwest corner of Alberta, sharing a border with BC within the Canadian Rockies and extending south to border with Waterton National Park to the South. The MD is home to ~3,000 residents (Government of Canada, n.d.) in various small hamlets and ranch land. The area is known as one of the windiest onshore areas in Canada and has been home to the pioneering of wind farms in Canada (APEGA, n.d.). The region also lies within the higher percentile areas for solar production in Canada (NRCan, 2020). Pincher Creek is a popular destination for many outdoor activities including skiing, river sports, hiking/camping, and climbing. Ranching is also a common profession of residents.

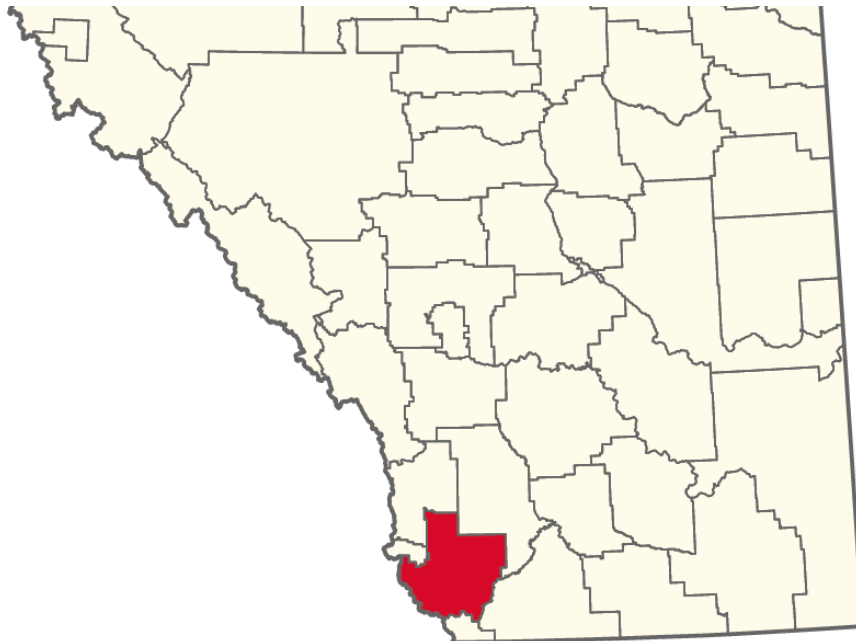


Figure 1: MD of Pincher Creek, Southern Alberta

The Town of Pincher Creek is located within the MD of Pincher Creek and provides a variety of services to Town and surrounding residents including a pool, arena, rodeo grounds, golf course, bowling alley, among others. The Town is home to ~3,600 residents (Government of Canada, n.d.) and is also home to many renewable energy and energy efficiency related businesses and community organizations. Multiple wind farm operation and servicing related companies have business and warehouse locations within the Town. Agriculture, energy, and tourism are the major economic drivers. About ~500,000 people/yr. visit the area (Everts, 2019).

The MD owns and maintains ~20 energy producing facilities and a road maintenance-oriented vehicle fleet. The Town owns and maintains ~30 energy producing facilities, a vehicle fleet, and downtown streetlights. The Town and MD both also pay for street lighting among a few other small energy users as listed in Table 1 and 2 below.

Table 1: Portfolio of Town Facilities

Site #	Facility Name	Facility Type	Location
1	Animal Shelter	Animal Shelter	1086 Kettles ST, Pincher Creek AB T0K 1W0
2	Canon Lift Station	Fresh Water & Treatment	975A Canon ST, Pincher Creek AB T0K 1W0
3	Canyon Early Learning Centre	Daycare	440 Victoria CRES, Pincher Creek AB T0K 1W0
4	Castle River Water Pumping Station	Fresh Water	SE 34 6 1 W5 FIELD
5	Castle View Park Irrigation Pumping Station	Irrigation	8110267 PL P15 B2 FIELD, Pincher Creek AB T0K 1W0
6	Community Hall	Social/Meet	287 Canyon Drive, Pincher Creek, AB T0K 1W0
7	Community Recreation Facility	Recreation Centre	696 Kettles Street, Pincher Creek, AB T0K 1W0
8	Downtown Lights	Lights	700 Main ST, Pincher Creek AB T0K 1W0
9	Diesel Vehicles	Vehicle	N/A
10	Final (Main) Lift Station	Fresh Water & Treatment	0 SE26-6-30 Rural Area FIELD, Pincher Creek AB T0K 1W0
11	Gas Vehicles	Vehicle	N/A
12	HWY. 6 North Sanitary Lift Station	Fresh Water & Treatment	NW 26-6-30 W4
13	JJT Park Irrigation	Irrigation	NE 23-06-30-W4
14	Lagoon Creek Pump	Fresh Water & Treatment	NE 25 6 30 W4
15	Lagoon Irrigation Pumphouse	Fresh Water & Treatment	SE 6 7 29 W4 FIELD
16	Lebel Mansion	Historical Building	696 Kettles St, Pincher Creek, AB T0K 1W0
17	Cemetery Lights	Lights	NW 24-006-30-04
18	Streetlights - Flashers Waterton & Main	Lights	0 Waterton/Main ST, Pincher Creek AB T0K 1W0
19	Streetlights	Lights	N/A
20	Lions Ball Park Irrigation	Irrigation	1053 Hill AVE, Pincher Creek AB T0K 1W0
21	Multi Purpose Recreational Facility - Arena, Pool/Library	Recreation Centre	867 Main ST, Pincher Creek AB T0K 1W0
22	Old RCMP Building	Office	659 Main ST, Pincher Creek AB T0K 1W0

Site #	Facility Name	Facility Type	Location
23	RCMP Building	Police Station	1369 Hunter ST, PINCHER CREEK AB TOK 1W0
24	Parks / Public Works Warehouse (Old Pool)	Warehouse	1025 St. John AVE, Pincher Creek AB TOK 1W0
25	Pincher Creek Intake Station	Fresh Water & Treatment	SW-22-6-30-W4, Pincher Creek AB TOK 1W0
26	Pineridge Fresh Water Booster	Fresh Water & Treatment	SW-22-06-30-W4
27	Porcupine Lagoons Pumping Station	Fresh Water & Treatment	SE 6 7 29 W4 FIELD
28	Propane (Including Zamboni)	Vehicles	N/A
29	Public Works New Shop	Maintenance Shop	1068 Kettles ST, Pincher Creek AB TOK 1W0
30	Public Works Maintenance Building	Maintenance Shop	1068 Kettles ST, Pincher Creek AB TOK 1W0
31	Sewer Lift Station	Fresh Water & Treatment	1049 Rimmington AVE, Pincher Creek AB TOK 1W0
32	South Hill Park Irrigation Pumping	Irrigation	800 South HILL, Pincher Creek AB TOK 1W0
33	Sproule Sports Field Irrigation Pumping Station	Irrigation	1188 Macleod RD, Pincher Creek AB TOK 1W0
34	St Michael's Early Learning Centre	Daycare	625 MCDUGALL ST, Pincher Creek AB TOK 1W0
35	Town Hall	Office	962 St. John AVE, Pincher Creek AB TOK 1W0
36	TV Booster - NW 15 6 30 W4 (field)	Fresh Water & Treatment	NW 15 6 30 4 FIELD
37	Veteran's Memorial Campground	Campground	947 Canon ST, Pincher Creek AB TOK 1W0
38	Water Pumping Station (Old Water Treatment Plant)	Fresh Water & Treatment	351 Main ST, Pincher Creek AB TOK 1W0
39	Water Treatment Plant	Fresh Water & Treatment	NW 22-6-30-w4, 1100 Beaver DR, Pincher Creek AB TOK 1W0
40	Welcome Signs North	Signs	NE-14-6-30-4
41	Welcome Signs South	Signs	SW-27-6-30-4
42	Town Yard Trailer	Office	1068 Kettles ST, Pincher Creek AB TOK 1W0

Table 2: Portfolio of MD Facilities

Site #	Facility Name	Facility Type	Location
1	Administration Building	Office	1037 HERRON AVE, Pincher Creek, AB T0K 1W0
2	Admin Office Parking Lights	Lights	2-12-0-543-2541
3	AES Fuel Depot	Fuel Depot	NE 36-06-01-W5
4	Airport Repair Shop	Maintenance Shop	NE 36-06-01-W5
5	Airport Terminal Building	Airport Terminal	NE 32-006-30-W4
6	Beaver Mines Lift Station	Fresh Water & Treatment	SW 10-006-02-W5
7	Beaver Mines Meter Station	Fresh Water & Treatment	Beaver Mines, AB T0K 1H0
8	Beaver Mines Park	Park/Public Space	SW 10-06-02-W5
9	Bobby Burns Fish Park	Park/Public Space	NE 23-06-30-W4
10	Castle Mountain Lift Station	Fresh Water & Treatment	SW 25-004-04-W5
11	Castle River Pumps (Obsolete)	Fresh Water & Treatment	Cowley, AB T0K 0P0
12	Cowley Raw Water Intake	Fresh Water & Treatment	Cowley, AB T0K 0P0
13	Cowley Standpipe	Water	2 Railway Avenue, Cowley, AB T0K 0P0
14	Cowley/Beaver Pump & Meter Station	Fresh Water & Treatment	NW 28-006-01-W5
15	Diesel Vehicles	Vehicles	N/A
16	Gas Vehicles	Vehicles	N/A
17	Lundbreck Irrigation/Old Plant	Fresh Water & Treatment	SW 26-07-02-W5
18	Lundbreck Shop	Maintenance Shop	215 BRECKENRIDGE AVE, Lundbreck AB T0K 1H0
19	Lundbreck Street Lights	Lights	N/A
20	Lundbreck Water Meter Station	Fresh Water & Treatment	SE 26-007-02-W5
21	Lundbreck Welcome Sign Plugs	Signs	SE 26-007-02-W5
22	Public Works. Main Shop	Maintenance Shop/Office	1051 MACLEOD ST, Pincher Creek AB T0K 1W0
23	Patton Park Lundbreck	Park/Public Space	Lundbreck AB T0K 1H0
24	Regional Water Treatment Plant	Fresh Water & Treatment	SW 28-007-01-W5
25	PW Parking Lights	Lights	1037 HERRON AVE, Pincher Creek, AB T0K 1W0
26	PW Sand/Gravel Shed	Warehouse	NE 23-06-30-W4

2.2 MEM Integration

David Desabrais was hired on as the Municipal Energy Project Lead working for both the MD of Pincher Creek and Town of Pincher Creek in May 2021. Tristan Walker took over starting April 11, 2022. The MEPL is technically an employee of the Town, but answers to the requirements of both individual councils. The new councils are settled in for both municipalities as of 2022.

2.2.1 Town Integration

During the first quarter David's integration was heavy with the Town. The Executive Sponsor for the position is an employee of the Town and assisted with setting David up with contacts to tour all major facilities within the scope of review which were passed on to me at the beginning of my contract. Tristan has been introduced and worked with all major government departments, ranging from PW operations to Town Council. David worked with our Marketing, Events, & Economic Development Officer to better communicate energy management throughout the Town, which Tristan continues to upkeep.

Initiatives include (but are not limited to):

- Setting up interviews with local papers for multiple projects
- Sharing of the Energy Team Charter on the town website and socials
- Network/social media posts related to MEM hiring
- Addition of a 150–300-word communication piece in the bi-monthly community newsletter
- Introductions to local sustainability groups and business
- Inclusion in bi-monthly utility community newsletter
- Inclusion in a capital budget council meeting to discuss energy related projects

The Executive Sponsor and the operations/facility teams at the Town have been heavily involved in MCCAC supported tasks and reports to date, participating in all recommended sessions including the Energy Scan on the recreation center and in the Energy Management Assessment activities.

2.2.2 MD Integration

Within the Municipal District of Pincher Creek integration has been steady. Some challenges have arisen due to the systemic nature of being a technical employee of the Town. These challenges include ease of access to MD networks and the inability to use MD vehicles due to insurance concerns despite travel mostly being associated with MD work. An acting employee (Roland Milligan) with the MD joined the Energy Team, and was replaced by David upon David's move to a position within the MD. David and Tristan both toured all major facilities and had introductions and collaboration with all major government departments. Employees have started to reach out to share conservation ideas and provide updates on projects that affect energy usage.

2.3 Energy Team Creation

Employees from the Town and MD of Pincher Creek were both involved in the creation of an Energy Team/Committee, which was signed into affect June 10th, 2021. Below is a list of the current members of the Energy Team and a brief role description.

Table 3: Energy Team Details

Name	Title	Focus Area	Role
Tristan Walker	Municipal Energy Project Lead	All	MEM
La Vonne Rideout	Director of Community Services	Town Recreation & Parks Facilities	Executive Sponsor; Town Energy Team Member
James Van Leeuwen	External Member	Technical Support	Energy Team Member
David Desabrais	Director of facilities and infrastructure	MD Facilities	MD Energy Team Member
Ad hoc; As needed			

An Energy Committee was planned by the Executive Sponsor prior to the awareness of the “Energy Team” being a program requirement from the MCCAC. The team was designed to have representation from both the Town and MD as well as technical support. Key indicators of the Energy Team’s success are:

- Reduce Municipal Governments baseline 2019 GHG emissions by 5%
- Energy Management Plan and other tools to monitor effectiveness of process modifications to reduce demand
- Adoption of Energy Policy and Management Plan by Municipal Governments

A copy of the Energy Team Charter can be found on the Town website:

- http://www.pinchercreek.ca/docs/files/town/Pincher%20Creek_Energy%20Team%20Charter_Signed.pdf

2.4 Municipality Engagement

Engagement has been strong from both the Town and MD organizations, with support for increased project budget and feedback from staff on new energy conservation opportunities.

2.4.1 Town Engagement

The Executive Sponsor (La Vonne Rideout) for this position is a Town employee and has been heavily engaged with program activities. Her assistance and enthusiasm for the position has helped develop relationships with peers and superiors throughout the Town. La Vonne’s position oversees the Recreation and Park assets, which have been a major focus for the position as the Recreation Center is the largest energy consumption facility within scope of this position by a significant amount. This oversight has allowed development of close relationships with the manager of the Recreation

Department (Adam Grose). Generally, one to two days a week are spent at the Recreation Facility to discuss projects, monitor progress, and integrate with the team.

The Energy Management Assessment (EMA) along with a few initial no cost & capital projects that save the Recreation Team maintenance work and address some long-standing issues have helped integrate with the team quicker.

La Vonne has also helped foster relationships with superiors, allowing for involvement in upcoming project or funding ideas such as funding related to downtown revitalization. Both David and Tristan have been brought to the table to brainstorm ideas and seek out funding for projects throughout the department.

There has also been significant involvement with Council as all grant funding must be presented for acceptance. Additionally, several update presentations have been made to the Council to keep them up to date on projects and achievements to date.

2.4.2 MD Engagement

Roland Milligan (Director of Development & Community Services, Energy Team Member; MD) has been involved and engaged with program activities throughout the first quarter. He has helped develop relationships with peers and superiors throughout the MD. The main office is setup in the MD Administration Building which means space is shared with Roland and the rest of the MD Administration Team most of the time. Upon transition to Tristan, David also works in this building so the relationship is maintained. David worked to create engagement by having a presence in this office and ensuring key aspects and decisions related to the MD are communicated with Roland, on a face-to-face basis which has been upheld after the transition.

At the start of David's term there was minimal employee awareness related to what the position entailed and what value could be added to the MD. This was of no fault to anyone, the position was approved and subsequently started in a very quick manner. It did however mean that David has borne a larger brunt of the responsibility of creating awareness and engagement around the position.

As part of this need for engagement David chose to complete the second Energy Scan on the MD Administration Building and Public Works Office/Shop. While these facilities are not the heaviest energy users in the scope of the position, there is plenty of room for savings and there has been some operational issues ongoing since installation related to their HVAC and energy usage.

Working through an Energy Scan on the Administration Building and PW Office/Shop allowed David the opportunity to heavily connect with peers and superiors, as most decision-making staff have offices in these two facilities. Tristan has been walked through these facilities and David has passed on the information and contacts he has made. David proceeded with a few no/low-cost solutions for these buildings which has allowed him to create deeper engagement within the staff while communicating some of the changes and creating more energy awareness.

Progress updates and presentations have been made to the MD Council and an energy operations update has been included in the Council Package for every meeting starting in 2023.

2.5 Employee Engagement

Employee engagement has primarily been achieved through Energy Scans and tours to date. Touring all facilities allowed interaction with a variety of employees in decision making positions related to energy usage. Everyone was given a run down of the MEPL position and invited them to reach out if they had any energy efficiency ideas. Working through Energy Scans with facility staff has also created engagement among facility personnel as well as director level personnel. More ideas for employee engagement have been brainstormed as part of the Energy Management Assessment (EMA) and the Energy Scans.

A key takeaway for employee engagement to date is that supervisor and director/manager level engagement is very important. It's been found that enthusiastic engagement from the superiors of facility building, and maintenance staff has created a more open-minded environment to energy saving solutions. Engagement with all employees going forward will be important, but a top-down focus on engagement could help spread some of the time spent on employee engagement.

Continued implementation of ECM's and following up with EMP's on a regular basis has helped to foster engagement with those whom have been assigned action items from EMPs. There has been mixed engagement with staff on the EMP and ECM's. A few staff were less receptive to change, particularly at the water treatment plant where position access to data and drawings was quite limited by the water operators.

The first quiz in the employee engagement campaign was completed in the quarter 3 which is described in more detail in Section 3.5. An energy focused lunch and learn was conducted for all municipal staff at the Town and MD which was well received.

A continued focus on senior employees and council will be important for energy management going forward.

2.6 MEM Organizational Barriers and Challenges

There have been some barriers due to the nature of the partnership where technically the MEM is only employed by one organization. Otherwise, getting buy in from certain members about the value of trialing new systems and improving efficiency has been the only limiting factor.

2.6.1 Town Organizational Barriers

Organizational barriers within the Town that have been discovered to date are minimal. Council has been open to opportunities so far which have slightly bypassed existing purchasing policies to secure funding for energy efficiency projects. Early barriers to successfully complete projects identified were:

- Operational; staffing limitations have likely been a cause of oversight for energy related projects in the past. Facility staff do not always have time to supervise projects among their day-to-day tasks,

and definitely do not have time to do things such as research how to program in night setbacks for a programmable thermostat

- Financial; Budget constraints limit the projects that can be undertaken. This improved in year 2 where specific energy projects were added to the budget contingent on grant funding.

Solutions include taking on more of the project management role where feasible to fill the staffing gap and integrating energy projects in future budgets.

In later quarters staffing limitations became less of a barrier as a few major positions were filled with eager staff. Financial considerations continue to be a barrier.

Preliminarily, the new council seems to be in favour of this program and the changes that it brings. The new council is mostly up to speed which should help accelerate any project approvals required over the coming quarters. They allotted budget for specific energy projects in 2023.

2.6.2 MD Organizational Barriers

The MD has similar barriers and solutions as the Town.

In addition, not being an employee of the MD has caused some administrative barriers. Direct access to financial and engineering documentation is limited compared to the Town. There is reliance on others to find digital documentation, which can result in delays and misses. It has not been possible to obtain vehicle usage permission with the MD (despite most of the travel being in the MD) as there are insurance issues related to nonemployees using vehicles.

Other small issues include simple things such as not having the ability to view the Outlook calendars of my colleagues for booking meetings.

These barriers create some inefficiency within this position. A solution could be to consider the position as an employee of both the town and MD, but the feasibility of this would need to be explored more. Another option is to have the position as a contractor and therefore service agreements could be drafted between both organizations individually.

A final barrier is the Intermunicipal Collaboration Framework which mandates the sharing of costs for certain facilities. This has required extra work to determine what the cost and savings numbers are for each municipality individually.

2.7 Program Feedback and Recommendations

- The program was fantastic and support throughout was welcome from both MCCAC and CLEAResult.
- The MEM program brought about awareness of energy usage within day-to-day operations and prompted conversation about saving energy within future plans. It also prompted discussion on planning for eventualities with climate change and being pro-active about changes in climate and energy pricing.

- Additional aspects that could be added to increase impact within the municipality would be the availability of a repository of standards, tools, reports etc. to reduce time spent on finding that material and give ideas to each MEM based on other's experience.
- Support in policy and program development and more of a focus on this side would be beneficial as well to set communities up for the long term.
- The coaching brought welcome insight to project ideas, support in the modelling and calculation process and awareness of opportunities that might otherwise have been missed.
- Both Town and MD Council passed finding in the budget for an extra year of the position.
- A continued collaboration framework and additional funding streams to continue supporting retrofits, EV implementation and novel ideas would be most welcome.

2.8 Success Story(ies)

Both the Town and MD have proclaimed the first Wednesday of October to be Energy Efficiency Day.

The Municipal Energy Project lead was awarded the Environmental Ambassador Award at the Pincher Creek Chamber of Commerce Awards of excellence in 2022.



Figure 2: Pincher Creek Awards of Excellence Team photo (left to right: MD CAO Roland Milligan, Town Director of Community Services LaVonne Rideout, Municipal Energy Project Lead Tristan Walker, MD Utilities and Infrastructure Manager David Desabrais, Chair of SASCI James Van Leeuwen)

The Town and MD both installed EV chargers with support from Enel Green Power and the Southgrow EV charging grant stream. Pictured below is the Recreation Team standing with the chargers installed at the splash park.



Figure 3: Recreation team standing with EV chargers installed with the support of Enel Green Power and Southgrow

2.8.1 Town Success Stories

The MPF BMS Upgrade and Insulation project has been completed!

The material delays on the BMS upgrade portion of this project continue to present a barrier to completion. David driving this project has shown that a lot of the energy savings potential (ie. Programming in schedules and setbacks) requires educated and attentive project management. This is expected to be a successful project with continual improvements made to the BMS system for additional energy savings. The BMS software in the library was also found and used to enable setbacks for that space.

An additional accomplishment in Q2 would be the retrofit of the lighting for the Town of Pincher Creek welcome sign coming in from the South side of town. David was not directly involved with the execution of the project, which makes it even more of a success (from an organization holistic standpoint). The recreation manager approached David about our options for fixing the lighting for these signs (the wiring had failed, and work needed to be done regardless). Since this was an un-metered site with a minimum demand, switching to LED lights would save energy, but we would not see any savings on our end due to the rate type. The site was successfully disconnected and is now saving the Town energy and money. The North sign was recently taken off grid at the end of Q4 as well.

In Q3 there was a site visit completed for an engineering study at the Memorial Arena that has identified three major retrofit options. This study helped in the application to the MCCAC REC program for furnace replacements in the arena and will help us define energy conservation measures that can be used for a Green and Inclusive Community Buildings (GICB) Application. The application was submitted in February 2023 along with an application for the new build of a recreation and events center featuring a curling rink.

Council has approved all funding brought forward to date on projects outlined in section 3.7.

2.8.2 MD Success Stories

The MD's energy portfolio is smaller than the Town's and there is also less capital allocated for upgrades and maintenance. This means that proving out accomplishments will go a long way in justifying the need for energy saving projects. The Energy Scan on the main Administration and PW Offices has given strong exposure to the program. It has also allowed creation of stronger engagement from supervisors and employees.

Early on low/no-cost energy savings solutions were implemented which required support from MD employees to take control over the BAS/programmable thermostats at the Administration Building and PW Office. Programmable timers have been installed for coffee makers that have heating elements which stay on all night.

The Energy Team sponsor for the MD was very supportive even of these "small wins", recognizing that while one small win may not be significant, the summation of many low/no-cost solutions can and will be significant. The traction and support on these early measures will allowed more trust and support to be gained as larger solutions and measures come into play.

David continued to foster his understanding of the Admin Building BMS system and was able to provide additional updates to the actual "programming" of the system to provide deadbands for zones which lowered the load on the supply fan VFD and minimized simultaneous heating/cooling in the building.

David was also able to re-program a "night-enable" setback on the main RTU unit. The BMS had a program where the main RTU should have turned on when any zone hits a low setpoint (17 °C) during unoccupied periods. Trends clearly indicated that the RTU was not turning on and likely never had turned on as intended. This meant that during unoccupied periods the building was relying purely on boiler radiant heaters, which do not provide heat to all zones. During extended cold unoccupied periods (ie. over weekends) some zones were reaching extreme lows (as low as 5 °C in a few cases), and continuous overuse of the boilers was occurring alongside extreme temperature swings when the building switched back to occupied mode. David was able to re-program a solution that ensured the RTU came on as intended when a zone hit the low zone setpoint. Trends will be observed via RETScreen to see the final affect on energy usage. Building comfort has been improved significantly with these changes.

As with previous changes, David struggled to get traction from the maintenance contractor to complete this work, as there has been issues with overall building comfort (and morning heat make-up) in the building's history and this would be a charge out service for them. Doing the work in house saved the MD dollars.

Major wins at the MD have included the addition of operating and maintenance budget for both 2022 and 2023 to complete smaller projects, as well as capital allocation for an Electric Ford Lightning and a large solar project in 2023. MD Council has also been an active participant in the Climate resilience and adaptation plan.

3 Program Activities

Activities to date include benchmarking both Town and MD facilities, conducting Energy scans, identifying projects and funding, conducting community engagement, and developing both the Clean Energy Improvement Program and a Climate Resiliency and Adaptation plan. These tasks are outlined in the following sections.

3.1 Benchmarking Study

The initial revision of the Benchmarking Study was provided by CLEAResult July 9th, 2021. Comments were made and a revised study was issued July 29th, 2021. The study focused on Town and MD Assets which were comparable to assets in similar climate zones. Therefore, assets such as water delivery/treatment facilities, vehicles, and streetlights were excluded.

MD facilities benchmarked included:

- Admin Building (MD Office/PW Shop)
- Airport Repair Shop
- Airport Terminal Building
- Lundbreck Shop
- PW Sand/Gravel Shed

Town facilities benchmarked included:

- Animal Shelter
- Canyon Early Learning Centre
- Community Hall
- CRC/Golf Course
- Lebel Mansion
- Memorial Arena
- Multi Purpose Recreation Facility
- Parks / Public Works Warehouse (Old Pool)
- Public Works Maintenance Buildings & Shops
- RCMP Building
- St Michael's Early Learning Centre
- Town Hall

Table 4: Comparison of energy benchmarking performance matrix

#	Facility Name	Year One (2020)			Year Two (2022)		
		EUI (GJ/m ²)	ECI (\$/m ²)	Energy Star Score	EUI (GJ/m ²)	ECI (\$/m ²)	Energy Star Score
1	Admin Building	1.12	19.78	49	1.13	22.21	28
2	Town Hall	0.71	11.98	88	0.66	12.74	81
3	Memorial Arena	1	20.16	82	0.86	20.77	89
4	Multipurpose Facility	4.75	62.69	Not Available	4.64	67.43	Not Available
5	Lebel Mansion	0.7	11.89	Not Available	0.72	13.1	Not Available
6	Town Water plant	2.91	64.71	Not Available	2.82	66.29	Not Available
7	RCMP Building	2.84	52.49	Not Available	2.58	54.4	Not Available
8	Animal Shelter	0.81	24.38	Not Available	0.85	27.01	Not Available
9	Canyon daycare	0.77	18.41	Not Available	0.66	17.78	Not Available
10	Sage daycare	0.85	20.63	Not Available	0.72	23.39	Not Available
11	Chinook Lanes	0.47	10.21	Not Available	0.4	10.62	Not Available
12	Community Hall	0.54	9.28	Not Available	0.58	17.3	Not Available
13	Golf Club House	0.68	22.98	Not Available	0.48	11.07	Not Available
14	Joes Gym	0.28	13.53	Not Available	0.35	15.9	Not Available
15	Old Pool Warehouse	0.01	1.78	Not Available	0.04	2.03	Not Available
16	Public Works Shop	0.87	15.13	Not Available	0.88	16.49	Not Available
17	Airport Shop	0.32	15.79	Not Available	0.36	18.97	Not Available
18	Airport Terminal	2.35	35.8	Not Available	2.17	36.05	Not Available
19	Lundbreck Shop	1.61	17.08	Not Available	1.46	20.89	Not Available
20	MD water plant	2.36	74.68	Not Available	1.95	80.7	Not Available

3.2 In-Scope GHG Inventory and Status

Table 5 and 6 below report the savings target and equivalent GHG emissions for all facilities in the Town and MD respectively. The estimated savings column represents feedback from energy models and engineering calculations including completed and planned projects. The achieved savings column represents data from a 2022 utility bill analysis compared against 2019 and reports the actual achieved reduction in GHG emissions in 2022.

Table 5: GHG inventory and reduction targets

#	GHG-emitting portfolio	2019 GHG emission (tCO ₂ e/year)	GHG saving target (%)	Expected GHG savings (tCO ₂ e/year)	Target timeline	Annual GHG savings		
						Estimated savings* (tCO ₂ e/year)	Achieved savings**	%***
1	Multi Purpose Recreational Facility - Arena, Pool/Library	1187.64	10.0	118.76	Q4 2022	255.5	264	21.5%
2	Water Treatment Plant	287.86	5.0	14.39	Q4 2022	31	-6	10.8%
3	RCMP Building	155.68	5.0	7.78	Q4 2022	0	-8	0.0%
4	Community Recreation Facility	103.74	5.0	5.19	Q4 2022	9	26	8.7%
5	Lebel Mansion	67.49	7.5	5.06	Q4 2022	21	11	31.1%
6	Town Hall	92.22	2.5	2.31	Q4 2022	7	19	7.6%
7	Final (Main) Lift Station	89.02	2.5	2.23	Q4 2022	0	16	0.0%
8	Canyon Early Learning Centre	31.26 ²	2.5	1.63	Q2 2023	2.5	3	8.0%
9	Sage Early Learning Centre	31.26 ²	2.5	1.63		2.5	2.5	8.0%
10	Public Works Maintenance Building	58.90	2.5	1.47	Q2 2023	0	1	0.0%
11	Castle River Water Pumping Station	58.17	2.5	1.45	Q2 2023	0	-17	0.0%
12	Gas Vehicles	32.88 ³	2.5	0.82	Q2 2023	0	-	0.0%
13	Diesel Vehicles	73.71 ³	1.0	0.74	Q2 2023	0	-	0.0%
14	Animal Shelter	15.21	1.0	0.76	Q2 2023	2.3	0.5	15.1%
15	Community Hall	46.91				0	7	0.0%
16	Veteran's Memorial Campground	13.45				-0.75	-1.5	-5.6%
14	Pincher Creek Intake Station	40.52	1.0	0.61	Q2 2023	0	4	0.0%
	Pineridge Fresh Water Booster	9.80				0	-2	0.0%
	TV Booster - NW 15 6 30 W4 (field)	1.00				0	0.7	0.0%

#	GHG-emitting portfolio	2019 GHG emission (tCO ₂ e/year)	GHG saving target (%)	Expected GHG savings (tCO ₂ e/year)	Target timeline	Annual GHG savings		
						Estimated savings* (tCO ₂ e/year)	Achieved savings**	%***
	Water Pumping Station (Old Water Treatment Plant)	9.30				0	-8	0.0%
15	Public Works New Shop	21.79	2.5	0.54	Q2 2023	0	-4.5	0.0%
16	Canon Lift Station	1.36	1	0.45	Q2 2023	0	0.5	0.0%
	HWY. 6 North Sanitary Lift Station	1.21				0	0.3	0.0%
	Lagoon Creek Pump	41.82				0	10	0.0%
	Porcupine Lagoons Pumping Station	0.05				0	0	0.0%
	Sewer Lift Station	1.06				0	0.3	0.0%
17	Town Yard Trailer	1.71	2.5	0.04	Q2 2023	0	-0.5	0.0%
18	Castle View Park Irrigation Pumping Station	2.87	0	0	N/A	0	-0.3	0.0%
19	JJT Park Irrigation	1.05	0	0	N/A	0	0.3	0.0%
20	Lagoon Irrigation Pumphouse	0.65	0	0	N/A	0	-0.15	0.0%
21	Lions Ball Park Irrigation	0.59	0	0	N/A	0	-0.6	0.0%
22	South Hill Park Irrigation Pumping	0.01	0	0	N/A	0	0.01	0.0%
23	Sproule Sports Field Irrigation Pumping Station	0.20	0	0	N/A	0	0	0.0%
24	Cemetery Lights	0.42 ¹	0	0	N/A	0	0	0.0%
25	Downtown Lights	12.98 ¹	0	0	N/A	0	0	0.0%
26	Streetlights	73.44 ¹	0	0	N/A	0	0.7	0.0%
27	Streetlights - Flashers Waterton & Main	3.77 ¹	0	0	N/A	0	0	0.0%
28	Welcome Signs North	1.89 ¹	0	0	N/A	1.89	1.89	99.9%
29	Welcome Signs South	1.89 ¹	0	0	N/A	1.89	1.89	99.9%
30	Old RCMP Building	32.94	0	0	N/A	0	-4	0.0%
31	Parks / Public Works Warehouse (Old Pool)	0.45	0	0	N/A	3.1	-2	688.9%
32	Propane (Including Zamboni)	7.42 ⁴	0	0	N/A	0	0	0.0%
Total		2,618	6.3%	165.8	-	336.92	316	12.9%

GHG Usage calculated based on 2019 utility usage for natural gas and electricity. Emissions factors of 0.05 tCO₂e/GJ used for natural gas and 0.00057/kW-hr for electricity based on MEM Program requirements.

¹Un-metered connections. Charged usage does not change year to year and is set rate with wire provider. Usage changes either controlled by wire provided or require wire provider approval after project implementation prior to lowering/changing.

²Facility built in 2020. Usage extrapolated per 8 months of known utility data by MCCAC in benchmarking report

³Emissions factor of 0.067 tCO₂e/GJ (gasoline) and 0.069 tCO₂e/GJ (diesel) calculated based on Carbon offset emission factors handbook.

Version 2.0, Government of Alberta, Link: <https://open.alberta.ca/dataset/9781460146064>. 34.66 GJ/m³ (gas), 38.68 GJ/m³ (diesel) conversion used per NRCAN Conversion Tables

⁴Usage estimated based on total 2019 invoices for propane. Pricing averaged to estimate L usage based on Weekly average retail prices for auto propane in 2019 for Lethbridge, Government of Canada,

https://www2.nrcan.gc.ca/eneene/sources/pripri/prices_bycity_e.cfm?productID=6&locationID=11&frequency=M&priceYear=2019&Redisplay=

Emissions factor of 0.059 tCO₂e/GJ calculated based on Carbon offset emission factors handbook. Version 2.0, Government of Alberta, Link:

<https://open.alberta.ca/dataset/9781460146064>. 25.53 GJ/m³ conversion used per NRCAN Conversion Tables

⁵Achieved savings estimated based on savings to date extrapolated for the remainder of the year. Savings to date are based on model

"Measurement & verification" charts via RETScreen since beginning of term. Actual achieved savings will need to be verified at the end of term.

⁶This site is no longer connected to grid operations and is fully powered by off-grid solar

⁷The site was not used in 2019 but has been turned into a modified shop space thus increasing lighting usage.

*Influenced savings is the sum of estimated savings from achieved and planned projects through calculation or energy modeling

**Achieved savings are based on 2019 vs 2022 utility bill comparison

*** Influenced savings

GHG emissions

Table 6: MD GHG Inventory and Reduction Targets

#	GHG-emitting portfolio	2019 GHG emission (tCO ₂ e/year)	GHG saving target (%)	Expected GHG savings (tCO ₂ e/year)	Target timeline	Annual GHG savings		
						Influenced savings* (tCO ₂ e/year)	Achieved savings**	%***
1	Administration Building/PW Main Shop	216.72	7.5	16.25	Q4 2022	25	11.7	11.5%
2	Diesel Vehicles	725.92 ¹	1.0	7.26	Q4 2022	35	-	4.8%
3	Gas Vehicles	199.61 ¹	2.5	4.99	Q4 2022	2	-	1.0%
4	Regional Water Treatment Plant	55.90	5.0	2.79	Q4 2022	24 ⁴	-0.8	42.9%
5	Cowley Raw Water Intake	45.54	2.5	1.14	Q2 2023	0	-14	0.0%
6	Airport Terminal Building	40.94	1.0	0.41	Q2 2023	10.5	-0.7	25.6%
7	Lundbreck Shop	22.70	1.0	0.34	Q2 2023	0.7	3.15	3.1%
	Airport Repair Shop	11.09			Q2 2023	0.7	-2.3	6.3%
8	Lundbreck Irrigation/Old Plant	11.09	1.0	0.34	Q2 2023	0	1	0.0%
	Cowley/Beaver Pump & Meter Station	9.11			Q2 2023	0	-2	0.0%
	Lundbreck Water Meter Station	6.52			Q2 2023	0	-2	0.0%
	Beaver Mines Meter Station	6.28			Q2 2023	0	0.5	0.0%
	Castle Mountain Lift Station	0.79			Q2 2023	0	-0.8	0.0%
	Beaver Mines Lift Station	0.51			Q2 2023	0	-0.15	0.0%
9	Lundbreck Street Lights	6.05 ²	0	0	N/A	0	2.8	0.0%
10	PW Parking Lights	0.16 ²	0	0	N/A	0	0	0.0%
11	Admin Office Parking Lights	0.30 ²	0	0	N/A	0	0	0.0%
12	Bobby Burns Fish Park	6.04	0	0	N/A	0.12	1.25	2.0%
13	Beaver Mines Park	0.22	0	0	N/A	0	0	0.0%

#	GHG-emitting portfolio	2019 GHG emission (tCO ₂ e/year)	GHG saving target (%)	Expected GHG savings (tCO ₂ e/year)	Target timeline	Annual GHG savings		
						Influenced savings* (tCO ₂ e/year)	Achieved savings**	%***
14	Patton Park Lundbreck	0.01	0	0	N/A	0	0	0.0%
15	PW Sand/Gravel Shed	0.91	0	0	N/A	0.1	-1.5	11.0%
16	Cowley Standpipe	0.87	0	0	N/A	0	0	0.0%
17	AES Fuel Depot	0.24	0	0	N/A	0	0	0.0%
18	Lundbreck Welcome Sign Plugs	0.05 ²	0	0	N/A	0.2	-0.15	384.6%
19	Beaver Mines Wastewater projects ⁵	N/A	N/A	9.99	N/A	0		
Total		1,368	3.1%	43.5	-	98.32	-4.1	7.2%

GHG Usage calculated based on 2019 utility usage for natural gas and electricity. Emissions factors of 0.05 tCO₂e/GJ used for natural gas and 0.00057/kW-hr for electricity based on MEM Program requirements.

¹Emissions factor of 0.067 tCO₂e/GJ (gasoline) and 0.069 tCO₂e/GJ (diesel) calculated based on Carbon offset emission factors handbook. Version 2.0, Government of Alberta, Link: <https://open.alberta.ca/dataset/9781460146064>. 34.66 GJ/m³ (gas), 38.68 GJ/m³ (diesel) conversion used per NRCAN Conversion Tables

²Un-metered connections. Charged usage does not change year to year and is set rate with wire provider. Usage changes either controlled by wire provided or require wire provider approval after project implementation prior to lowering/changing.

³Achieved savings estimated based on savings to date extrapolated for the remainder of the year. Savings to date are based on model "Measurement & verification" RETScreen charts since beginning of term. Actual achieved savings will need to be verified at the end of term.

⁴Solar installation being used to aggregate against this usage

⁵This facility is currently under construction

*Influenced savings is the sum of estimated savings from achieved and planned projects through calculation or energy modeling

**Achieved savings are based on 2019 vs 2022 utility bill comparison

*** Influenced savings
GHG emissions

3.3 Energy Scan and Opportunity Register

Facilities listed in Table 7 below have undergone Energy Scans within the first year of the program. A total of 197 ECM's have been identified between them (inclusive of post-scan identified ECM's, not including dumped ECM's). A focus has been put on high-level energy scans to find easy wins and low/no cost opportunities for the remaining buildings in the municipality.

Table 7: Facilities Update on Energy Scan Process

#	Facility Name	Scan Completion Date	Opportunity Register Submission date	Number of ECMs Identified	Measures Included in EMP	Opportunity register link
1	MPF & Memorial Arena	06/10/2021 (Q1)	07/23/2020 (Q1)	42	Yes	Link
2	Administration & PW Office/Shop	07/29/2021 (Q1)	08/27/2020 (Q2)	50	Yes – MD Specific	Link
3	Lebel Mansion	09/17/2021 (Q2)	09/30/2021 (Q2)	27	Yes	See #1
4	Water Treatment Plant	12/09/2021 (Q3)	12/15/2021 (Q2)	9	Yes – MD Specific	See #2
5	Town Water Treatment Plant	06/15/2022 (Y2Q1)	07/15/2022 (Y2Q1)	4	Yes	See #1
6	Community Recreation Center/Golf Course Animal Shelter Community Hall Daycares	04/16/2022 (Y2Q1)	06/16/2022 (Y2Q1)	11	Yes	See #1
Total						

3.3.1 Energy Scan: Multi-Purpose Facility & Memorial Arena

The MPF consists of a recreational pool, a waterslide, a library, a gymnasium/workout area, an ice arena, a small seniors centre and associated washrooms and office areas. The facility is located on main street Pincher Creek. The Arena was originally built in 1963 with the pool/library/gym area added on in the early 2000's. The most recent addition included a water slide expansion and outdoor spray park.

The Energy Scan for this facility was facilitated by CLEAResult. A pre-scan meeting was complete on June 2nd, 2021, and a brainstorming session on June 10th, 2021. The [Opportunity Register](#) was released July 23rd, 2021 and an EMP session was completed July 26th, 2021. The Energy Management Plan (EMP) was received August 9th, 2021.

3.3.2 Energy Scan: Administration Building & PW Office/Shop

The Administration Building & PW Office/Shop are two separate buildings that share a power meter. The facilities are located within the Town of Pincher Creek across the street from each other. The Administration Building hosts administrative staff offices and the Council Chambers for the MD of

Pincher Creek. The building is a single floor and was built in 2013. The major energy user is the HVAC system.

The Public Works (PW) Office/Shop consists of PW staff offices and two large bay maintenance areas. The PW Office/Shop has undergone major expansions/overhauls since its original build (likely in 80's). The most recent expansion was completed in 2017, which replaced much of the office area HVAC systems but not the shop systems (which have been intermittently replaced over the years). The shop systems are aged. Major energy users include the office HVAC systems, shop heating, and shop users (air compressor, hoist, etc.)

The Energy Scan for this facility has been facilitated by David. A pre-scan meeting was complete on July 14th, 2021. Brainstorming sessions were split per building and completed on July 27th and July 29th, 2021, respectively. The [Opportunity Register](#) has been completed and updated as of May 2022.

3.3.3 Energy Scan: Lebel Mansion

[The Lebel Mansion](#) is a registered Municipal Historic Resource located in the Town of Pincher Creek. The mansion was constructed in the early 1900's and has undergone multiple uses and designations in its time. The site has been a residence, a hospital, and is now leased by a local arts organization. Due to its age and lack of major energy retrofits, there are plenty of potential implementable ECM's that respect the historical designation.

The Energy Scan for this facility was facilitated by David. A pre-scan meeting was completed on September 8th, 2021 and a brainstorming session on September 17th, 2021. The Opportunity Register was released September 30th, 2021 and an EMP session was completed October 12th, 2021. The EMP was released October 19th, 2021.

3.3.4 Energy Scan: MD Water Treatment Plant

The MD Water Treatment Plant is located on Range Road 13B, SW ¼ 28 – 7 – 1 – W5M, just north of Cowley, Alberta and serves residents in Beaver Mines and Lundbreck.

The plant was designed to meet Alberta Environment & Parks Guidelines for Canadian Drinking Water Quality. Treatment capacity meets the 25-yr. Maximum Day Demand (MDD), with an additional provision & expansion capacity of the Membrane Filtration System of 36% (Full build complete).

The Energy Scan for this facility was facilitated by David. Due to the smaller scope of this plant and limited staff availability, no pre-scan was held. The Energy Scan was held in one session on December 9th, 2021. The Opportunity Register was released December 15th, 2021 alongside an updated EMP.

3.3.5 Energy Scan: Town Water Treatment Plant

This scan was conducted to find low hanging fruit and low cost ECMs. There has been significant hesitation from operation staff in adjusting anything within the plant as it is critical infrastructure. The plant has recently been upgraded and modernized, therefore most of the large retrofits have been completed. Identified opportunities lie in the HVAC system which has not been upgraded and still runs on analog low efficiency equipment.

3.3.6 Energy Scan: Community Buildings

These scans include accessory water distribution buildings, the Animal Shelter, Community Hall, Daycares, and Community Recreation Facility. The Daycares were commissioned in 2019, while the Community Hall and Community Recreation Facility are much older, dating back to likely the 1980s. These scans were conducted to find low hanging fruit and low cost ECMs. A focus has been on old and past end of life equipment, and utilization of current infrastructure such as thermostats, lights and heating/cooling equipment. These scans are ongoing, and staff have been encouraged to bring up any ideas they have.

3.4 Energy Management Assessment (EMA) & Energy Management Plan (EMP)

An Energy Management Assessment (EMA) was facilitated by CLEAResult on July 8th, 2021. Attendees included: David Desabrais (Former MEM), La Vonne Rideout (Town; Director of Community Services/Executive Sponsor), Alexa Levair (Town; Capital Project/Asset Coordinator), Adam Grose (Town; Recreation Manager), Alex Shelton (Town; Recreation Facility Coordinator), and Roland Milligan (MD; Director of Development and Community Services/Energy Team Member).

The EMA Report was released to the Pincher Creek Partnership on July 26th, 2021, and comments were provided by David to CLEAResult for incorporation July 27th, 2021. A revised report was received August 5th, 2021.

The Report concluded that the Pincher Creek Partnership *“has established an efficient process and energy team for incorporating strategic energy management. The team should continue to focus on implementing energy conservation measures along with employee engagement activities, policy, goal setting, etc. The energy team should continue to work over the next three months focusing on employee awareness and develop an action plan to support the elements of Plan, Do, Check, and Act components of this EMA.”*

The EMA Report identified a few areas to work on over the last quarter. Summaries of the items that involve the MEM are as follows:

- **Plan - Planning/ Budgeting:** *Identify short and long-term projects and include them in the budget planning*
 - Projects have been identified and focused on via the EMP's. A few larger capital projects have had budget dollars allocated for 2022 (such as Lebel Mansion windows)
 - Going forward more work on this is required to create more consistent planning and potentially a green fund into 2023
- **Do – Energy Team:** *Facilitate change over to new MEM.*
 - The team has successfully transitioned to Tristan Walker as the new MEM and is continuing to further the program.

- **Do – Employee Engagement:** *Set up a physical or virtual suggestion box that can be used to collect energy savings ideas.*
 - Completed. energy@pinchercreek.ca will be used going forward for suggestions/ideas
- **Do – Training & Development:** *Determine a list of employees who would benefit most from additional training*
 - Completed. A list has been created. Consideration for additional training being considered alongside energy team expansion
- **Do – Procurement:** *Networking with other MEMs to find information on utility rate renegotiation and data analysis. City of Brooks have had some success on this.*
 - Completed. Utility rate types and existing contracts have all been reviewed. Opportunities for savings were found (~\$5,000/yr. in savings for one site with an extreme excessive minimum contract demand)
- **Check – Performance & Reporting:** *Create and update RETScreen model using the daily usage data and share the generated performance graphs.*
 - Multiple models completed with continual updates ongoing
 - Lebel mansion model underway
- **Act – Audit & Control:** *Review BMS upgrades and control system to ensure savings are being achieved.*
 - Ongoing.
- **Act – Overall Effectiveness** *Develop energy goals and begin implementing low/no-cost projects to build case studies.*
 - Goals developed as shown in this report. EMP progress continues for low/no-cost projects

3.4.1 Energy Management Assessment 2022

An Energy Management Assessment was done for year 2 on June 9th 2022. Attendees included Tristan Walker, David Desabrais, LaVonne Rideout, and Wendy Catonio. The EMA was facilitated by Komal Kalyan and Gregory Wees.

The report concluded that *“Pincher Creek Partnership has made good progress on activities from the year one EMA. They have established a well-structured environment for incorporating strategic energy management. The team's current enthusiasm and strategies will help them move forward with significant progress. They should continue to focus on implementing energy conservation measures, securing a budget reserve for energy projects, updating and implementing procurement policy, etc. This EMA demonstrates a solid foundation for establishing an Energy Management System. The energy team should continue to work over the next year on the elements within this EMA's Plan, Do, Check and Act components. The partnership can achieve balance within the four components of this assessment by focusing on the action items and recommendations listed on pages 4 and 5 of this report.”*

- **Plan - Planning/ Budgeting:**
 - Formalize your established goals in an energy policy. When writing the policy, consider including goals for fleet electrification and management.

- With the help of Wendy, investigate if there is a way to secure an annual budget allocation for energy projects. This will encourage project implementation by reducing the level of evaluation projects must undergo before receiving funds.
- **Do – Employee Engagement:**
 - Increase engagement of staff through energy-saving campaigns. The engagement could include activities like lunch n' learns, a turn-off campaign, an alternative transportation day, etc.
 - Collaborate with James and the communications department to increase community engagement and awareness around the city's efforts to become more energy efficient.
- **Do – Procurement:**
 - Investigate formalizing the procurement process to evaluate purchases with low environmental impact at a higher value.
- **Check – Performance & Reporting:**
 - Create and update RETScreen model using the daily usage data and share the generated performance graphs.
- **Act – Audit & Control:**
 - Write a monthly 1-page energy report which includes the most up-to-date energy model and project updates. Provide the report to management for them to distribute as they see fit.
- **Act – Overall Effectiveness** *Develop energy goals and begin implementing low/no-cost projects to build case studies.*
 - Prioritize low-cost/no-cost measures. Given the district's size, small changes to setpoints, schedules, etc., can lead to significant energy savings while avoiding capital investment.

Appendix A contains a full list of action items, spider chart, and graphs detailing the results of the EMA Report.

3.4.2 Energy Management Plans

An Energy Management Plan (EMP) session was facilitated by CLEAResult for the MPF & Memorial Arena Facility on July 26th, 2021. The EMP was issued to the Pincher Creek Partnership on August 9th, 2021. The EMP details out projects that shall be completed over the 2 year MEM program. Additional Town facilities have been added to this plan as further energy scans have been completed. The full calendar can be viewed in Appendix B.

An Additional EMP was also created for the MD Admin Building/PW Office & Shop, based on the session completed on September 2nd, 2021. The EMP was issued to participants September 7th, 2021.

The MD EMP has been updated based on the results of the 4th Energy Scan completed on the Water Treatment Plant and high level scans of smaller facilities.

The full calendar can be viewed in Appendix B, highlights from the past two years include:

- 212 ECMs Identified
- 94 ECMs Complete or Underway

3.5 Engagement Campaign

The MCCAC and CLEAResult hosted a virtual employee engagement session on September 21, 2021. From the workshop, David identified a broad scope project to increase employee engagement while also addressing action items from the EMA Report.

The project is called the ***Pincher Creek Energy & Emissions Series***, an educational based quiz series designed to:

- Foster & promote a culture of employee awareness on climate change, energy efficiency, and sustainability related topics
- Increase employee engagement with energy management
- Increase employee feedback related to energy wastes and efficiency opportunities or ideas
- Provide a platform for sharing successes
- Promote & decrease GHG emissions

The project will be geared towards the following audiences:

- Facility Managers
- Council/Decision Makers
- General Staff

The first quiz in this series was launched to employees on November 16th, 2021, with a completion date of November 22nd, 2021. A copy of the initial quiz can be viewed [here](#). The details & deeper learning is contained within the “answer review”. Measures of success were as follows:

SPECIFIC

- Repeating certain quiz questions and measuring uptick in correct answers
 - *To occur in future quizzes*
- Reaching a certain threshold (25%) of employees/councilors for engagement
 - *The quiz was sent to 80 respondents. 24 responses were received (30% response rate)*
- Number of individuals reaching out to suggest ideas for energy conservation
 - *This is a more difficult measure to track as ideas often come up in regular conversation and during energy scan's, etc.*
 - *Outside of these standard areas ~3 ideas have come via “cold call” style in the past quarter (electric vehicle charging, snow melting ideas for Zamboni room)*

GENERAL

- Adoption of energy policies by councils
 - *Yet to be presented to council for adoption*
- Overall decrease in energy usage reaching setout GHG reduction targets (5%)
 - *Currently forecasting a 2.5% GHG reduction from Y1 reporting period based on measured reductions to date (does not include planned reductions)*

Details and status updates can be found in Appendix C. The results from quiz #1 has been announced to the public via social channels and there are plans to release a second quiz early this summer.

As part of the continued engagement campaign, a lunch and learn [presentation](#) has been developed and presented to the MD staff in a breakfast and learn and a public works safety meeting. The presentation focused on information about energy usage in our everyday lives and encouraged team work for the participants to build an energy savings portfolio in an imaginary home. The presentation was also made to all of Town staff.

3.5.1 Climate resiliency and adaptation plan

Through the development of a Climate resiliency and adaptation plan in partnership with the Town and MD there have been several public engagement tasks completed.

A community survey was released as part of the Climate risk assessment. It was designed to solicit feedback from the community on the perception of climate risks in the area. Targeted impacts included drought conditions, wildfire risk, flooding, invasive species, health impacts, and the effects on recreation. The survey elicited 211 respondents total responses between the Town, MD, Piikani Nation, Cowley, and other;

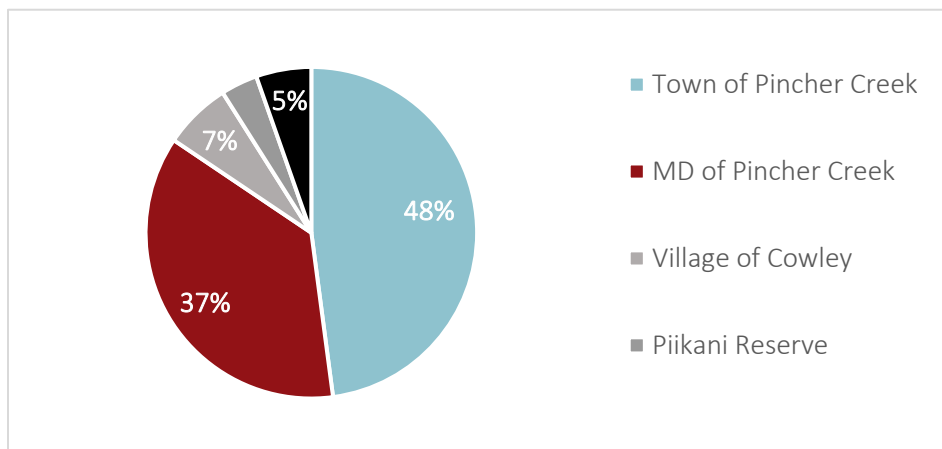


Figure 4: Climate risk survey respondents breakdown by location

The majority of respondents were under 44 years old, and identified highest risks of Prolonged Drought, Wildfire smoke, and low stream flow and creek levels.

Impact	Percentage of 'Moderate' or 'Major' responses
Prolonged drought affecting local farmers, ranchers and the economy	80%
More wildfire smoke, reducing air quality and local health impacts	78%
Lower streamflow and creek levels in summer	78%
Reduced water levels in lakes and wetlands	77%
More wildfires causing damage to homes and infrastructure	76%
Prolonged drought affecting local vegetation, wildlife and ecosystems	75%
Hailstorms damaging homes and infrastructure	75%
Increased heat stress on food crops and challenges for local farmers	73%
Blizzards disrupting transportation and causing injuries	73%
Windstorms damaging homes and infrastructure	72%
Increased heat stress on livestock and challenges for local ranchers	71%
Invasive species outbreak affecting local ranchers and farmers	71%
Increased surface water temperatures (and potential algal blooms)	70%
Water supply shortage affecting local businesses	68%
Negative impacts to aquatic (water-based) wildlife and habitat	68%
Increased heat stress on local vegetation, wildlife, and ecosystems	68%
Increase pests and invasive species	68%
Increased invasive species damaging local trees and forests	65%
Water supply shortage reducing community service levels	64%
Overland flooding of homes and property from heavy rainfall	59%
Negative impacts to terrestrial (land-based) wildlife and habitat	59%
Longer growing season for local farmers and ranchers [benefit]	57%
Local health impacts from extreme heat	55%
Freezing rainstorms damaging local trees and disrupting transportation	55%
Creek Flooding causing damage to local infrastructure	55%
Dam flooding	54%
Increased air conditioning costs	45%
Extended summer recreation season [benefit]	44%
Loss of winter recreation (skating, skiing, sledding, etc.)	44%
Reduced space heating and fuel costs in winter seasons [benefit]	44%
Tornados damaging homes and infrastructure	44%

Figure 5: Climate Risk survey risk ranking based on responses

Analysis was conducted on the distribution of answers by age, and location. Further results and analysis can be found in the Pincher Creek Results report.

An open house was also held to share the results of the climate projection report conducted by the Prairie Adaptation Research Collaborative, and the risk assessment developed by the AllOneSky Foundation. Maps of projected climate changes in the area were generated as seen below and shared along with feedback posters to receive comments and thoughts on adaptation measures that should be considered. Approximately 40 residents were in attendance which included both members of the Town and MD.

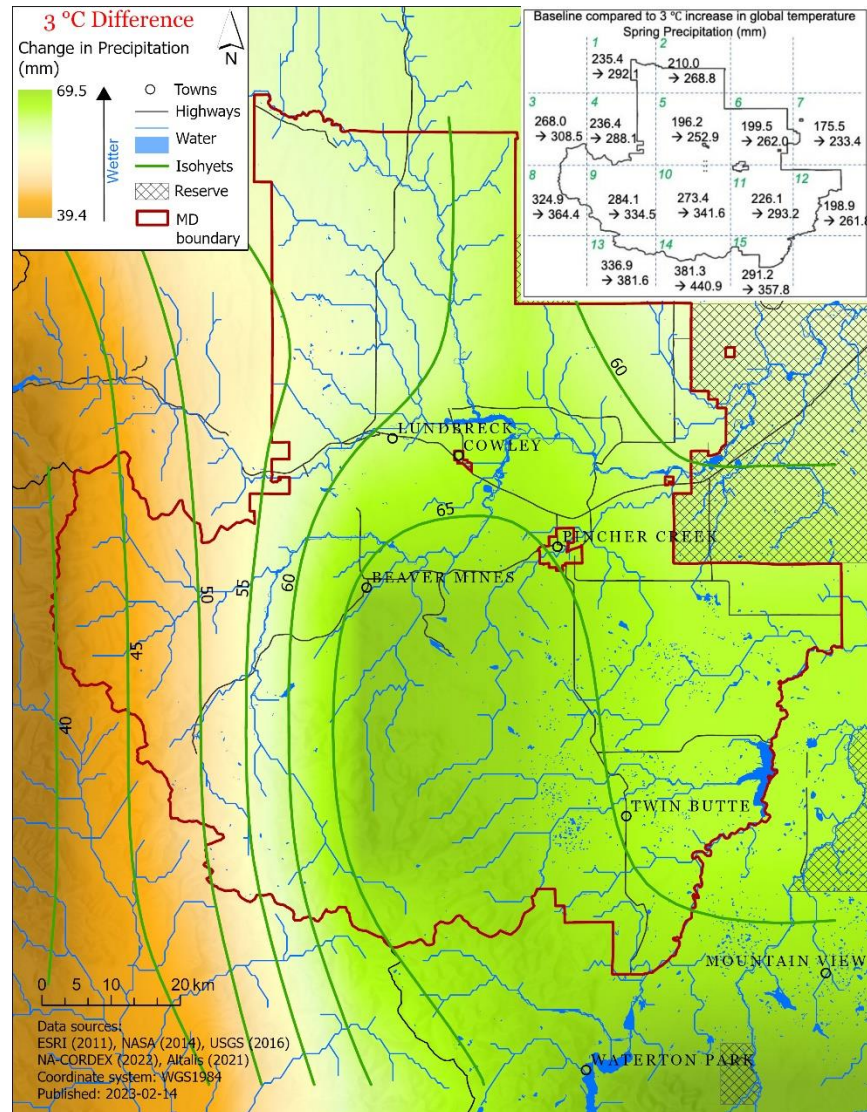


Figure 6: Climate projections for Spring precipitation in the MD of Pincher Creek

The remaining maps and development procedure can be found in the Climate Projections Report. A final open house is planned to be held at the end of June to share the results of the Adaptation Plan.

3.5.2 Monthly Newsletters

A monthly energy newsletter has been started to keep residents, staff, and other stakeholders up to date with goals, project progress, achievements to date, and to supply energy savings tips. An example of the March 2023 newsletter is seen below. This newsletter is distributed through both Town and MD

website, Facebook, and Instagram, as well as in the Newspaper, and Municipal Mailing lists such as the Chamber of Commerce and the Southern Alberta Sustainable Communities initiative.



Figure 7: March 2023 monthly energy outreach newsletter

3.5.3 Newspaper engagement

The MEM program has worked continuously to get projects featured in the local newspaper “Shootin the Breeze”. To date projects that have been featured include:

- Position hire’s for both David Desabrais and Tristan Walker
- Multipurpose Facility Building management system
- The REALice cold water ice resurfacing system
- New furnace replacement and programmable thermostat installation at the Arena
- Funding receipt for and installation of Electric Vehicle chargers
- Solar panel installation on the new Eco Station recycling center
- The Clean Energy Improvement Program

- The Climate Resilience and Adaptation Program

3.6 Clean Energy Improvement Program

An application to the Federation of Canadian Municipalities (FCM) has been developed with the support of Alberta Municipalities to support the implementation of a partnership launch of the Clean Energy Improvement Program.

A market study has been completed that indicates an estimated 18 projects per year will be undertaken, for a total project cost for \$2.1M over 4 years. The FCM application is for 80% of these costs and is currently under review.

The focus of this program is to support residents in increasing the resilience and efficiency of their homes to help reduce energy costs and green house gas emissions within the region.

Both Municipalities are expecting to pass their bylaws in May 2023 and launch the program in Q2 of 2024.

3.7 Energy Management Software (EMS)

To increase savings across the portfolio of facilities some software-based solutions are required. Here is a brief summary of the EMS that have been used or are planned to be used over the coming quarters:

3.7.1 RETScreen

Individual facility models have been created for sites with completed Energy Scan's. To date, energy models have been started for the:

- [Multi-Purpose Facility](#)
- [Memorial Arena](#)
- [MD Admin Building & PW Office/Shop](#)
- [Lebel Mansion](#)

These models are used to verify the success of implemented ECM's. Snapshots of progress to date for these models is shown in Appendix E.

3.7.2 Excel-based Portfolio Tracking

Excel-based tracking spreadsheet developed by CLEAResult is under continued use to track overall site costs and consumption year-over-year. This tracking has started to be transferred to RETScreen, which is better to integrate with models and potentially ease data importing. A spread sheet of capital projects has been developed to facilitate to the reporting of costs and savings within each municipality due to the Intermunicipal Funding Agreement that mandates shared costs for certain facilities.

3.7.3 Excel-based Engineering Calculations

Due to the sheer number of ECM's identified (and expected in the future), it has not been practical to complete engineering calculations for all identified ECM's. ECM savings have been estimated at a very high level for the majority of ECM's. To facilitate accurate estimations tools have been developed to

conduct calculations for lighting retrofits, furnace replacements, maintenance contracts, and solar installations.

Some other ECMs savings have been estimated using Excel based tools provided by CLEAResult such as VFDs. Example calculations are shown in Appendix F.

Chosen EMS software on a per facility basis is shown in Table 8 below.

Table 8: Energy Management Software Plan for building portfolio

#	Facility Name	Chosen EMS	Competency Level (Scale 1-5) ¹	Fuel Type to be Quantified	Expected model completion date
1	Town Multi-Purpose Facility	RETScreen/Eng. Calc., etc.	3	Elec/Gas	Complete
2	Town Memorial Arena	RETScreen/Eng. Calc., etc.	3	Elec/Gas	Complete
3	MD Administration Building/PW Office & Shop	RETScreen/Eng. Calc./Power Logging, etc.	3	Elec/Gas	Complete
4	Town Lebel Mansion	RETScreen Eng. Calc., etc.	3	Elec/Gas	Complete
5	MD Water Treatment Plant	Eng. Calc., etc.	3	Elec/Gas	
6	General Community Facilities	Excel Tools	5	Elec/Gas	

3.7.4 Sub-Metering Plan

Currently there is no plan to sub-meter facilities. The scope of energy usage for most facilities is likely too low to justify the initial capital cost vs. investing that money in ECM's, which have a very limited budget as is. The facilities where it may be worth considering installing sub-metering in the future include:

- Town MPF Facility/Arena
- Town Water Treatment Plant
- MD Admin Building/PW Office & Shop
- Town RCMP Building

These facilities are the largest emitters, with a variety of energy-producing equipment. The MD Admin Building/PW Office & Shop is running off a single power meter, with individual gas meters for each building. This is the only building combination known of in our portfolio that does have some sort of live energy tracking system. The main panel has a local Schneider PowerLogic Series 800 Meter, which

¹ Provide the competency level on chosen EMS – **1:** No prior knowledge, training, or experience; **2:** Beginner knowledge - has attended training or experiential learning, but is not yet competent; **3:** Intermediate knowledge and experience, able to work on the subject with extra leanings; **4:** Advanced knowledge and experience, comfortable to work on the subject; **5:** can be considered an expert on this subject

provides monthly interval tracking of many power/energy related variables (amperage, max/min demand, energy usage, etc.

3.8 Projects Summary

Table 9 includes all projects with energy saving factors and those supported by the MEPL over the two years with the Municipalities. It should be noted that the cost of some project cannot be taken at face value as they are being purchased due to required equipment replacement cycles such as furnaces or light fixtures, or as part of a capital acquisition process in place of the standard scenario like the EV Ford Lightning. It is more representative to use the cost difference of these items versus a standardly available option to do a cost comparison. Some non-energy required maintenance projects are also included that influence a much larger payback period than simply analyzing the energy projects. For a reflection of the impact and cost of energy projects alone see Section 3.9.

Table 9: List of measures completed to date and planned with approved budget/funding.

SN	Measure/Project details	Measure category	Cost class	Expected measure cost (\$)	Expected energy saving (kWh/year)	Expected energy savings (GJ/year)	Expected cost savings (\$/year)	Expected GHG savings (tCO ₂ e/year)	Expected measure lifetime (years)	EMS Used for calculations	Completion date
Multipurpose Facility											
1	2: Schedule Space Temperature Setbacks	OR	No cost	0	0	106	\$954	5.3	15	Energy Audit	7/28/2021
2	3: Reset setpoints seasonally	Opp Reg	Capital							RETScreen	9/15/2021
3	5: Use notched V belts	Opp Reg	Low cost	\$200	1,000		\$125	0.57	2	Eng calcs	1/30/2022
4	7: Install differential pressure sensors to indicate filter change	Opp Reg	Capital				\$100		15	Energy Audit	4/8/2022
5	9: Implement monthly BAS checks and communicate with staff	Opp Reg	No cost		500	15	\$100	1.04		Energy Audit	4/8/2022
6	12: Upgrade the BMS system and show staff how to use it*	Opp Reg	Capital	\$37,756	59,735	559	\$9,389	62	15	Energy Audit	8/29/2022
7	26: Educate staff on manually turning off water features	Employee Engagement	No cost		518	3	\$50	0.5		Eng calcs	8/30/2021
8	28: Monthly building walk around to monitor lighting	Employee Engagement	No cost		1,000		\$100	0.57		Eng calcs	12/15/2021
9	33: Perform Thermographic scan to identify radiation loss	Opp Reg	No cost								2/15/2022

SN	Measure/Project details	Measure category	Cost class	Expected measure cost (\$)	Expected energy saving (kWh/year)	Expected energy savings (GJ/year)	Expected cost savings (\$/year)	Expected GHG savings (tCO ₂ e/year)	Expected measure lifetime (years)	EMS Used for calculations	Completion date
10	37: Reduce pool temperature during unoccupied hours	Opp Reg	No cost			100	\$1,000	5		Energy Audit	4/8/2022
11	45: Insulate pool room valves and pumps*	Opp Reg	Capital	\$6,805		194	\$1,305	9.68	10	Energy Audit	10/14/2021
12	74: Replace library lights with LEDs as they fail	Opp Reg	Low cost	\$2,500	4,056		\$600	2.31	12	Eng calcs	Ongoing
13	78: Lower RPM on waterslide pump	Opp Reg	No cost		47,325		\$4,048	26.99		Eng calcs	5/13/2022
14	80: Build insulation insert for slide	Opp Reg	Low cost	\$150		5	\$45	0.25	10	Eng calcs	10/15/2022
15	89: Replace gym lights with CFLs	Opp Reg	Low cost	\$2,425	2,262		\$357		12	Eng calcs	06/16/2022
16	105: Install Endotherm	Opp Reg	Capital	\$8,580		810	\$6,480	40.5	10	RFP	02/08/2023
17	118: Develop routine to turn off waterslide pump when not in use	Employee Engagement	No cost		16,912		\$1,303			Eng calcs	08/08/2022
18	121: Implement circuit by circuit tracking system*	Opp Reg	Capital	\$27,600	3,000		\$3,000			RFP	07/25/2023
RETSscreen Savings Total				\$85,916	96,849	2,047	\$30,154¹	157.55	-	RETSscreen	
Arena											
1	14: REALice*	OR* / EMA / Employee Engagement	Capital	\$39,512	36,896	271	\$5,892	34.6	25	Energy Audit	04/15/2022
2	17: Lower floodwater temperature	Opp Reg	No cost							Energy Audit	04/15/2022
3	19: Increase brine temperature	Opp Reg	No cost							Energy Audit	12/15/2022
4	23: Insulate DHW pipes	Opp Reg	Low cost	\$200		20	\$100	1	8	Eng Calcs	8/29/2022
5	30: Replace score clock**	Opp Reg	Capital	\$10,000	2,500	0	\$250	1.43	20	Eng Calc	08/01/2022
6	34: Weatherstripping	Opp Reg	Low cost	\$2,500	1,000	50	\$600	3	8	Eng Calc	2/1/2023

SN	Measure/Project details	Measure category	Cost class	Expected measure cost (\$)	Expected energy saving (kWh/year)	Expected energy savings (GJ/year)	Expected cost savings (\$/year)	Expected GHG savings (tCO ₂ e/year)	Expected measure lifetime (years)	EMS Used for calculations	Completion date
7	76: Replace furnaces and install programmable thermostats*	Opp Reg	Capital	\$23,069	446	100	\$834	5.2	20	Eng Calc	10/20/2022
8	120: replace old outdoor lights and fix photocells	Opp Reg	Low Cost	\$2,100	1,176	0	\$156	0.7	12	Eng Calc	12/29/2022
RETScreen Savings Total				\$77,381	93,869	906	\$18,446¹	98			
MD Administration building											
1	2: Schedule space temperature setbacks	Opp Reg	No cost		5,000	150	\$1,544	10.35		Eng Calcs	8/5/2021
2	3: Change setpoints seasonally	Opp Reg	No cost		5,000	50	\$831	5.35		Eng Calcs	9/17/2021
3	7: Regular BAS checks	Opp Reg	No cost		3,784	3	\$377	2.28		Eng Calcs	10/20/2021
4	9: Build asset management plan	Opp Reg	No Cost								
5	13: Eliminate DHW heater	Opp Reg	Low Cost	\$1,500	1,200		\$510	0.68	15	Eng Calcs	9/2/2022
6	15: Regular lighting inspection	Opp Reg	No cost		200		\$20	0.11		Eng Calcs	
7	16: Lighting Retrofit upon failure	Opp Reg	Low Cost	\$3,500	3,460		\$824	2		Eng Calcs	Ongoing
8	17: Install smart plugs	Opp Reg	Low Cost	\$80	1,290		\$123	0.74	10	Eng Calcs	9/7/2021
9	18: Thermographic scan	Opp Reg	No cost								3/1/2022
10	19: Weather Stripping	Opp Reg	Low Cost	\$350	200	13.5	\$115	0.79	5	Eng Calcs	1/10/2023
11	26: VAV zone reset and control upgrade	Opp Reg	No Cost		2,000	25	\$368	2.39		Eng Calcs	7/28/2021
12	27: Lower boiler over ride	Opp reg	No Cost		1,500	35	\$392	2.61		Eng Calcs	8/17/2021
13	28: Blinds and door management	Employee Engagement	No Cost		300	5	\$64	0.42		Eng Calcs	7/29/2021
14	32: Check VAV design conditions	No Cost									10/14/2021

SN	Measure/Project details	Measure category	Cost class	Expected measure cost (\$)	Expected energy saving (kWh/year)	Expected energy savings (GJ/year)	Expected cost savings (\$/year)	Expected GHG savings (tCO ₂ e/year)	Expected measure lifetime (years)	EMS Used for calculations	Completion date
15	33: Remove over cooling of server room	Opp Reg	No Cost		1,500	5	\$178	1.11		Eng Calcs	9/14/2021
16	43: Complete Power Training	Opp Reg	No Cost								10/18/2021
17	64: Increase Temperature deadbands	Opp Reg	No Cost		2,000	40	\$475	3.14			3/31/2022
18	85: Add Endotherm	Opp Reg	Low Cost	\$1,345		103	\$886	5.15			12/19/2022
RETScreen Savings Total				\$6,775	6,119	-8	\$530¹	3			
MD Public Works											
1	4: Install Programmable thermostats	Opp Reg	Capital	\$5,403	1,100	225	\$1,708	11.88	10	RETScreen	6/17/2022
2	29: Maintenance Contract	Opp Reg	Low cost	\$5,000	5,000	70	\$974	6.35	8	Eng calcs	Ongoing
3	30: Lower Pressure Washer temperature set point	Opp Reg	No Cost			5	\$36	0.25		Eng Calcs	8/13/2021
4	50: Air checks for compressor	Employee Engagement	No Cost		2,000		\$190	1.14		Eng Calcs	4/1/2022
5	52: Replace AODD pumps	Opp Reg	Low Cost								1/15/2022
6	53: Signage for lights and HVAC	Employee Engagement	No Cost		500	5	\$83	0.54		Eng Calcs	3/1/2022
7	54: Upgrade air compressor	Opp Reg	Capital								10/21/2021
8	76: Replace quanset light bulbs	Opp Reg	Low Cost	\$544	1,400		\$133	0.8	8		07/07/2022
RETScreen Savings Total				\$10,947		126	\$1,260¹	6.3			
Lebel Mansion											
1	46: fix indoor lights	Opp Reg	Capital							Eng Calcs	12/29/2022
2	47: LED light retrofit	Opp Reg	Capital	\$11,480	7,077		\$1,488	4	12	Eng Calcs	12/29/2022
3	56: Electric heater awareness	Employee Engagement	No cost		1,700	-12	\$37	0.37		Eng Calcs	3/31/2022

SN	Measure/Project details	Measure category	Cost class	Expected measure cost (\$)	Expected energy saving (kWh/year)	Expected energy savings (GJ/year)	Expected cost savings (\$/year)	Expected GHG savings (tCO ₂ e/year)	Expected measure lifetime (years)	EMS Used for calculations	Completion date
4	60: Thermographic scan	Opp Reg	No cost								1/21/2022
5	63: Pilot storm windows	Opp Reg	Low Cost	\$1,350	150	0.05	\$13	0.09	25	Eng Calcs	
6	65: Ceiling fans	Opp reg	Low Cost	(see 47)	-375	4	\$3	-0.01	12	Eng Calcs	12/29/2022
7	67: Education on blinds	Employee Engagement	No cost		200	4	\$53	0.31		Eng Calcs	3/31/2022
8	68: Maintenance awareness	Employee Engagement	No cost		2,000	4	\$53	0.31		Eng Calcs	3/31/2022
9	69: Solar Assessment	Opp reg	Capital	\$9,450							12/31/2021
10	70: Radiator Education	Opp Reg	No Cost		200	4	\$53	0.31			3/31/2022
11	71: PV Solar*	Opp Reg	Capital	\$35,000	8,500	0	\$725	4.85	25	Eng Calcs	Q3 2023
12	72: Clean Kiln	Opp Reg	Low cost		100		\$8	0.06			3/1/2022
13	91: Insulate and brick in old doors	Opp Reg	Low Cost	\$1,000		13	\$117	0.65	25	Eng Calcs	Q3 2023
14	106: Endotherm	Opp Reg	Low Cost	\$1,430		69	\$575	3.6	10	RFP	Q3 2023
RETSscreen Savings Total				\$59,710	1,836	62	\$620	4.14			
General MD											
1	84: Lunch and learn	Employee Engagement	Low Cost								7/10/2022
2	89: Energy Efficiency day	Employee Engagement	No Cost								10/05/2022
3	56: Waterplant LED replacement	Opp Reg	Low Cost								Ongoing
4	58: Water plant DHW temperature change	Opp Reg	No Cost			3	\$21	0.15		Eng Calcs	12/9/2021
5	65: Airport DHW insulation	Opp Reg	Low Cost								6/2/2022
6	68: Airport thermostat install	Opp Reg	Low Cost	\$1,661	800	122	\$1,037	5	10	Eng Calcs	10/20/2022

SN	Measure/Project details	Measure category	Cost class	Expected measure cost (\$)	Expected energy saving (kWh/year)	Expected energy savings (GJ/year)	Expected cost savings (\$/year)	Expected GHG savings (tCO ₂ e/year)	Expected measure lifetime (years)	EMS Used for calculations	Completion date
7	72: Airport Weatherstripping	Opp Reg	Low Cost	\$700	200	21	\$180		5	Eng Calcs	01/23/2023
8	73: Airport lighting retrofit*	Opp Reg	Low Cost	\$7050	4,008		\$717	2.28	12	Eng Calcs	Ongoing
9	74: Anti-idling policy	Employee Engagement	No Cost				\$1,882	3.3		Eng Calcs	02/01/2022
10	75: Grader training	Opp Reg	Capital				\$22,000	15		Eng Calcs	Ongoing
11	80: Fish Park LED retrofit	Opp Reg	Low Cost	\$50	220		\$79	0.125	12	Eng Calcs	8/8/2022
12	81: Ecostation Solar	Opp Reg	Capital	\$9,100	3,300		\$282	1.88	30	Eng Calcs	Ongoing
13	82: Airport Furnace Replacement	Opp Reg	Capital	\$9,000	300	70	\$600	3	20	Eng Calcs	Ongoing
14	90/91: Lundbreck shop lighting retrofit	Opp Reg	Low Cost	\$900	1,245		\$105	0.7	12	Eng Calcs	1/10/2023
15	92: Sand Shed lighting retrofit	Opp Reg	Low Cost	\$100	15		\$196	0	12	Eng Calcs	1/10/2023
16	93: Electric Vehicle*	Opp Reg	Capital	\$82,045			\$3,100	2.5	15	MCCAC EV	Ongoing
17	94: Airport Solar installation*	Opp Reg	Capital	\$100,000	45,000		\$3,000	25.65	25	PVWatts	Ongoing
Facility Total				\$210,606	55,088	216	\$33,199	59.6			
General Town											
1	79: Daycare thermostat programming	Employee Engagement	No Cost		500	92	\$870	4.9			5/16/2022
2	87: Town Office LED light retrofit	Opp Reg	Low Cost		12238		\$1,046	7	12	Eng Calcs	Ongoing
3	94: Community Recreation facility thermostat replacement	Opp Reg	Low Cost	\$1,200	1000	75	\$760	4.3	15	Eng Calcs	9/6/2022
4	98: Animal Shelter adjust AC	Opp Reg	No cost		728		\$62	0.41		Eng Calcs	
5	101: Lagoon irrigation rate adjustment	Opp reg	No cost				\$5,000			Fortis Rates	6/20/2021

SN	Measure/Project details	Measure category	Cost class	Expected measure cost (\$)	Expected energy saving (kWh/year)	Expected energy savings (GJ/year)	Expected cost savings (\$/year)	Expected GHG savings (tCO ₂ e/year)	Expected measure lifetime (years)	EMS Used for calculations	Completion date
6	102: Old Pool lighting retrofit	Op Reg	Capital	\$7,500	5,500		\$470	3.13	12	Eng Calcs	6/6/2021
7	103: Lunch and Learn	Employee Engagement	Low Cost								9/12/2022
8	111: Southhill park meter removal	Op Reg	No Cost				\$1,200			Fortis Rates	9/1/2022
9	112: South Welcome Sign off grid	Op Reg	Low Cost	\$3,780			\$1,375			Fortis Rates	6/20/2021
10	113: North Welcome Sign off grid	Op Reg	Low Cost				\$1,375			Fortis Rates	5/10/2022
11	114: Remove natural gas service and replace DHW with electric	Op Reg	Low Cost	\$2,000	-1200	10	\$500	-0.18	15	Eng Calcs/T+D Rates	4/20/2022
12	115: Town water plant thermostat policy	Op Reg	No Cost			580	\$5,220	29		Eng Calcs	10/24/2022
13	116: Pineridge booster thermostat policy	Op Reg	No Cost			5	\$45	0.25		Eng Calcs	10/24/2022
14	117: Pincher Creek intake thermostat policy	Op Reg	No Cost		700		\$60	0.4		Eng Calcs	10/24/2022
15	119: Efficiency Day proclamation	Employee Engagement	No Cost								10/05/2022
Facility Total				\$14,480	19,461	762	\$17,983	49.21			
Municipality Total				\$465,815	273,222	4,111	\$102,192	377.8			-

¹These savings values use a \$/kWh rate of \$0.1 and a \$/GJ rate of \$10. These are both lower than the blended rate but demand cannot be factored into RETscreen

*Grant funding used for this project is shown in Section 4.

**Not an Energy project but has energy saving results

3.9 Energy Projects

Table 10: List of energy projects completed and planned along with values for costs, estimated savings, estimated savings in 2030, and grant funding achieved.

Project Name	Building	Total project cost	Grant funding	Total Cost	Projected cost saved	Projected GHG saved	2030 Projected cost saved
MEPL position costs	All	180,000.00	120,000.00	60,000.00	-	-	-
Gas removal	Veterans	2,100.00	-	2,100.00	280.08	(0.75)	262.65
lighting retrofit	Admin	3,500.00	-	3,500.00	824.79	1.97	1,228.39
Endotherm	MPF	8,580.00	-	8,580.00	6,480.00	40.50	12,364.09
Weatherstripping	Airport Shop	350.00	-	350.00	91.69	0.58	175.92
Weatherstripping Admin and PW	Admin	350.00	-	350.00	123.41	0.79	237.40
Weatherstripping	Airport	350.00	-	350.00	91.69	0.58	175.92
Lighting Retrofit	Lundbreck Grader shop	100.00	-	100.00	156.85	0.20	214.24
Lighting Retrofit	Sand shed	100.00	-	100.00	196.01	0.01	242.00
Outdoor light retrofit	Arena	2,100.00	-	2,100.00	156.57	0.67	265.30
lighting retrofit	Lebel	11,480.00	-	11,480.00	1,488.87	4.03	2,268.82
Endotherm	Admin	1,430.00	-	1,430.00	656.00	4.10	1,251.67
Thermostat policy	Water plant	-	-	-	4,901.95	30.70	9,359.81
Slide insert	MPF	150.00	-	-	40.00	0.25	76.32
Arena Furnaces	Arena	23,069.00	17,301.75	5,767.25	834.37	5.25	1,596.29
Thermostat replacement	Airport	1,661.00	-	1,661.00	1,037.53	6.56	1,987.39
Lighting Retrofit	Town hall	-	-	-	2,089.81	6.71	3,298.04
BMS Adjustments	Admin	-	-	-	-	-	-
Thermostat replacement	CRC	1,945.00	-	1,945.00	676.91	4.32	1,301.26
DHW tank removal	Admin	2,275.00	-	2,275.00	563.48	0.68	767.23

Project Name	Building	Total project cost	Grant funding	Total Cost	Projected cost saved	Projected GHG saved	2030 Projected cost saved
Grid disconnect	South hill	-	-	-	1,200.00	0.12	1,213.30
Pool BMS	MPF	56,538.00	42,403.50	14,134.50	9,075.84	62.00	17,889.41
Turn off waterslide pump at night	MPF	-	-	-	1,303.42	9.64	2,649.03
Lighting	Bobby burns	50.00	-	50.00	79.03	0.13	110.81
Adjust tstat	SPCA	-	-	-	55.99	0.41	113.89
Lighting	PW	544.00	-	544.00	870.91	0.80	1,157.70
Grid disconnect	South welcome sign	3,780.00	-	3,780.00	1,375.00	0.86	1,467.77
Programmable tstats	PW	5,403.00	-	5,403.00	1,884.78	11.88	3,606.77
gym LED light retrofit	MPF	2,425.00	-	2,425.00	357.32	1.29	579.35
Lower pump RPM	MPF	-	-	-	3,844.69	26.99	7,657.14
Program setbacks on thermostats	Daycares	-	-	-	774.45	4.89	1,482.53
Grid disconnect	North welcome sign	-	-	-	1,489.00	0.86	1,581.77
Schedule Library occupancy	MPF	-	-	-	855.71	5.36	1,633.68
REALice	Arena	39,512.55	28,223.25	11,289.30	5,014.01	34.60	6,166.60
Change HVAC belts	MPF	200.00	-	200.00	77.07	0.57	156.64
Awareness	Lebel	-	-	-	142.15	0.94	277.03
Light Retrofit	old pool	7,500.00	-	7,500.00	1,421.65	3.14	2,088.62
Arena Study	Arena	7,992.00	7,992.00	-	-	-	-
Pilot storm windows	Lebel	1,350.00	-	1,350.00	15.54	0.11	31.10
Idle Policy	Vehicles	-	-	-	1,882.50	3.39	2,447.90
Solar assessment	Lebel	9,450.00	-	9,450.00	-	-	-
Pool eq room insulation	MPF	6,805.00	4,377.57	2,427.43	1,552.00	9.70	2,961.28

Project Name	Building	Total project cost	Grant funding	Total Cost	Projected cost saved	Projected GHG saved	2030 Projected cost saved
Light Retrofit	Lundbreck Grader shop	700.00	-	700.00	93.58	0.51	170.75
Adjust server room temps	Admin	-	-	-	155.61	1.11	311.28
Programmable plugs	Admin	80.00	-	80.00	99.42	0.74	202.06
Lower pressure washer set point	PW	-	-	-	40.00	0.25	76.32
Adjust rate	Lagoon irrigation	-	-	-	5,000.00	-	6,149.37
Climate Resiliency Grant	All	160,000.00	160,000.00	-	-	-	-
Total Complete Estimates	Total	541,869.55	380,298.07	161,421.48	59,349.68	287.41	99,254.83
Planned projects	Total						
Arena Lighting retrofit	Arena	2,000.00	-	2,000.00	622.51	2.22	1,006.45
Airport Furnaces	Airport	11,000.00			243.94	1.24	434.84
PW Furnace	PW	5,000.00			242.37	1.24	432.90
Huddleston lighting retrofit	Arena	3,000.00	-	3,000.00	456.29	0.92	660.88
Library Lighting retrofit	MPF	900.00	-	900.00	606.50	2.31	996.78
Joes gym lighting retrofit	CRC	6,165.00	-	6,165.00	1,040.45	5.37	1,862.67
endotherm	Lebel	1,430.00	-	1,430.00	575.07	3.62	1,100.17
EV charger	Town	16,000.00	16,000.00	-	-	-	-
EV charger	Admin	16,000.00	16,000.00	-	-	-	-
EV charger Castle	MD	16,000.00	16,000.00	-	-	-	-
Maintenance contract	MPF	6,000.00	-	6,000.00	1,533.70	2.66	2,175.10
RTU	MPF	35,000.00	26,250.00	8,750.00	705.32	3.43	1,239.42
Solar	Ecostation	8,665.20	-	8,665.20	256.57	1.90	521.87
Solar	Lebel	35,000.00	35,000.00		648.65	4.81	1,319.39

Project Name	Building	Total project cost	Grant funding	Total Cost	Projected cost saved	Projected GHG saved	2030 Projected cost saved
Thermostat replacement	SPCA	700.00	-	700.00	260.91	1.72	507.52
CAT training	Vehicles	?	-	?	16,999.50	30.60	24,227.44
Additional idle policy	Vehicles	?	-	?	750.00	1.35	1,068.89
Lighting Retrofit	Airport	7,050.00	5,000.00	2,050.00	717.46	2.28	1,130.27
EV	MD	82,045.00	14,000.00	68,045.00	3,150.00	2.00	4,091.12
solar	MD	100,000.00	30,000.00	70,000.00	3,307.09	24.51	6,726.79
CEIP	All	400,000.00	400,000.00	-	-	-	-
MEPL position costs	All	100,000.00	19,000.00	81,000.00	-	-	-
Total Planned Estimates	Total	897,955.20	589,250.00	292,705.20	39,096.91	140.95	63,378.26

Completed savings estimates are broken down as seen below where the majority of savings are split evenly by reduced electrical demand, lowered Natural Gas consumption, and reduced Electrical consumption. These estimates have been overshoot by utility bill review but provide an idea of the breakdown of cost reductions.

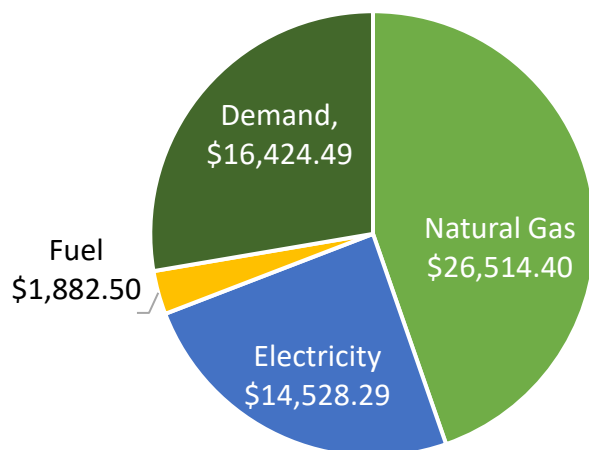


Figure 8: Estimated savings breakdown by cost class including fuel, electricity, demand charges, and Natural Gas

Total cost to both municipalities is estimated to be approximately \$160,000 split into \$92,000 for the Town and \$68,000 for the MD based on the ICF agreement guidelines.

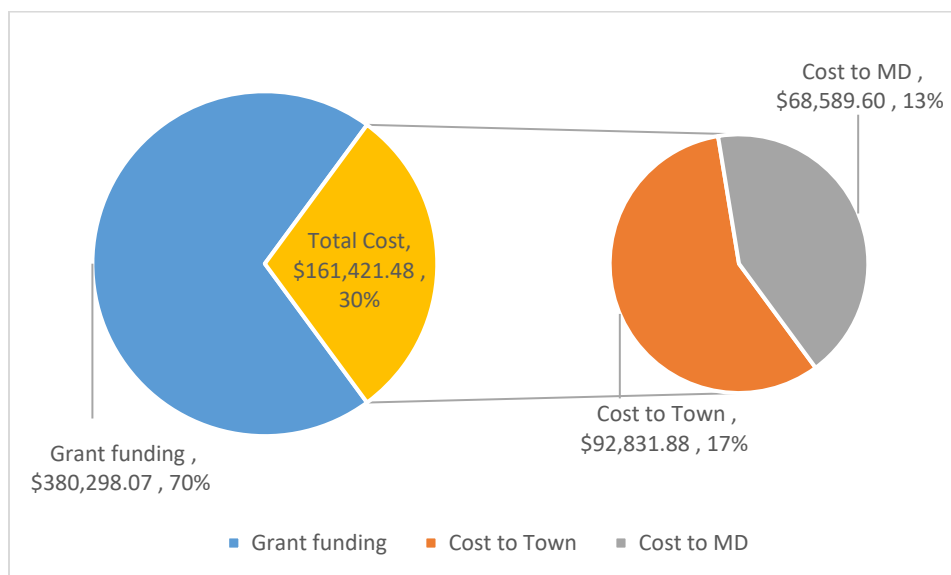


Figure 9: Breakdown of total project cost covered by grants or the Town and MD

Projecting into the future with the projects planned to be completed the program will break even and pay itself back by Q3 2026 and reach a total savings of almost \$1M by 2032.

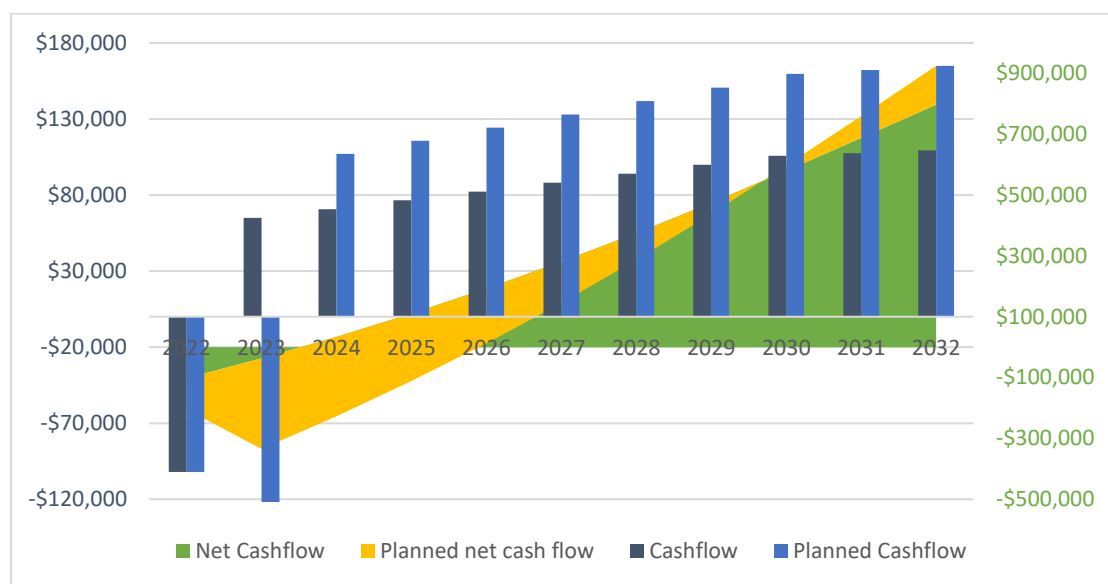


Figure 10: Cashflow analysis of energy projects and associated savings into 2032

This is based on estimates made for savings that will be achieved and it should be noted that upon a 2022 utility bill review vs the baseline in 2019 these estimates have already been overshoot by 80% with Total Adjusted cost savings of \$79,514 annually as seen in Table 11.

Table 11: Preliminary utility review analysis

Municipality	2019				2022 ¹			
	Gas (GJ)	Electricity (kWh)	Gas (\$)	Electricity (\$)	Gas (GJ)	Electricity (kWh)	Gas (\$)	Electricity (\$)
MD	3,360	475,898	28,367	105,382	3,005	593,268 ²	34,249	121,920 ²
Town	23,170	2,244,660.00	216,657	574,860	19,916	2,107,689.78	218,424	591,600

¹2022 saw a large increase in electrical usage across all water infrastructure.

²These values include an estimated December consumption due to a changeover in billing company and inaccurate reported consumption.

Municipality	Consumption Savings ²			Adjusted Cost Savings ²			
	Gas (GJ)	Electricity (kWh)	Adjusted Electricity (kWh) ¹	Gas (\$)	Electricity (\$)	Adjusted Electricity (\$) ¹	Total (\$) ¹
MD	355	-117,370	6,343	4,046	-24,360	1,342	5,388
Town	3,253	136,970	136,970	35,681	38,445	38,445	74,126
Total ¹	3,608	19,600	143,313	39,727	14,085	39,787	79,514

¹These values don't include MD water infrastructure and other infrastructure introduced after 2019 that was not adjusted through the energy management program and has seen significant upgrades

²These values include an estimated December 2022 consumption due to a changeover in billing company and inaccurate reported consumption.

4 Study and Capital Project List

Funding applications have been made to several organizations to support Energy and Sustainability projects throughout the Town and MD. The accepted funding includes applications to the MCCAC REC, Climate Resiliency plan, and EV programs, the Southgrow EV charging program, the Fortis Save Energy grant, private funding from Enel Green Power, the Federation of Canadian (FCM) community building retrofit tracking grant, and Lethbridge Community Foundation.

Funding applications have been submitted and are under review for both the GICB new build and retrofit streams, the FCM GHG reduction grant, and the FCM property assessed clean energy funding stream. For further details on executed projects, the state of projects, and funding applied for see Table 12 below.

Table 12: Summary of studies and capital projects

Facility	Project	Grant funding		Status
		Provider or Program	Amount	
Confirmed:				
MPF	BMS upgrade	MCCAC REC	\$42,403	Complete and closed out
MPF	Insulation	MCCAC REC	\$4,377	Complete and closed out
Community	Climate Resiliency Grant	MCCAC Climate Resiliency Fund	\$160,000	Plan in progress, scheduled to finish June 30, 2023
Arena	Study	MCCAC REC	\$7,992	Complete and closed out
Arena	Furnaces	MCCAC REC	\$17,301	Complete and closed out
Arena	REALice	MCCAC REC	\$28,223	Complete and closed out
MPF/Arena	Energy tracking	FCM CBR	\$22,080	Executed, project installation expected July 2023
Splash Park	EV Chargers	Southgrow EV Charging	\$5,127	Project complete, awaiting closeout
MD Admin	EV Chargers	Southgrow EV Charging	\$9,036	Project awaiting closeout
Castle Mountain Resort	EV Chargers	Southgrow EV Charging	\$8,147	Project Schedule for May/June 2023
EV Chargers	EV Chargers	Enel Green Power	\$25,860	Funding support for above projects
EV	Ford Lightning	MCCAC EV program	\$14,000	Vehicle ordered, expecting delivery Q3 2023
Lebel	Solar	Lethbridge Community Foundation	\$10,000	Funding received, project expected for Q3 2023.

Facility	Project	Grant funding		Status
		Provider or Program	Amount	
Airport	Lighting retrofit	Fortis Save Energy	\$5,000	Funding received, project expected May 23, 2023
Community	MEM	MCCAC MEM	\$120,000	Received and program closed out
Total			\$479,546	
Planned:				
MPF/Arena	Energy Efficiency Retrofit	GICB	\$2,036,000	Submitted, pending review
MPF/Arena	Energy Efficiency Retrofit	FCM CBR GHG reduction	\$1,321,527	Submitted, pending review
Lebel	Solar	Enel Green Power	\$7,000	Verbal commitment has been approved
New build	New build	GICB	Private	Submitted, pending review
CEIP	CEIP	FCM	\$1,706,512	Submitted, pending review
Total			\$5,071,039	
Exploring:				
Airport	Solar		\$30,000	Any solar grants that come available
Community	Regional Energy Management	NRCAN	Private	Supporting Application which has been handed over to Alberta Southwest regional Economic Development Alliance with
Total				

5 Future Work

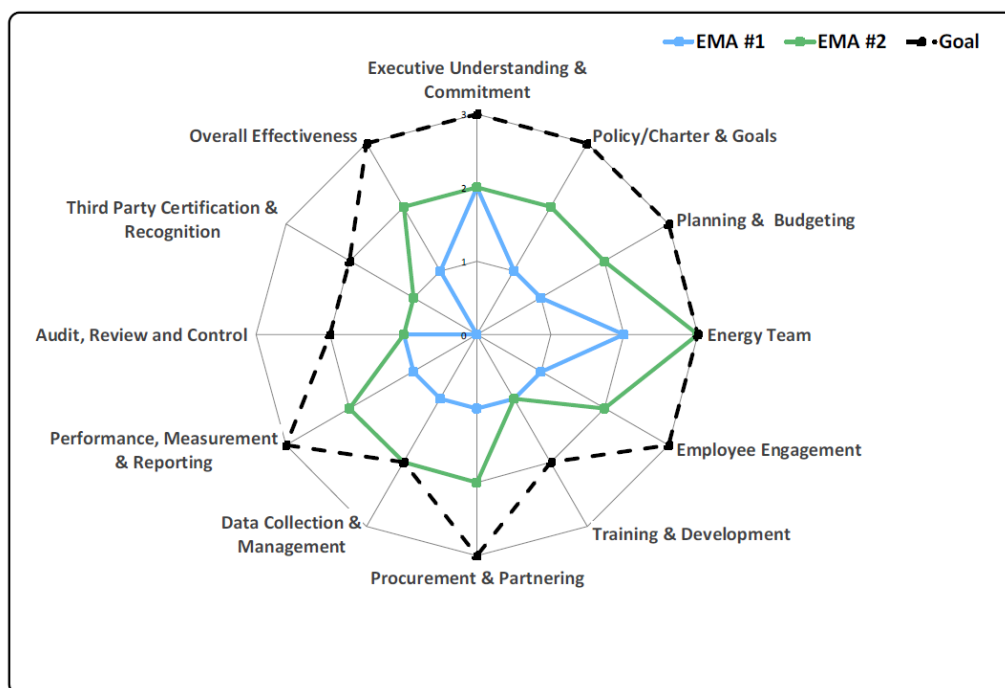
Future work for the Municipal Energy Project Lead moving into year 3 is split into three parts; completing projects, building programs, and planning for the future. Projects to be completed include the Climate Resiliency and Adaptation Plan, MD Solar project, EV chargers, various small ECMs across all facilities, and the Lebel Mansion Solar installation. The MEPL will support the development of the CEIP in partnership with the Town and MD, and assist in administration once launched. Finally, the MEPL will support developing plans as follows:

- An overarching energy guidance plan for facilities, fleet, and infrastructure to be used to support planning documents in both Municipalities.
- Developing capacity with the QUEST Canada net zero program to support recommendations for bylaw, policy, and goal setting.
- Integrating energy into asset management program.

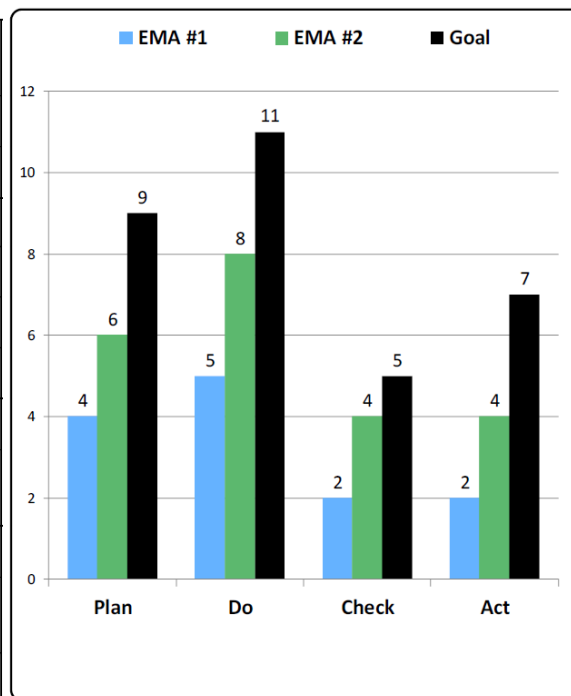
Appendix A: EMA Analysis for the Pincher Creek Partnership and Action Items

Action Plan			
Topic	Action	Due Date	Owner
Plan			
Executive Involvement	Executive Sponsor could announce an environmental champion winner for each quarter. This recognition from the top level helps promote employee interest and commitment.	Q3, 2022	La Vonne, Tristan
Policy/Charter & Goals	Formalize your established goals in an energy policy. When writing the policy, consider including goals for fleet electrification and management.	Q4, 2022	Tristan
Planning & Budgeting	With the help of Wendy, investigate if there is a way to secure an annual budget allocation for energy projects. This will encourage project implementation by reducing the level of evaluation projects must undergo before receiving funds.	Q4, 2022	Tristan, Wendy
Do			
Employee Engagement	Increase engagement of staff through energy-saving campaigns. The engagement could include activities like lunch n' learns, a turn-off campaign, an alternative transportation day, etc.	Q3, 2022	Tristan
	Collaborate with James and the communications department to increase community engagement and awareness around the city's efforts to become more energy efficient.	Q3, 2022	Tristan
Training & Development	Determine which employees would benefit most from attending training and conferences to expand their knowledge and see if a budget can be allocated for their attendance.	Q3, 2022	Tristan, Facility Team
Procurement & Partnering	Investigate formalizing the procurement process to evaluate purchases with low environmental impact at a higher value.	Q1, 2023	Tristan, Procurement Team
Check			
Performance, Measurement & Reporting	Write a monthly 1-page energy report which includes the most up-to-date energy model and project updates. Provide the report to management for them to distribute as they see fit.	Q4, 2022	Tristan
Act			
Audit, Review & Control	Review current PMs and update them as needed with energy conservation in mind. The review can prioritize the most significant energy users in scope and then expand to the remaining equipment.	Q1, 2023	Tristan, Facility Team
	Follow a maintenance checklist for transitioning equipment and operations to winter and summer seasons.	Q3, 2022	Tristan, Facility Team
Third Party Certification & Recognition	Investigate green building certifications and weigh the value of pursuing them. Even if the decision is made not to pursue certification, the standards can be a helpful framework to guide energy management decisions.	Q1, 2023	Tristan
Overall effectiveness	Prioritize low-cost/no-cost measures. Given the district's size, small changes to setpoints, schedules, etc., can lead to significant energy savings while avoiding capital investment.	Q3, 2022	Tristan

Recommendations		
Topic	Action	Owner
Do		
Energy Team	Create a cross-functional Energy Team with a target of awareness and engagement. Potential team member segments could include Operations & Maintenance team, council, Marketing, HR, Communications, or other departments. They can be engaged on an as-needed basis and periodically invited to energy team meetings.	Tristan
Check		
Data Collection & Management	Continue to assess data granularity and arrival speed. If it is determined that improvements are needed, consider installing submetering.	Tristan



	Management Area	EMA #1	EMA #2	Goal
Plan	Executive Understanding & Commitment	2	2	3
	Policy/Charter & Goals	1	2	3
	Planning & Budgeting	1	2	3
Do	Energy Team	2	3	3
	Employee Engagement	1	2	3
	Training & Development	1	1	2
	Procurement & Partnering	1	2	3
Check	Data Collection & Management	1	2	2
	Performance, Measurement & Reporting	1	2	3
Act	Audit, Review and Control	1	1	2
	Third Party Certification & Recognition	0	1	2
	Overall Effectiveness	1	2	3
TOTALS		13	22	32
% Actual versus Goal		41%	69%	



Pincher Creek Partnership - Energy Management Assessment						
	2021		2022			2023
	Q3	Q4	Q1	Q2	Q3	Q1
1	"ONGOING" Plan - Executive Inv. Continue sharing regular quarterly updates on the MEM program with all municipality's management team. Dave, La Vonne, Roland 08/18: Ongoing 11/25/2021 - Completed and ongoing	COMPLETE/ONGOING Plan - Planning/ Budgeting Identify short and long-term projects and include them in the budget planning. Dave, La Vonne 10/27: projects identified based on EMPs to date. Per discussions, Capital items to be presented as one-offs 11/25/2021-Propose green fund and work with the finance dept. - focus on	"ONGOING" Plan - Policy/Charter Share the Team Charter with all employees and council members to promote energy efficiency awareness. La Vonne, Dave 01/17/22: The Energy Policy & path forward is still an ongoing topic of discussion	"DROPPED" Plan - Executive Inv. Acknowledgment in form of rewards or appreciation from Executive Sponsor to energy team performance. La Vonne 08/31: It may lead to favouritism or competition that may not have true results	"DROPPED" Plan - Executive Inv. Executive Sponsor to announce an environmental champion winner for each quarter. La Vonne, Tristan 08/31: It may lead to favouritism or competition that may not have true results	"ONGOING" Plan - Policy/Charter Formalize established goals in an energy policy. When writing the policy, consider including goals for fleet electrification and management. Tristan 03/31/2023: This has become a priority for this year. Engaging with Quest to develop capacity and create documents for future
2	COMPLETE Plan - Planning/ Budgeting Develop a project plan to incorporate funding for energy projects outlined in the Energy Management Plan. Dave, Operations Team 08/18: Working on the budget that will be submitted in next ~2 weeks. 09/14: End of Sep completion for MD and Town 10/01: Complete, but continual updates required	"ONGOING" Do - Energy Team Create a formal process for replenishing the energy team should there be turnover or reallocation of employee time. La Vonne 10/27: To be a part of Energy Policy terms of reference	Plan - Planning/ Budgeting Place an Energy Efficiency component into your budget planning for future projects. Dave 01/17/22: Only small operational items made it to budgets. No energy efficiency component. Approached on one-off basis		"COMPLETE" Do - Emp Engagement Increase engagement of staff through energy-saving campaigns. This could include lunch n' learns, a turn-off campaign, etc. Tristan 08/31: Lunch n' Learn planned for Sept 12 on Energy Saving at Home. It would also be presented to Chamber of Commerce. Engagement stickers are being posted across some facilities.	"COMPLETE" Plan - Planning/ Budgeting Investigate if there is a way to secure an annual budget allocation for energy projects. Tristan, Wendy 17/10/2022: Energy budget items proposed
3	"ONGOING" Do - Emp Engagement Piggyback on council meetings to include energy talk in lunch and learns or in internal morning meetings. La Vonne, Dave 09/14/2021 - have been in for approvals 11/25/2021 - Currently not pursuing as working on other engagement project	COMPLETE Do - Emp Engagement Set up a physical or virtual suggestion box that can be used to collect energy savings ideas. Dave 10/27: My email will be suggestion box for now. Working to spread awareness 01/17/22: energy@pinchercreek.ca	"ONGOING" Do - Energy Team Increase cross-functionality of the energy team by inviting members from other departments. Dave 01/17/22: Planning path forward on this		"COMPLETE" Do - Emp Engagement Increase community engagement and awareness around the town's efforts to become more energy efficient. Tristan 01/13/2023: Lunch & learns still to be done 10/5: Energy efficiency day for MD and Town w social posts 08/31: Lunch n' Learn with Chamber of	"COMPLETE" Check - Performance & Reporting Write a monthly 1-page energy report which includes the most up-to-date energy model and project updates. Tristan 01/13/2023: Operations reports are created and maintained. It list ongoing projects, total spending
4	"ON HOLD" Do - Training / Dev. Connect with Energy Futures Lab to increase community engagement. Dave 09/14/2021 - James has been leading this initiative, might bring Community Road Show 10/27/21: EFL Lab open for applications 11/25/2021 - Applications closed, on hold	COMPLETE Do - Training / Dev. Send an introductory list of energy training and certifications. Share technical training opportunities. Prashant, Dave 11/25/2021 - To be shared, connect w/ P 12/06/2021 - To be complete	"ONGOING" Do - Procurement Do a systematic evaluation on electricity rates once a year. Look for ways to reduce peak demand. Dave, Alexa 01/17/22: Peak demand reduction not yet reviewed. In long term pricing contracts		"COMPLETE" Do - Training / Dev. Determine which employees would benefit from attending training and conferences and see if a budget can be allocated for their attendance. Tristan, Facility Team 01/13/2023: Tristan will be attending the FCM's Sustainable Communities in Feb 2023. 11/28/2022: Investing grader operator	

5		COMPLETE Do - Training / Dev. Determine a list of employees who would benefit most from additional training. Dave 10/27: Complete	Check - Data management Implement usage of data loggers after acquiring guidance from the MEM Coach on the optimum location and process. Dave		"COMPLETE" Act - Audit & Control Follow a maintenance checklist for transitioning equipment and operations to winter and summer seasons. Tristan, Facility Team 03/31/2023: Created a checklist for the contractors. Contractors will complete the checklist and make any notes for improvement. Applicable for recreation facilities.			
8		COMPLETE Do - Procurement Networking with other MEMs to find information on utility rate renegotiation and data analysis. City of Brooks have had some success on this. Dave 10/27: Received and aware of all contract refresh dates. Reviewing options for rate classes 12/20/23: Review complete	Check - Performance & Reporting Share RETscreen graphs that show saving as useful engagement tools. Dave		"COMPLETE" Act - Overall Effectiveness Prioritize low-cost/no-cost measures. Tristan 01/13/2023: Continuously advocating and implementing the low cost / no cost			
7		COMPLETE Check - Performance & Reporting Create RETScreen model using the daily usage data and share the generated performance graphs. Dave, Prashant 10/27: Model is in for approval with CLEAResult. Working on other	Act - Audit & Control Implement Energy Efficient settings on Standard Operating Procedures (SOP) for new equipment. Dave					
8		COMPLETE Act - Audit & Control Add "upgrade air compressor" to Opportunity Register. Dave 10/21: Complete & Installed	"ONGOING" Act - Overall Effectiveness Leverage Employee and council engagement by sharing progress and results. Dave 01/17/22: Results shared					
9		COMPLETE Act - Third Party Cert. Provide a list of building certification and recognition options to the energy team. Prashant	"ONGOING" Act - Overall Effectiveness Develop energy goals and begin implementing low/no-cost projects to build case studies.					
in								

Appendix B: Energy Management Plan for Town and MD

2021					2022						
August	September	October	November	December	January	February	March	April	May		
<div>ECM 2; COMPLETE MPF</div> <div>Schedule space temperature setbacks and ventilation settings based on occupancy.</div> <div>Owner: DD</div> <div>03/31: Setback adjustment to be captured post BAS installation.</div> <div>08/18: Completed for all the location except library which is controlled by zone-all system. 04/20: Adjusted library setbacks</div> <div>A</div>	<div>ECM 3; COMPLETE MPF</div> <div>Reset HVAC setpoints seasonally.</div> <div>Owner: DD/AS</div> <div>9/14/2021: Will be implemented on colder days</div> <div>9/15/2021: Complete for Lobby/Gym</div> <div>A</div>	<div>ECM 45; COMPLETE MPF</div> <div>Upgrade pool room insulation & install insulation blankets on pumps, flanges, etc.</div> <div>Owner: DD</div> <div>10/14/2021: Completed</div> <div>A</div>	<div>ECM 63; COMPLETE LEBEL</div> <div>Pilot storm windows. Contact window contractor and get pricing to properly seal front windows and pilot internal/external options</div> <div>Owner: DD/AS</div> <div>01/21/22: Weatherization for front windows complete</div> <div>A</div>	<div>ECM 60; COMPLETE LEBEL</div> <div>Perform a thermographic scan of the building envelope to reveal areas of radiant loss. Check radiators, windows, doors, etc.</div> <div>Owner: DD</div> <div>Jan. 21/22: Scan complete, report underway</div> <div>A</div>	<div>ECM 5; COMPLETE MPF/ARENA</div> <div>Begin using notched V-belts rather than smooth V-belts for the RTUs and other applicable HVAC appliances.</div> <div>Owner: AS</div> <div>1/21/22: Implemented for future changes</div> <div>A</div>	<div>ECM 37; COMPLETE MPF</div> <div>Reduce the pool temp during unoccupied hours.</div> <div>Owner: AG</div> <div>03/31: To be addressed with BMS commissioning</div> <div>04/08/22: Complete</div> <div>A</div>	<div>ECM 1; check if feasible MPF</div> <div>Schedule outside air damper control based on occupancy rather than letting them run continuously.</div> <div>Owner: DD</div> <div>03/31: Part of BMS.</div> <div>A</div>	<div>ECM 14 COMPLETE ARENA</div> <div>Ice Resurfacing Temperature Measure (proprietary name is REALice).</div> <div>Owner: DD/AS</div> <div>11/1/21: Signed offer, working to issue PO's</div> <div>installed: 04/22/22</div> <div>A</div>	<div>ECM 78: COMPLETE MPF</div> <div>Reduce pump speed for slide</div> <div>Owner: TW/AS</div> <div>complete: 5/13/22</div> <div>A</div>		
<div>ECM 26; COMPLETE MPF</div> <div>Educate staff on manually turning off water features.</div> <div>Owner: AG</div> <div>08/18: Ongoing</div> <div>08/30: Complete</div> <div>B</div>	<div>ECM 112; COMPLETE TOWN</div> <div>Take south welcome sign off grid</div> <div>Owner: DD</div> <div>30/09/21: Complete</div> <div>A</div>	<div>ECM 69; COMPLETE LEBEL</div> <div>Complete building condition assessment including solar assessment of roof above pottery studio</div> <div>Owner: DD</div> <div>02/21/22: Complete</div> <div>A</div>	<div>ECM 28; COMPLETE MPF/ARENA</div> <div>Do a monthly building walkaround to ensure that all lighting photocells are working.</div> <div>Owner: AS</div> <div>11/25/2021 - Completed on monthly basis, areas identified</div> <div>B</div>	<div>ECM 33; COMPLETE MPF/ARENA</div> <div>Perform a thermographic scan of the building envelope to reveal areas of radiant loss.</div> <div>Owner: DD</div> <div>11/1/2022 - Completed the scan, working on reporting</div> <div>B</div>		<div>ECM 9; COMPLETE MPF</div> <div>Implement monthly BAS "checkup" to make sure setpoints and schedules are correct.</div> <div>Owner: AG/DD</div> <div>03/31: To be done once BAS is installed.</div> <div>11/25/2021 - BAS install not yet complete</div> <div>B</div>	<div>ECM 56; COMPLETE LEBEL</div> <div>Tenant awareness or incentive program related to electric heater usage</div> <div>Owner: SM/DD/JVL</div> <div>03/31/22</div> <div>B</div>	<div>ECM 76; COMPLETE ARENA</div> <div>Install condensing furnaces for change rooms and seniors center</div> <div>Owner: DD/AS</div> <div>23/10/2022: Completed</div> <div>A</div>	<div>ECM 79; COMPLETE MPF</div> <div>Implement temperature schedule at the daycares</div> <div>Owner: TW/AS</div> <div></div> <div>A</div>		
<div>#12: depends on REC funding (approved)</div> <div>#14: Submitting rec application tomorrow (done)</div>	<div>#13: Review financials (Complete)</div>	<div>ECM 12 COMPLETE MPF</div> <div>Upgrade the building BMS system.</div> <div>Owner: DD/AS</div> <div>03/31: Received parts, installation still ongoing.</div> <div>9/14/2021: Offer letter from REC, issued PO.</div> <div>B</div>	<div>ECM 36; ONGOING MPF</div> <div>Evaluate installing variable speed drives on pool pumps and reducing pool circulation to only the amount needed.</div> <div>Owner: DD</div> <div>03/31/2022: Still ongoing - trouble getting good pricing from</div> <div>C</div>			<div>ECM 101; COMPLETE MPF</div> <div>change lagoon from rate 26 to rate 41</div> <div>Owner: DD</div> <div>A</div>	<div>ECM 68; COMPLETE LEBEL</div> <div>Increase tenant awareness of maintenance & energy contacts</div> <div>Owner: SM/DD/AS</div> <div>03/31: Addressed when released the thermal scan report.</div> <div>B</div>		<div>ECM 6; DUMPED MPF</div> <div>For the Library HVAC system, which have zone dampers and bypass dampers, consider installing VFD on supply fan.</div> <div>Owner: DD</div> <div></div> <div>C</div>		
		<div>ECM 17; COMPLETE ARENA</div> <div>Reduce flood water heater temperatures from 160 F to 140 F.</div> <div>Owner: AG/AS</div> <div>10/08/2021: Complete</div> <div>B</div>					<div>ECM 67; COMPLETE LEBEL</div> <div>Tenant education on blinds/shades usage</div> <div>Owner: SM/DD</div> <div>Completed: 03/31/22</div> <div>B</div>				
		<div>ECM 72; COMPLETE LEBEL</div> <div>Perform annual Kiln clean & inspection (along with blower & associated lines)</div> <div>Owner: SM</div> <div></div> <div>B</div>					<div>ECM 70; COMPLETE LEBEL</div> <div>Tenant education on radiators and performance when blocked</div> <div>Owner: SM/DD</div> <div>Completed: 03/31/22</div> <div>B</div>				
		<div>ECM 46; ONGOING LEBEL</div> <div>Fix issue lighting (dead or major driver issues) and replace with LEDs</div> <div>Owner: DD/AS</div> <div></div> <div>B</div>					<div>ECM 102; COMPLETE MPF/ARENA</div> <div>Install LEDs in old pool warehouse</div> <div>Owner: DD/AS</div> <div></div> <div>B</div>				
		<div>ECM 7; COMPLETE MPF</div> <div>Put a differential pressure across the air filters in AHUs and use its output to take a call on filter change.</div> <div>Owner: DD/AS</div> <div>9/14/2021: Awarded w/ ECM 12</div> <div>04/8/22: Complete</div> <div>C</div>									
				<div>#16, 21: Wants to wait for the results from eng. study from REC</div>			<div>PROJECT TYPES:</div> <div>- Low Effort, High Savings</div> <div>- Low Effort, Low Savings</div> <div>- High Effort, High Savings</div> <div>- High Effort, Low Savings</div> <div>A</div> <div>B</div> <div>C</div> <div>D</div>				

June	July	August	September	October	November	December	January	February	March	April	May
<div>ECM 55: DUMPED LEBEL</div> <div>Insulate boiler lines to prevent heat loss in areas where no useful heat is given</div> <div>Owner: AS</div> <div>03/31: To be done with the findings of thermal scan. 05/24: Determined insulating lines would have negative effect on building style and this should be re evaluated after radiator retrofit</div> <div>A</div>	<div>ECM 27:DUMPED MPF/ARENA</div> <div>Install lighting occupancy sensors in low traffic areas and photo sensors for outside light.</div> <div>Owner: AS</div> <div>A</div>	<div>ECM 94: COMPLETE GOLF COURSE</div> <div>Install Programmable thermostat</div> <div>Owner: TW</div> <div>Complete: Sept 6 2022</div> <div>A</div>	<div>ECM 103: COMPLETE TOWN</div> <div>Lunch and learn with staff</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 80: COMPLETE MPF</div> <div>Insulation insert for slide</div> <div>Owner: TW/AS</div> <div>B</div>	<div>ECM 66: COMPLETE LEBEL</div> <div>Perform check on windows and attempt to open where feasible and/or document those that can't be opened</div> <div>Owner: DD/AS</div> <div>D</div>	<div>ECM 54: ON HOLD LEBEL</div> <div>Seasonal boiler changes to supports including water temperature, WWSO, night setback for water temp., etc.</div> <div>Owner: DD/AS</div> <div>01/21/22: Changes deemed risky without HVAC pro input</div> <div>A</div>	<div>ECM 29: IN PROGRESS ARENA</div> <div>Replace non-LED fixtures with LED equivalents in seniors center.</div> <div>Owner: TW</div> <div>03/10/2023: May happen in late 2023. Fortis grant was used towards airport. FCC could be an alternative option in spring 12/19/2022: Received quotes 01/05/2023: Applied for Fortis</div> <div>B</div>	<div>ECM 52: ON HOLD LEBEL</div> <div>Evaluate low-carbon heating option (GSHP vs. Biomass) and perform preliminary design/ Consider air-source for cooling</div> <div>Owner: DD</div> <div>03/10/2023: On hold based on capacity</div> <div>A</div>	<div>ECM 83: COMMUNITY HALL</div> <div>replace old furnaces with new high efficiency versions</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 71: LEBEL</div> <div>Install Solar PV on South Roof above pottery studio</div> <div>Owner: DD</div> <div>C</div>	<div>ECM 109: MPF</div> <div>Install HRVs on exhaust fans</div> <div>Owner: TW</div> <div>C</div>
<div>ECM 89: COMPLETE MPF</div> <div>Retrofit gym lights with LEDs</div> <div>Owner: TW</div> <div>A</div>	<div>ECM 100: COMPLETE GOLF COURSE</div> <div>Turn AC up to 21 from 18C</div> <div>Owner: TW</div> <div>Should be checked on regularly</div> <div>B</div>	<div>ECM 107: DUMPED TOWN OFFICE</div> <div>Create microgen agreement</div> <div>Owner: TW</div> <div>10/05/2022: The team is being asked to wait until the budget session i.e. early December</div> <div>A</div>	<div>ECM 19: COMPLETE ARENA</div> <div>Increase ice temp to 23 F</div> <div>Owner: AS/TW</div> <div>B</div>	<div>ECM 106: ONGOING Lebel Mansion</div> <div>Endotherm in boiler</div> <div>Owner: TW/AS</div> <div>03/10/2023: No update for now, Tristan will follow up with the maintenance person. Budget might not be approved. 01/13/2023: Still waiting for the radiator to be refurbished; They will be looking for out of town contractors</div> <div>C</div>	<div>ECM 86: DUMPED WTP</div> <div>Insulate roller door</div> <div>Owner: TW</div> <div>C</div>	<div>ECM 24: ON HOLD MPF/ARENA</div> <div>Install low flow faucets, urinals, toilets, sink taps, etc.</div> <div>Owner: AS</div> <div>1/21/22: On hold pending related upgrade scheduling. Not worth doing ahead of time</div> <div>B</div>	<div>ECM 51: ONGOING LEBEL</div> <div>Consider efficiency in future purchases. Document end of life equipment and spec. out/price out high-efficiency replacements</div> <div>Owner: DD</div> <div>03/10/2023: Included in the GICB grant. Implementation depends on the grant approval</div> <div>B</div>	<div>ECM 21: MPF</div> <div>Consider installing VFD on brine pumps and controlling them based on target differential pressure.</div> <div>Owner: DD</div> <div>03/10/2023: Included in the GICB grant. Implementation depends on the grant approval</div> <div>C</div>	<div>ECM 108: TOWN OFFICE</div> <div>add solar PV</div> <div>Owner: TW</div> <div>C</div>	<div>ECM 50: LEBEL</div> <div>Pilot off-grid solar lighting for parking lot lighting</div> <div>Owner: DD</div> <div>C</div>	<div>ECM 15: ARENA</div> <div>Evaluate installing ice plant heat recovery to provide hot water for low-grade heat needs.</div> <div>Owner: DD</div> <div>C</div>
<div>ECM 74: ONGOING MPF</div> <div>Replace CFLs with LEDs in Library as they fail</div> <div>Owner: TW/AS</div> <div>A</div>	<div>ECM 23:COMPLETE MPF/ARENA</div> <div>Review insulation on DHW lines and if opportunity exist, insulate hot piping.</div> <div>Owner: DD/AS</div> <div>03/31: To be done with the findings of thermal scan.</div> <div>B</div>	<div>ECM 110: DUMPED MUNICIPALITY</div> <div>Stop paying highway 6 flasher bill</div> <div>Owner: TW</div> <div>9/16/2022: Council decided to keep them and foot the bill</div> <div>B</div>	<div>ECM 18: DUMPED ARENA</div> <div>Keep ice thickness between 0.75 and 1 in. (19-25 mm).</div> <div>Owner: AG/AS</div> <div>9/15/2021: Moved post REALICE due to ice thickness concerns</div> <div>B</div>	<div>ECM 91: ONGOING LEBEL</div> <div>insulate old doorways</div> <div>Owner: TW/AS</div> <div>03/10/2023: The brick they use is manufactured some times. Waiting for the availability, custom order not possible.</div> <div>C</div>	<div>ECM 85: DUMPED WTP</div> <div>Replace furnace with heat pump</div> <div>Owner: TW</div> <div>C</div>	<div>ECM 43: COMPLETE MPF/ARENA</div> <div>Evaluate Solar PV for generation & emissions offset</div> <div>Owner: DD</div> <div>C</div>	<div>ECM 84: DUMPED WTP</div> <div>Install programmable thermostats</div> <div>Owner: TW</div> <div>10/24/2022: Set it and forget it at low temps means no need for program</div> <div>C</div>	<div>ECM 49: LEBEL</div> <div>Occupancy sensor control on Verandah lights and outdoor lighting upgrade to LEDs</div> <div>Owner: DD/AS</div> <div>03/10/2023: To be reviewed soon</div> <div>A</div>	<div>ECM 93: DUMPED MPF</div> <div>Install water covers to reduce heat loss to evaporation</div> <div>Owner: TW</div> <div>03/31/2023: Cost is one reason but also operational challenges associated with removing covers on and off</div> <div>C</div>	<div>ECM 92: WTP</div> <div>Install water covers to reduce heat loss to evaporation</div> <div>Owner: TW</div> <div>C</div>	<div>ECM 16: ARENA</div> <div>Replace existing compressor with higher efficiency model.</div> <div>Owner: DD/AG</div> <div>03/10/2023: Included in the GICB grant. Implementation depends on the grant approval</div> <div>C</div>
<div>ECM 30: COMPLETE ARENA</div> <div>Replace the existing score clock with higher efficiency one.</div> <div>Owner: DD/AS</div> <div>C</div>	<div>ECM 87: ONGOING TOWN OFFICE</div> <div>Retrofit town office with LEDs as they fail</div> <div>Owner: TW</div> <div>to be done on rolling retrofit basis as lights burn out</div> <div>A</div>		<div>ECM 59: COMPLETE LEBEL</div> <div>Insulate DHW lines to prevent heat loss in areas where no useful heat is given</div> <div>Owner: AS</div> <div>03/31: To be done with the findings of thermal scan. 09/20: Alex ordered insulation 10/3/2022: installed</div> <div>B</div>	<div>ECM 47: COMPLETE LEBEL</div> <div>Retrofit lights with LEDs and add switches</div> <div>Owner: TW/AS</div> <div>01/13/2023: The whole facility is now retrofitted with LEDs. Outside lights were already LEDs. 11/28/2022: Waiting for the lights to arrive 10/24/2022: PO sent and plan for install Nov 18</div> <div>A</div>		<div>ECM 10: DUMPED MPF/ARENA</div> <div>Investigate installing ERVs in pool, exhaust areas</div> <div>Owner: DD</div> <div>01/13/2023: Dumped based on cost vs benefits. Less benefits against the high cost.</div> <div>C</div>	<div>ECM 104: MPF</div> <div>Trial solarthermal DHW</div> <div>Owner: TW</div> <div>03/10/2023: Included in the GICB grant. Implementation depends on the grant approval. 01/13/2023: No budget received although there is a bit of grant funding available.</div> <div>C</div>	<div>ECM 34: COMPLETE MPF/ARENA</div> <div>Install or repair door sweeps, weatherstripping and caulk to reduce air infiltration.</div> <div>Owner: AS</div> <div>03/10/2023: Tristan to follow up on completion, project was identified and planned 03/31: To be done with the findings of thermal scan</div> <div>B</div>	<div>ECM 75: LEBEL</div> <div>Trial radiant heater reflectors and test thermographically before/after. If successful, install throughout</div> <div>Owner: DD/AS</div> <div>C</div>	<div>ECM 48: LEBEL</div> <div>Install indoor occupancy sensor/photosensors</div> <div>Owner: DD/AS</div> <div>A</div>	<div>ECM 62: LEBEL</div> <div>Upgrade attic insulation to prevent heat loss through roof</div> <div>Owner: DD/AS</div> <div>C</div>
<div>ECM 98: COMPLETE SPCA</div> <div>Turn AC up to 21 from 16C</div> <div>Owner: TW</div> <div>Should be checked on regularly</div> <div>B</div>	<div>ECM 111: COMPLETE Southhill Park</div> <div>Remove electrical service overnight</div> <div>Owner: TW</div> <div>A</div>		<div>ECM 118: COMPLETE MPF</div> <div>Turn off waterside pump overnight</div> <div>Owner: TW</div> <div>8/8/2022: Estimated implementation</div> <div>A</div>	<div>ECM 115: COMPLETE WATERPLANT</div> <div>Reduce thermostat to 15 degrees from 18 and 20</div> <div>Owner: TW</div> <div>A</div>		<div>ECM 120: COMPLETE MPF/ARENA</div> <div>Install 3 new lights outside arena and 2 outside library</div> <div>Owner: TW</div> <div>12/12/2022: Dylan installed the outside lights 12/19/2022: Follow up to check what was done</div> <div>C</div>	<div>ECM 65: COMPLETE LEBEL</div> <div>Install ceiling fans to assist with heat destratification in Winter and cooling in summer</div> <div>Owner: TW/AS</div> <div>12/29/2022: Install complete</div> <div>B</div>	<div>ECM 8 MPF/ARENA</div> <div>Control exhaust fans in dressing rooms, washrooms, and family room with occupancy sensors.</div> <div>Owner: AS</div> <div>03/10/2023: Some of them are</div> <div>A</div>	<div>ECM 114: COMPLETE VETERANS PARK</div> <div>Remove NG service and add electric DHW</div> <div>Owner: TW</div> <div>10/03/2022: Meter was locked 20/04/2023: Completed</div> <div>B</div>	<div>ECM 35: ARENA</div> <div>Install a reverse osmosis system to reduce the amount of iron, limestone, and other impurities in the flood water.</div> <div>Owner: DD</div> <div>C</div>	<div>ECM 44: ARENA</div> <div>Install control system for ice plant to enable better temp/pressure control when plant not in use and night setbacks</div> <div>Owner: DD</div> <div>C</div>
<div>ECM 113: COMPLETE TOWN</div> <div>Take north welcome sign off grid</div> <div>Owner: TW</div> <div>A</div>				<div>ECM 116: COMPLETE PINERIDGE</div> <div>Reduce thermostat to 15 degrees from 18</div> <div>Owner: TW</div> <div>B</div>		<div>ECM 82: ON HOLD COMMUNITY HALL</div> <div>insulate DHW lines and turn down temperature on tanks</div> <div>Owner: TW</div> <div>03/10/2023: Community Hall board asked to stop any</div> <div>B</div>	<div>ECM 64: ON HOLD LEBEL</div> <div>Install shades/blinds to decrease solar gain in summer & provide insulation in Winter</div> <div>Owner: DD/AS</div> <div>03/10/2023: On hold due to</div> <div>C</div>	<div>ECM 96: SPCA</div> <div>update door insulation</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 88: CRC</div> <div>Retrofit Joes gym lights with LEDs</div> <div>Owner: TW</div> <div>A</div>	<div>ECM 90: ARENA</div> <div>Replace CFLs with LEDs and add occupancy sensors in arena dressing rooms</div> <div>Owner: TW/AS</div> <div>A</div>	
				<div>ECM 117: COMPLETE PINCHER CREEK INTAKE</div> <div>Reduce thermostat to 60 from 65</div> <div>Owner: TW</div> <div>B</div>				<div>ECM 53: ONGOING LEBEL</div> <div>Refurbish Radiators & Upgrade Zoning Capabilities</div> <div>Owner: DD</div> <div>03/10/2023: Ongoing, more updates to follow 01/13/2023: Still waiting for the contractors</div> <div>C</div>	<div>ECM 97: SPCA</div> <div>install LED bulbs</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 81: COMMUNITY HALL</div> <div>replace lights with LEDs</div> <div>Owner: TW</div> <div>C</div>	<div>ECM 57: LEBEL</div> <div>Install programmable thermostats for baseboard heaters in Lebel Mansion</div> <div>Owner: DD/AS</div> <div>03/31: To be done.</div> <div>B</div>
				<div>ECM 119: COMPLETE TOWN</div> <div>Energy Efficiency day proclamation and social media outreach</div> <div>Owner: TW</div> <div>B</div>				<div>ECM 105: COMPLETE MPF</div> <div>Endotherm in boiler</div> <div>Owner: TW</div> <div>C</div>		<div>ECM 95: SPCA</div> <div>Add in programmable thermostat</div> <div>Owner: TW</div> <div>A</div>	<div>ECM 61: LEBEL</div> <div>Complete high priority weatherization based on results of thermographic scan</div> <div>Owner: DD/AS</div> <div>A</div>
											<div>ECM 121: Active MPF/ARENA</div> <div>Install electrical tracking system</div> <div>Owner: TW</div> <div>04/15/2023: Grant funding</div> <div>C</div>

MD

2021					2022				
August	September	October	November	December	January	February	March	April	May
ECM 2; COMPLETE <u>ADMIN, PW OFFICE/SHOP</u> Schedule HVAC setbacks based on schedule Owner: DD Completed: Aug 5th, except Admin boilers 10/14/21: Setback zone temperatures throughout 	ECM 3; COMPLETE <u>ADMIN, PW OFFICE/SHOP</u> Reset HVAC setpoints seasonally. Owner: DD Completed: 9/14/21 for Admin, except zone floating. 9/17/21 for PW Office 	ECM 43; COMPLETE <u>ADMIN</u> Read manual on power logging system in Admin Building and see what can be tracked/logged Owner: DD 10/18/21: Power, Peak demand, Energy can be logged 	ECM 50; COMPLETE <u>PW OFFICE/SHOP</u> Completely bi-weekly air system checks for leaks on compressor system & fix them Owner: BC 03/31/2022: Working on replacing the hoses. 	ECM 56; COMPLETE <u>WTP</u> Continue swapping fluorescent lights/ballasts with LED's as they fail Owner: RM (H2O) 01/01/2022: Continual project 	ECM 9; ONGOING <u>ADMIN, PW OFFICE/SHOP</u> Create inventory of HVAC/DHW/Heater Equipment reaching EUL in 2-5 years and plan high efficiency replacement units Owner: DD/MK 02/1/2022: List underway 		ECM 1; DUMPED <u>ADMIN</u> Schedule Office RTU OSA Damper Control based on occupancy Owner: DD 3/31/2022: Needs to re-evaluate again. 		ECM 59; ONGOING <u>WTP</u> Get maintenance contractor to provide regular filter, unit, heater, cooling checks Couple with other facilities Owner: DD
ECM 26; COMPLETE <u>ADMIN</u> Reset RTU-2 (Offices) Zone setpoints and tighten control to avoid overcooling/heating Owner: DD Completed: Jul 29th, could be programmed in (awaiting JCI) 	ECM 33; COMPLETE <u>ADMIN</u> Lower server room setpoint seasonally to match surrounding area setpoints within a degree or so Owner: DD Completed: 9/14/21, suggest turning off completely before EOS 	ECM 5; COMPLETE <u>ADMIN, PW OFFICE/SHOP</u> Use notched v-belts rather than smooth v-belts for RTUs and other HVAC motors Owner: JG/BC 10/27/21: Ongoing, no replacements needed yet 	ECM 15; COMPLETE <u>ADMIN, PW OFFICE/SHOP</u> Complete monthly building walkarounds during night/day to ensure lighting photocells are working and lights aren't remaining on when they shouldn't be Owner: JG 	ECM 58; COMPLETE <u>WTP</u> Lower DHW Setpoint Owner: RM (H2O) 	ECM 53; COMPLETE <u>PW OFFICE/SHOP</u> Label lights, fans, HVAC, etc. with what they do and put up signage that reminds employees to turn off lights, equipment, etc. Owner: BC/JG 01/20/22: site visit complete, labels to be created 2/1/2022: Completed 	ECM 18; COMPLETE <u>ADMIN, PW OFFICE/SHOP</u> Perform thermographic scan of building envelopes to reveal areas of significant heat loss. Release reports to staff Owner: DD 2/1/2022: Ongoing 		ECM 10; COMPLETE <u>PW OFFICE/SHOP</u> Review DHW insulation + other hot piping. If insulation is low or missing, plan repair Owner: TW complete: 05/16/22 	
ECM 27; COMPLETE <u>ADMIN</u> Lower override setpoint for boiler to 20C in winter, 15C in summer. Go down by 5C until issues arise Owner: DD Completed: Aug 17th, & October for Winter 	ECM 90; COMPLETE <u>LUNDBRECK SHOP</u> Replace fluorescent tubes with LED strips Owner: DD Completed: estimated sept 22 	ECM 7; COMPLETE <u>ADMIN</u> Implement monthly BAS "checkup" to make sure setpoints and schedules are correct Owner: DD No commissioning report, technically involved 10/20: Complete 	ECM 31; DUMPED <u>PW OFFICE/SHOP</u> Trial lowering air compressor setpoint to 125 psig for 1 week, lower by 5 psi/week to see if lower setpoint pressure can be used Owner: BC 	ECM 52; COMPLETE <u>PW OFFICE/SHOP</u> Replace AODD with similar electrical model when they reach end of life. Would require electrical work Owner: DD/BC 12/20/22: Sent list of options to BC for consideration 		ECM 61; ONGOING <u>WTP</u> Perform thermographic scan of building envelope to reveal areas of significant heat loss. Release reports to staff Owner: DD 3/31/2022: Scan done. Report ongoing. 2/1/2022: Will be completed this 		ECM 29; ONGOING <u>PW OFFICE/SHOP</u> Get maintenance contractor to provide regular filter, belt, HVAC replacement checks. Couple with other facilities. Owner: DD 	
ECM 17; COMPLETE <u>ADMIN, PW OFFICE/SHOP</u> Install smart power strips or programmable plugs Owner: DD Completed: Sep 7, 2021 		ECM 32; COMPLETE <u>ADMIN</u> Check VAV Box Design Conditions for Office RTU Owner: DD 10/14/21: Complete. Setpoints not changeable locally, investigation required 	ECM 51; DUMPED <u>PW OFFICE/SHOP</u> Use engineered air nozzles instead of open air hose blowing. Disallow open air blowing Owner: BC 					ECM 57; DUMPED <u>WTP</u> Install insulation 2-3 meter from inlet/outlet of DHW Owner: DD 	
ECM 28; COMPLETE <u>ADMIN</u> Close doors/shades for unoccupied zones, put up signage, and modify temperature setpoints Owner: DD Completed: Jul 29th 		ECM 54; COMPLETE <u>PW OFFICE/SHOP</u> Replace air compressor with new model that auto shuts off and move inside Owner: BC Oct 10/21: Complete 						ECM 35; ONGOING <u>ADMIN</u> Install occupancy sensors in Council Chambers to control temperature setbacks. This area is often unoccupied and heated at comfortable temperatures Owner: DD 	
ECM 30; COMPLETE <u>PW OFFICE/SHOP</u> Lower pressure washer setpoint to 140F and put up signage to keep below Owner: BC Completed: Aug 20th 		ECM 34; DUMPED <u>ADMIN</u> Increase building static pressure to 1" WC Owner: DD 10/14/21: Not changeable with current BMS setup, VFD controlled off duct pressure 						ECM 73; COMPLETE <u>AIRPORT</u> Replace lights with LEDs and remove ballasts in the shop Owner: TW 06/03/2022: Talked to Shane, will be done on a rolling basis 	

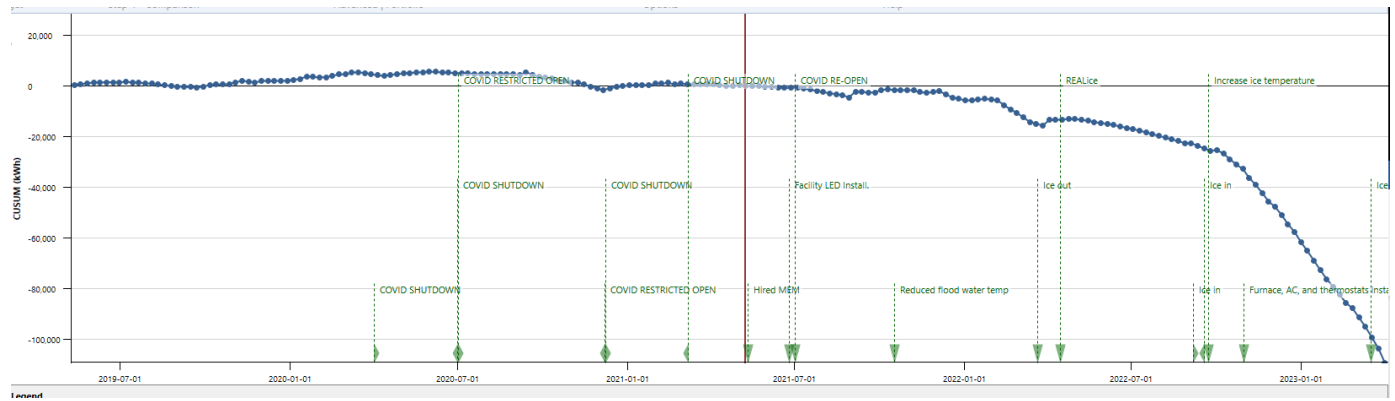
June	July	August	September	October	November	December	January	February	March	April	May
<div>ECM 60: COMPLETE</div> <div>WTP</div> <div>Adjust main room thermostat temp. & setbacks seasonally</div> <div>Owner: RM (H2O)</div> <div>A</div>	<div>ECM 6: DUMPED</div> <div>ADMIN,PW OFFICE/SHOP</div> <div>Control exhaust fans in washrooms and lunchrooms with occupancy sensors</div> <div>Owner: DD</div> <div>01/13/2023: Dumped due to higher cost of controls</div> <div>A</div>	<div>ECM 81: ONGOING</div> <div>ECOSTATION</div> <div>Put solar on it</div> <div>Owner: TW/DD</div> <div>03/10/2023: Still dealing with the permit issues. Could be done in next 1-2 months</div> <div>01/13/2023: Close to finish;</div> <div>D</div>	<div>ECM 72: COMPLETE</div> <div>AIRPORT SHOP</div> <div>Weatherstrip doors in shop</div> <div>Owner: TW</div> <div>01/27/2023: Completed last week</div> <div>01/13/2023: Still ongoing, depend on the availability</div> <div>B</div>	<div>ECM 68: COMPLETE</div> <div>Airport</div> <div>Install programmable thermostats</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 55: DUMPED</div> <div>WTP</div> <div>Perform review of expected pump performance verse operating data</div> <div>Owner: DD</div> <div>B</div>	<div>ECM 39: ONGOING</div> <div>Consider energy efficiency evaluations in all new MD purchases. Include section in Energy Policy relating to new purchases</div> <div>Owner: DD/RM</div> <div>03/10/2023: Already in</div> <div>B</div>	<div>ECM 82: ONGOING</div> <div>PW OFFICE</div> <div>Repalce furnace</div> <div>Owner: TW</div> <div>03/21/2023: Quotes received. Also, investigating heat pump. Prashant to check calculator for quantifying savings of heat</div> <div>Owner: DD</div> <div>A</div>	<div>ECM 40: DUMPED</div> <div>ADMIN, PW OFFICE/SHOP</div> <div>Evaluate all-season window tint and pilot in known high issue areas. Monitor if affect is noticeable & if so, plan to add throughout buildings</div> <div>Owner: DD</div> <div>C</div>	<div>ECM 48: ON HOLD</div> <div>PW OFFICE/SHOP</div> <div>Calculate energy savings & replace existing fans with destratification high energy efficient fans that can be programmed to be turned off at night</div> <div>Owner: DD</div> <div>D</div>	<div>ECM 8: ON HOLD</div> <div>ADMIN, PW OFFICE/SHOP</div> <div>Evaluate HRVs in shop exhausts (north, maybe south), washrooms, mechanical rooms, and lunchroom & install if economic</div> <div>Owner: DD</div> <div>D</div>	<div>ECM 83</div> <div>AIRPORT</div> <div>combine services to all 3 buildings</div> <div>Owner: TW/LEO</div> <div>C</div>
<div>ECM 4: COMPLETE</div> <div>PW OFFICE/SHOP</div> <div>Install networked programmable thermostats or BAS System to replace existing thermostats & achieve night setbacks</div> <div>Owner: DD</div> <div>03/31/2022: RFQ to be prepared. Budget exist.</div> <div>A</div>	<div>ECM 14: DUMPED</div> <div>ADMIN</div> <div>Install lighting occupancy and/or photocell sensors in low traffic areas</div> <div>Owner: DD</div> <div>10/05/2022: To be completed with #16</div> <div>B</div>	<div>ECM 80: COMPLETE</div> <div>BOBBY BURNS PARK</div> <div>replace incandescent lights</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 19: COMPLETE</div> <div>ADMIN, PW OFFICE/SHOP</div> <div>Install/repair door sweeps, weatherstripping, caulking, etc. for issue areas identified in thermographic scan. Repair damage to building envelope</div> <div>Owner: TW</div> <div>01/27/2023: Completed last</div> <div>B</div>	<div>ECM 85: COMPLETE</div> <div>ADMIN</div> <div>Add endotherm</div> <div>Owner: TW</div> <div>01/13/2023: Completed on Dec 19; Projected savings for 5 years. Payback period is 2.5 years. 11/28/2022: Waiting for the gas kit for the pot feeder</div> <div>Owner: DD</div> <div>C</div>	<div>ECM 49: ON HOLD</div> <div>PW OFFICE/SHOP</div> <div>Recommission HVAC Systems including shop which are currently only being touched when there are problems</div> <div>Owner: DD</div> <div>11/28/2022: On hold until next summer</div> <div>C</div>	<div>ECM 62: DUMPED</div> <div>WTP</div> <div>Install weatherization/caulking related to ECM 61</div> <div>Owner: DD</div> <div>01/13/2023: No opportunity to install the project</div> <div>B</div>	<div>ECM 67: ONGOING</div> <div>Airport</div> <div>Install LEDs and occupancy sensors</div> <div>Owner: TW</div> <div>03/10/2023: Fortis grant secured, installtion in next 1-2 months</div> <div>01/13/2023: Ongoing, applied</div> <div>B</div>	<div>ECM 79: ONGOING</div> <div>PARKS</div> <div>Go offgrid with lundbreck sign - put solar to power the sign</div> <div>Owner: TW</div> <div>03/10/2023: Applied grant to Lethbridge Community Foundation and waiting to hear. (\$1000 yearly charges against</div> <div>Owner: DD</div> <div>C</div>	<div>ECM 36: DUMPED</div> <div>ADMIN</div> <div>Evaluate if destratification fans would be valuable in high ceiling areas. If so, get quote for install</div> <div>Owner: DD</div> <div>D</div>	<div>ECM 75: ONGOING</div> <div>VEHICLES</div> <div>Adjust grader methods</div> <div>Owner: TW</div> <div>03/31/2023: Training on how to efficiently use the grader for max efficiency. Ongoing basis.</div> <div>Owner: DD</div> <div>B</div>	<div>ECM 41</div> <div>ADMIN</div> <div>Evaluate economics of GSHP & funding options for boiler pre-heat</div> <div>Owner: DD</div> <div>D</div>
<div>ECM 76: COMPLETE</div> <div>PW QUANSET</div> <div>replace old 300 W lightbulbs with new 30 W LEDs</div> <div>Owner: TW</div> <div>01/27/2023: Completed last week</div> <div>C</div>	<div>ECM 13: COMPLETE</div> <div>ADMIN</div> <div>Eliminate DHW Heater in North Bathroom or Kitchen Area and plumb hot water from one heater to both sources.</div> <div>Owner: TW</div> <div>C</div>	<div>ECM 86: COMPLETE</div> <div>PW</div> <div>Safety discussion on carbon</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 25: DUMPED</div> <div>ADMIN, PW OFFICE/SHOP</div> <div>Evaluate areas for potential solar installations, research funding options, & plan for installation if economic</div> <div>Owner: DD</div> <div>10/05/2022: DUMPED</div> <div>C</div>	<div>ECM 89: COMPLETE</div> <div>Admin</div> <div>Energy efficiency day proclamation</div> <div>Owner: TW</div> <div>Complete 10/05/2022</div> <div>C</div>	<div>ECM 42: ONGOING</div> <div>ADMIN</div> <div>Install charging station with funding from MCCAC in consideration with MD electrical vehicle & solar install</div> <div>Owner: DD</div> <div>03/10/2023: Wiring is complete for</div> <div>D</div>		<div>ECM 88: ONGOING</div> <div>Admin</div> <div>Develop alternative learning curriculum for schools</div> <div>Owner: TW</div> <div>03/10/2023: Materials developed, waiting from school to get confirmation on</div> <div>C</div>	<div>ECM 46: DUMPED</div> <div>PW OFFICE/SHOP</div> <div>Investigate if VFD can be installed on North RTU fans and install if economic</div> <div>Owner: DD</div> <div>03/10/2023: The fans are already on ECM motors.</div> <div>C</div>	<div>ECM 71: ON HOLD</div> <div>AIRPORT</div> <div>Insulate walls and roof</div> <div>Owner: TW</div> <div>C</div>	<div>ECM 47: ON HOLD</div> <div>PW OFFICE/SHOP</div> <div>Investigate if air curtains are economic and install if they are</div> <div>Owner: TW</div> <div>9/30/2022: Would need to attach to a control for door opening in order to not have</div> <div>D</div>	<div>ECM 77</div> <div>AIRPORT</div> <div>cover south windows</div> <div>Owner: TW</div> <div>B</div>
<div>ECM 65: COMPLETE</div> <div>AIRPORT</div> <div>Install insulation 2-3 meter from inlet/outlet of DHW</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 66: DUMPED</div> <div>Airport</div> <div>Take DHW tank from MD and install in Airport</div> <div>Owner: TW</div> <div>10/28/2022: Electric hot water tank at the MD, and NG one at the airport. Potentially to be dumped. Potential to purchase a new one in the future.</div> <div>B</div>				<div>ECM 87: COMPLETE</div> <div>AIRPORT TERMINAL</div> <div>Install/repair door sweeps, weatherstripping, caulking, etc. for issue areas identified in thermographic scan. Repair damage to building envelope</div> <div>Owner: TW</div> <div>01/27/2023: Completed last week</div> <div>01/13/2023: Still ongoing, to be</div> <div>B</div>		<div>ECM 92: COMPLETE</div> <div>Sand Shed</div> <div>Replace fluorescent bulbs with LEDs</div> <div>Owner: TW</div> <div>01/27/2023: Completed last week</div> <div>A</div>	<div>ECM 37: COMPLETE</div> <div>ADMIN</div> <div>Evaluate HVAC system & consider upgrades if system is truly performing at limits and static pressure/temperature issues cannot be fixed</div> <div>Owner: DD</div> <div>03/10/2023: Fixed</div> <div>C</div>	<div>ECM 63: ONGOING</div> <div>Airport</div> <div>Evaluate solar, design, and locate available grants</div> <div>Owner: TW</div> <div>01/13/2023: Changed installation from WTP to Airport. Working on the strategy and designing; potential for 30 kW. Funder in house. Tentative</div> <div>D</div>	<div>ECM 70</div> <div>AIRPORT</div> <div>Repalce shop windows</div> <div>Owner: TW</div> <div>C</div>	
<div>ECM 69: DUMPED</div> <div>AIRPORT</div> <div>turn down compressor set point</div> <div>Owner: TW</div> <div>B</div>	<div>ECM 74: COMPLETE</div> <div>Vehicles</div> <div>Anti idling policies</div> <div>Owner: TW</div> <div>B</div>						<div>ECM 91: COMPLETE</div> <div>LUNDBRECK SHOP</div> <div>Replace fluorescent tubes and bulbs with LEDs</div> <div>Owner: TW</div> <div>01/27/2023: Completed last week</div> <div>A</div>	<div>ECM 16: COMPLETE</div> <div>ADMIN</div> <div>Evaluate replacing all non-LED lights in high use areas with equivalent LED models. Get funding</div> <div>Owner: DD</div> <div>03/10/2023: Completed for burned lights, but will be replacing with LEDs as they</div> <div>C</div>			<div>PROJECT T</div> <div>A</div> <div>B</div> <div>C</div> <div>D</div>
	<div>ECM 84: COMPLETE</div> <div>Admin</div> <div>Breakfast and learn</div> <div>Owner: TW</div> <div>B</div>										<div>FOL</div> <div>11 -</div> <div>12 -</div> <div>45 -</div>

Appendix C: Employee Engagement – Planning Session

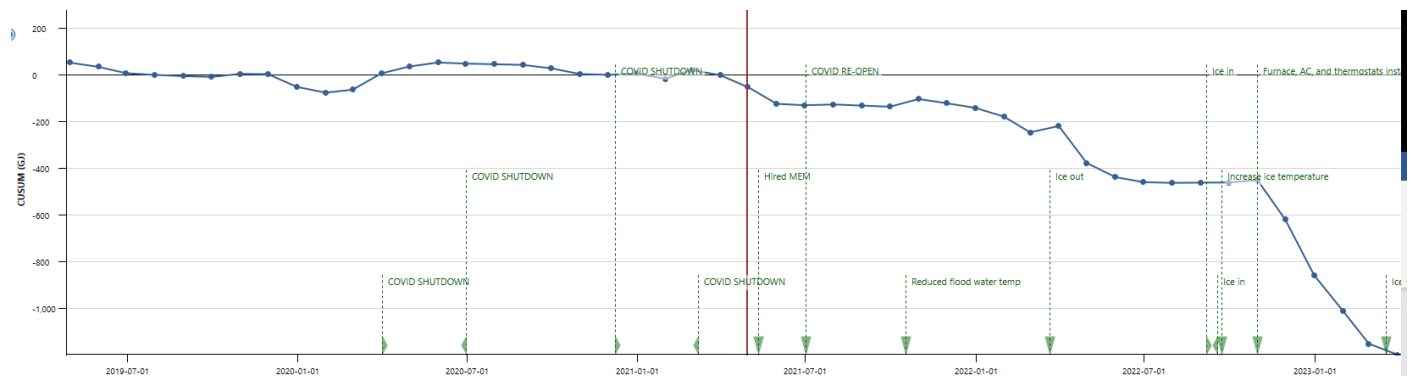
What to do and when?					
Timeline		Activity / Action Item	ADKAR	Owner	Status
Q4 2021	October	Brainstorm potential questions and knowledge to spread through campaign	Aw	David Desabrais	Completed
		Identify platform and means of communication	Ab	David Desabrais	Completed
		Engage communicators and start leveraging knowledge/resources (graphics, avenues of communication?)	Aw	David Desabrais	Completed
	November	Identify and gather prizes	D	David Desabrais / Marie Everts	Completed
		Create quiz #1 & Launch	Ab	David Desabrais	Completed
		Create timeline plan for other quizzes	Ab	David Desabrais	Completed
	December	Recognize results of quiz #1 and distribute prizes with additional feedback and quiz answers in quick readable format for those whom didn't participate	R	David Desabrais	Completed
		Share stories of success (if any) in regard to engagement with energy team	R	David Desabrais	Completed
		Share results in weekly meetings with Town & MD (or with council)	R	David Desabrais	Completed
Q1 2022	January	Monitor the activities of the staff and continue the conversation on energy efficiency benefits	Ab	David Desabrais	In progress
	February				
	March	Provide feedback via energy modelling (share results via bulletin boards, emails, etc.)	R	David Desabrais	
Q2 2022	April	Distribute awards to winners and announce the results to Quiz #1		David Desabrais	Completed
				Tristan Walker	
	May	Develop quiz #2		Tristan Walker	In progress
Q3 2022	June	Provide feedback via energy modelling (share results via bulletin boards, emails, etc.)	R	Tristan Walker	Completed
				Tristan Walker	Completed
	July	develop lunch and learn		Tristan Walker	Completed
		build retscreen model for energy savings metrics		Tristan Walker	Completed
		Deliver lunch and learn to MD admin		Tristan Walker	Completed
Q4 2022	August	deliver presentation to MD PW safety meeting		Tristan Walker	Completed
	September	deliver lunch and learn to town staff		Tristan Walker	
Q4 2022	October				
	November				
Q4 2022	December	Develop monthly newsletter		Tristan Walker	Completed

Appendix D: RETScreen Energy Models – CUSUM Analysis

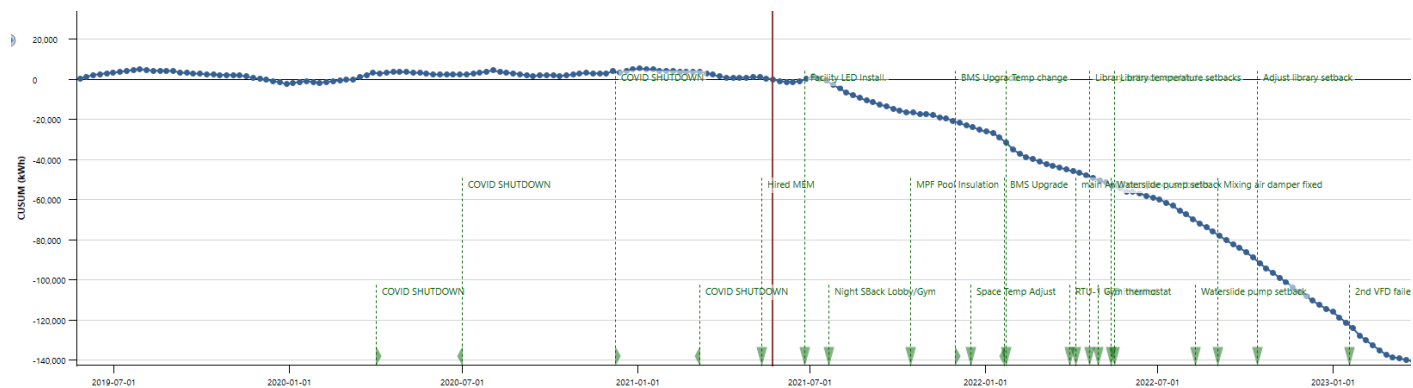
Arena: Electric Model

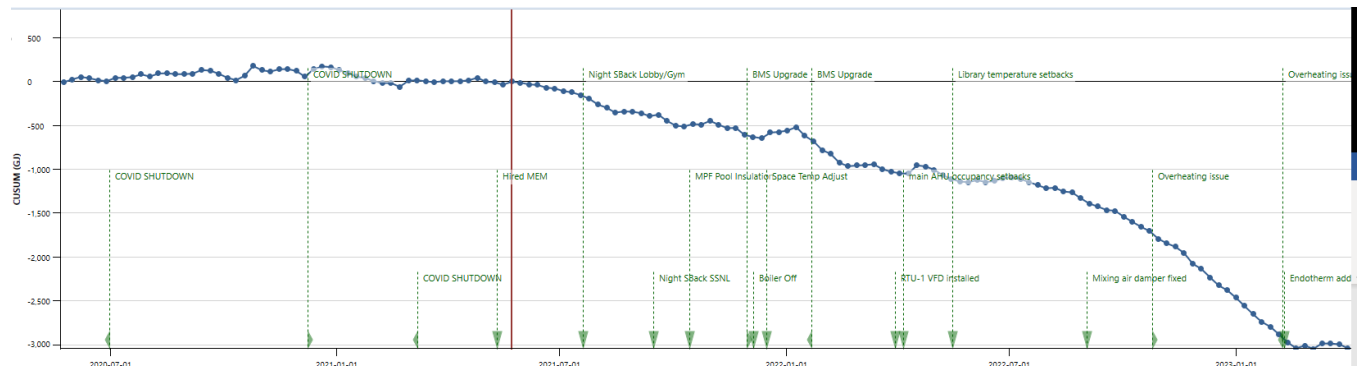
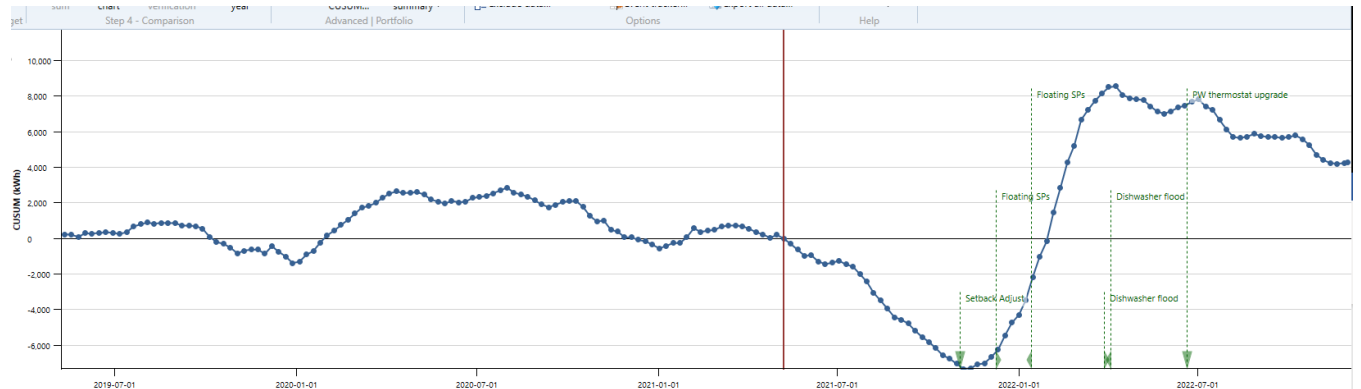
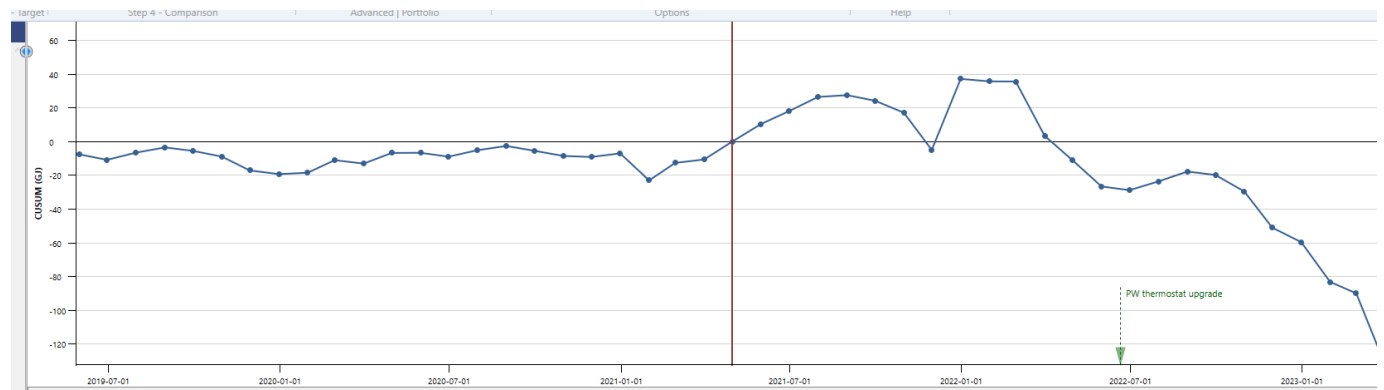


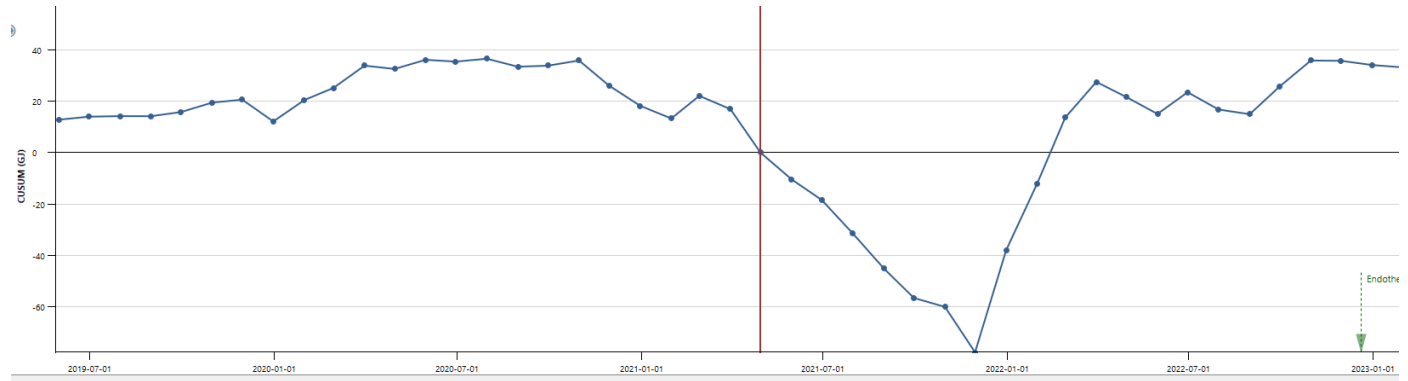
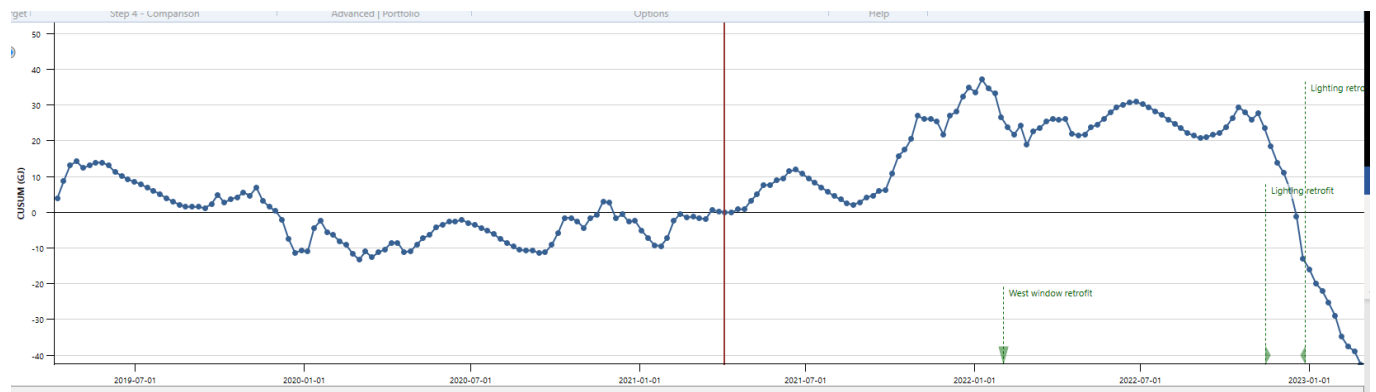
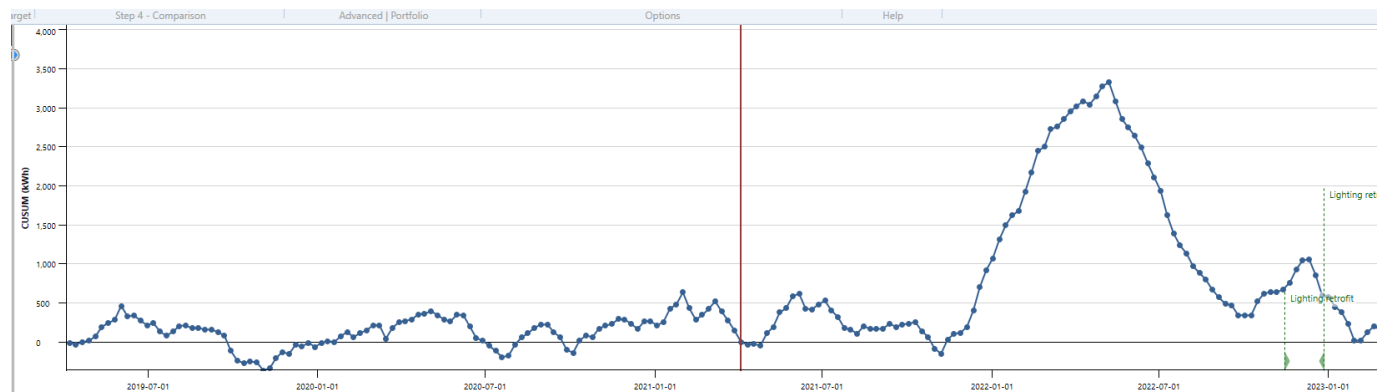
Arena: Gas Model



MPF: Electric Model



MPF: Gas Model**MD: Electric Model****MD PW: Gas Model**

MD Admin: Gas Model (not REC verified)**Lebel: Gas Model****Lebel: Electric Model**

Appendix E: Examples of Calculations Performed in EMS

Note: GHG Factors of 0.00057 tCO₂/kWhr and 0.05 tCO₂/GJ were used when calculating estimated GHG reductions (along with actual GHG reductions).

Cost savings were calculated based on \$/kW and \$/GJ costs identified in benchmarking report on a per facility basis. These costs were factored down to account for the non-variable components of electricity and gas distribution.

Other high-level savings shown in opportunity registers and estimated as part of GHG Portfolio are mostly estimated based on size of equipment and estimated energy usage per facility. For example, if during the Energy Scan we concluded that refrigeration equipment is using 25% of facility energy, and we are setting back the refrigeration temperature total energy savings would be a small portion of the 25% of total energy usage. This was done due to the vast number of ECM's to help consider which ECM's to pursue and prioritize without using up all of the positions time in quantifying difficult to estimate low/no-cost savings.

MPF: Replacing Fluorescent Lights with LEDs

Refer to REC Program [Lighting Calculator](#).

MPF: Measure #2 Schedule space temp. setbacks based on occupancy where ability exists

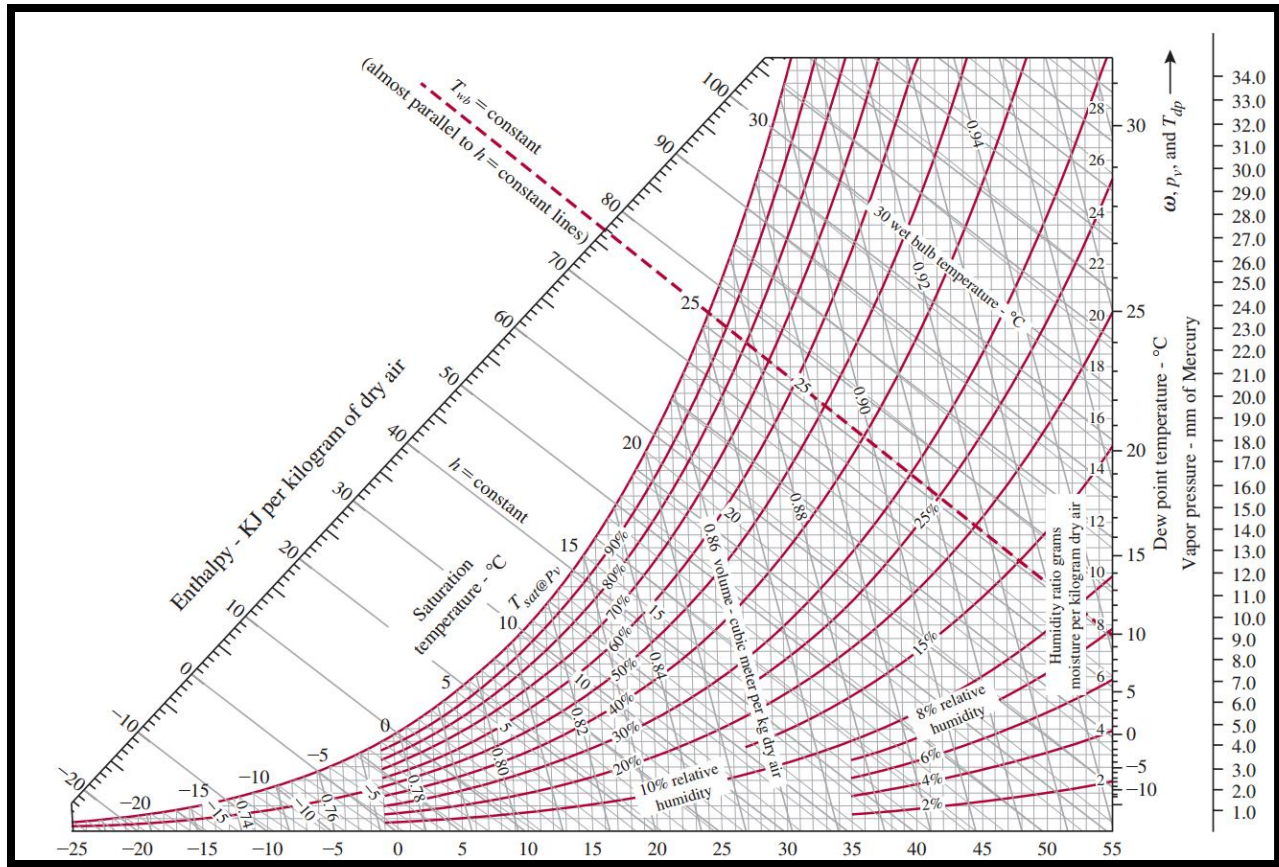
The Lobby area and Gym area of the MPF center have programmable thermostats. Temperatures were reduced in this area during low/no occupancy.

Lobby area heat setpoint is 21.5 °C during occupied period and 16 °C during unoccupied.

Gym area heat setpoint is 17 °C during occupied period and 16 °C during unoccupied.

Savings for this measure were calculated based on the following given information and assumptions:

- The relative humidity is 60% (based on annual ground data)
- The air density is 1.1 kg/m³ (based on average pressure, temperature, Humidity)
- Lobby has a space of 2,300 m³
- Gym has a space of 1,600 m³
- Referring to SI Psychrometric Chart, the enthalpy of air is 48 KJ/kg when the temperature is at 21.5 °C; the enthalpy of air is 36 KJ/kg when the temperature is at 17 °C, and 33.5 KJ/kg at 16 °C
- Heating season of 8 months
- Lobby setbacks = 81 hrs/wk, 2,592 hrs/season
- Gym setbacks = 75 hrs/wk, 2,592 hrs/season



The thermostat control savings were calculated as:

Lobby Thermostat control savings (GJ)

$$\begin{aligned}
 &= \left\{ \left[\text{Space (m}^3\text{)} \times \text{Density of air } \left(\frac{\text{kg}}{\text{m}^3} \right) \right. \right. \\
 &\quad \times \left. \left. \left(\text{Enthalpy of air at 21.5C} - \text{Enthalpy of air at 16C} \right) \left(\frac{\text{kJ}}{\text{kg}} \right) \right]_{\text{Fraser}} \right\} \\
 &\quad * \text{Annual time (hr)} = \left\{ \left(2300 \text{ m}^3 * 1.1 \frac{\text{kg}}{\text{m}^3} + (48 - 33.5) \frac{\text{kJ}}{\text{kg}} \right) \right\} * 2592 \text{ hr} \\
 &= \mathbf{95 \text{ GJ/yr}}
 \end{aligned}$$

Gym Thermostat control savings (GJ)

$$\begin{aligned}
 &= \left\{ \left[\text{Space (m}^3\text{)} \times \text{Density of air } \left(\frac{\text{kg}}{\text{m}^3} \right) \right. \right. \\
 &\quad \times \left. \left. \left(\text{Enthalpy of air at 17C} - \text{Enthalpy of air at 16C} \right) \left(\frac{\text{kJ}}{\text{kg}} \right) \right]_{\text{Fraser}} \right\} \\
 &\quad * \text{Annual time (hr)} = \left\{ \left(1600 \text{ m}^3 * 1.1 \frac{\text{kg}}{\text{m}^3} + (36 - 33.5) \frac{\text{kJ}}{\text{kg}} \right) \right\} * 2592 \text{ hr} \\
 &= \mathbf{11 \text{ GJ/yr}}
 \end{aligned}$$

MPF: Measure #26 Educate staff on turning off slide

Combined power usage of water slide equipment ~5.4 kW

Combined heating usage of water slide equipment is ~200 mBTU/hr

Pool operates all year except 1 month

Assume training results in 2 hrs reduced usage/wk in power and 20 minutes/wk in gas

$$\text{Total reduced power } P_{red} = \text{Power} \times \text{hrs} = 5.4 \text{ kW} * 2 \text{ hrs} * \frac{48 \text{ wks}}{\text{yr}} = 518 \frac{\text{kWhr}}{\text{yr}}$$

$$\text{Total reduced gas } G_{red} = 200,000 \frac{\text{BTU}}{\text{hr}} * \frac{1055 \text{ J}}{\text{BTU}} * 0.33 \text{ hrs} * \frac{48 \text{ wks}}{\text{yr}} = 3.3 \frac{\text{GJ}}{\text{yr}}$$

Admin/PW Office & Shop: Measure #17 Install Programmable Plugs for Coffee Machine/Constant Draws

Refer to [Excel Calculation](#) for savings from one (1) Bunn Coffee Machine and one (1) water cooler.

For the Admin/PW Office & Shop two (2) programmable plugs were installed on coffee machines and three (3) on water coolers.

$$\text{Total Savings (kWhr)} = 300 * 2 + 230 * 3 = 1290 \frac{\text{kWhr}}{\text{yr}}$$

Lebel Mansion: Measure #63 Pilot Storm Windows & Weatherstripping

Refer to [Excel Calculation](#) for heat loss by air infiltration calculated as follows:

$$H_i = c_p \rho n V (t_i - t_o) * 240 \text{ days (heating)}$$

$$H_i = \text{Heat Loss Infiltration (kW)}$$

$$c_p = \text{specific heat air} \left(\frac{\text{J}}{\text{kgK}} \right) = 1,005 \frac{\text{J}}{\text{kgK}}$$

$$\rho = 1.225 \frac{\text{kg}}{\text{m}^3}$$

$$\begin{aligned} n &= \# \text{ of air shifts per second in room} \\ &= \frac{\text{AVG air in speed (measured via anemometer)} * \text{intake area}}{\text{room volume}} = \frac{(1.12 * 0.001)}{105} \\ &= 0.0000106984 \end{aligned}$$

$$H_i = 0.05 \text{ GJ}$$

Municipality Wide: Review utility rates and perform data analysis to see if classes or minimum demands can be changed

Refer to [Excel Calculation](#). Note calculations are drafts and were used to flag suspect sites for further discussion. Not to be used for reliable checks.

Admin/PW Office & Shop: Measure #15 Walkaround of lighting

Refer to [Excel Calculation](#). Excessive photocell shading of a main light control was identified & resolved.

PW Office & Shop: Measure #52 AODD Replacement Recommendation

Refer to [Calculation Email](#). Only a recommendation was completed for this, energy savings only achieved if implemented.

Beaver mines wastewater projects solar installation

[Sizing document](#). Refer to [Excel Calculation](#). Energy generation data was found using PVwatts from nrel.

HVAC replacements

[Excel Tool](#)

Lighting Projects

[Excel Tool](#)

Fuel Usage report

[Excel Tool](#)

EV savings

[Excel Tool](#)

Appendix F: Program Completion Checklist

#	Item	File format	Status	Remarks (if any)
1	Y2 Report	.doc	<input checked="" type="checkbox"/>	
2	Energy Management Plan (EMP) for scanned facilities	.xlsx	<input checked="" type="checkbox"/>	
3	EMA calendar for scanned facilities	.xlsx	<input checked="" type="checkbox"/>	
4	Opportunity Registers for scanned facilities	.xlsx	<input checked="" type="checkbox"/>	
5	RETSscreen energy models	.retx	<input checked="" type="checkbox"/>	
5	Photographs of completed and ongoing projects, engagement activities, celebration, recognition, etc.	Any image format	<input checked="" type="checkbox"/>	
6	Quotes from municipality leaders	In Y2 report	<input checked="" type="checkbox"/>	
7	Council / top management presentation	Pdf or ppt	<input checked="" type="checkbox"/>	To be done in June
8	Completion of the MEM program evaluation for Executive Sponsors	Survey link	<input checked="" type="checkbox"/>	
9	Completion of the MEM program evaluation for MEMs	Survey link	<input checked="" type="checkbox"/>	