AGENDA
COUNCIL COMMITTEE MEETING
MUNICIPAL DISTRICT OF PINCHER CREEK
January 28, 2025
11:00 am
Council Chambers

1) Approval of Agenda

2) Delegations

   a) 11:00 am to 11:20 am - Highway 3 Twinning Development Association
   b) 11:20 am to 11:40 am - Proposed Curling Rink Location Opposition Group
   c) 11:40 am to 12:10 pm - Renewable Energy Study Presentation

3) Closed Session

   a) Curling Club Funding Discussion – FOIP Sec. 24.1
   b) Public Works Call Log – FOIP Sec. 24.1
   c) Policy C-PW-003 Winter Maintenance on Roads – FOIP Sec. 24.1

4) Round Table

5) Adjournment

November 30, 2024

Municipal District of Pincher Creek Renewable Energy Conversion Study

Final Report

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MASSIF ENERGY

Executive Summary

The Municipal District of Pincher Creek (MD) is historically known as the birthplace of the wind industry in Canada due to their early adoption of wind turbine technology that has accelerated over the past twenty-five years. With a mature industry and significant infrastructure in place, concerns have been raised around the effective management of further renewable energy development. The MD contracted Massif Energy to review the existing renewable energy conversion (REC) infrastructure in the region and their impact on the tax base, the bylaws guiding development regulations and opportunities for improvement, and conduct community consultation to understand the perspective of local residents on future renewable energy projects.

Existing infrastructure includes 255 wind turbines over 9 wind farms for a total capacity of 511 MW, 1 hydro dam, and one battery. There are 16 substations in the region and 18 transmission lines with Voltages ranging from 69 kV to 500 kV. The tax income from these projects is estimated at $4.6 million in 2023 or 33% of municipal revenue, progressively decreasing as projects age and decommission until revenues hit 0 by 2050 based on the provided depreciation tables.

The MD Land Use Bylaw was reviewed and compared to other bylaws in Alberta from 7 similar jurisdictions, with some options for improvement identified. These improvements lie primarily in the restrictions and requirements around preferred land areas for development, reclamation and security and process, and consultation requirements with community and Municipal government.

Consultation was done through a community open house and survey using the findings of the study as a basis for discussion. A total of 20 people attended the open house and the survey garnered 87 responses. Based on what was heard, the community has concerns over the amount of wind turbines that currently exist, and would prefer minimal new development in favour of redeveloping existing sites or brownfield sites near existing transmission infrastructure to maintain the tax income and local jobs. It was also noted that preference would be for early consultation with developers before any site has been selected, and to use the Municipal land Use Suitability Tool (MLUST) which the MD commissioned in 2018 as a basis for identifying suitable locations for development. Finally, the community noted a strong preference for a new approach to community benefit for projects that provided cheaper energy on resident's energy bills.

Contents

Figures and Tables

Introduction

The Municipal District of Pincher Creek (MD) has contracted Massif Energy to conduct a review of the renewable energy conversion systems (RECs) within the MD, and the Land Use Bylaw (LUB) in relation to renewable energy development projects for the purpose of identifying opportunities to integrate future regulations around development. This review includes community consultation in the form of an open house and survey. A meeting was held on June 26, 2024 with MD and Old Man River Regional Services Commission staff to discuss scope and timeline for the project.

The analysis of existing infrastructure involved the density of RECs and capacity available on the transmission lines within the MD, analysis of existing applications for new generation, review of current Municipal and Provincial Policy, evaluation of tax income from RECs, and community sentiment towards RECs. The open house held on October 16, 2024 aimed to foster an inclusive space for residents to discuss the potential benefits, challenges, and community impacts of renewable energy projects. Through several informational, participants gained insight into the types of renewable technologies under consideration, such as wind, solar, and energy storage systems. The accompanying survey was conducted to gather detailed community feedback on renewable energy topics, allowing residents to voice their perspectives on aspects such as site selection, environmental concerns, economic benefits, and long-term sustainability.

This report provides an overview of the findings of the study and recommendations for future improvements to the LUB. The report is broken down into sections for each stage starting with the review of existing infrastructure, tax estimates, bylaw review, and ending with the results of the community consultation.

Current Renewable Energy Infrastructure

The following section provides an overview of the existing utility scale Renewable Energy Conversion Systems located within the MD. The location of all energy generation within the MD is shown below in Figure 1 downloaded from the Alberta Electric Systems Operator (AESO)[1] .

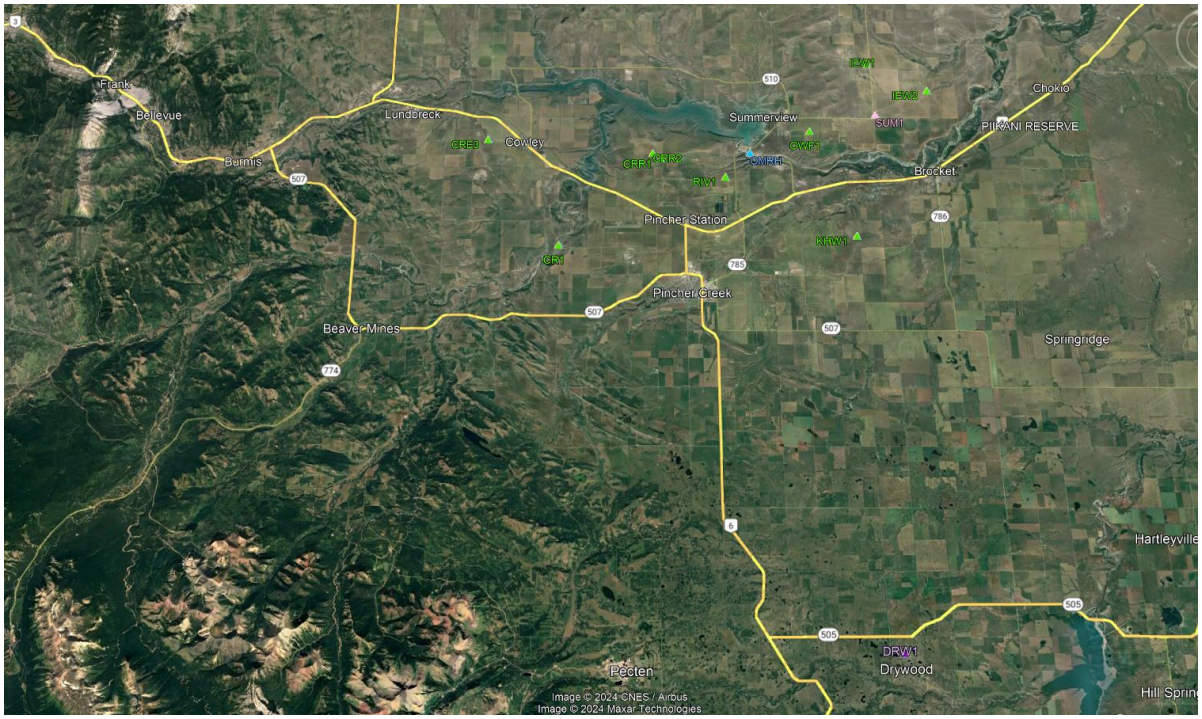


Figure 1: Map of current electricity generation facilities in the MD of Pincher Creek

The data for each site is retrieved and broken down into generator type, total sites, total generators at each site, as well as site and generator capacity. Currently, there are nine wind farms with 255 turbines, one battery storage facility, one natural gas generator and one hydro plant operating within the region for a total of 559 MW of capacity. The individual statistics of each generator can be seen below in Table 1.

[1] 'Connection Project Reporting » AESO' <https://www.aeso.ca/grid/transmission-projects/connection-project-reporting/> accessed 30 July 2024.

Table 1: Existing generation statistics in the MD of Pincher Creek

	Site Name	Commissioning Date	Site Capacity	Generator capacity	Total Generators
Wind	Cowley Ridge	2001	20 MW	1.3 MW	15
	Castle River #1	2001	39 MW	660 kW	60
	Castle Rock	2012	77 MW	2.3 MW	33
	Castle Rock 2	2020	29 MW	4.2 MW	7
	Riverview	2020	105 MW	4.2 MW	25
	Oldman 2	2014	46 MW	2.3 MW	20
	Kettles Hill	2006	63 MW	1.8 MW	35
	Summerview 1	2004	66 MW	1.8 MW	38
	Summerview 2	2010	66 MW	3 MW	22
	Total Wind	-	**511 MW**	-	**255**
Batteries	**Summerview**	2020	10 MW/20 MWh	10 MW/20 MWh	1
Natural Gas	**Drywood**	2020	6 MW	1.475 MW	4
Hydro	**Oldman River**	2002	32 MW	16 MW	2
Total	**-**	**-**	**559 MW**	-	**262**

The transmission infrastructure within the MD that enables the connection of these existing generators, and future generator connections to the grid is analysed in the next section.

Transmission Infrastructure

Within the MD of Pincher Creek there are several transmission lines ranging from 69 kV to 500 kV. These transmission lines enable addition of large loads, or the offtake of energy generation. For the purpose of this analysis, the published capacity from the AESO[2] for generation hosting on lines within the MD is analysed. The map of transmission line infrastructure including lines and substations is shown below in Figure 2. There are 16 substations within the MD, six 69 kV circuits represented in purple, nine 138 kV circuits in green, five 240 kV circuits in red, and one 500 kV circuit in blue. While

[2] 'Transmission Capability Map » AESO' <https://www.aeso.ca/grid/connecting-to-the-grid/transmission-capability-map/> accessed 30 July 2024.

this map is published by the AESO it uses approximated and estimated values to provide indicative results. For exact capacity at any location, it is recommended to conduct an interconnection study.

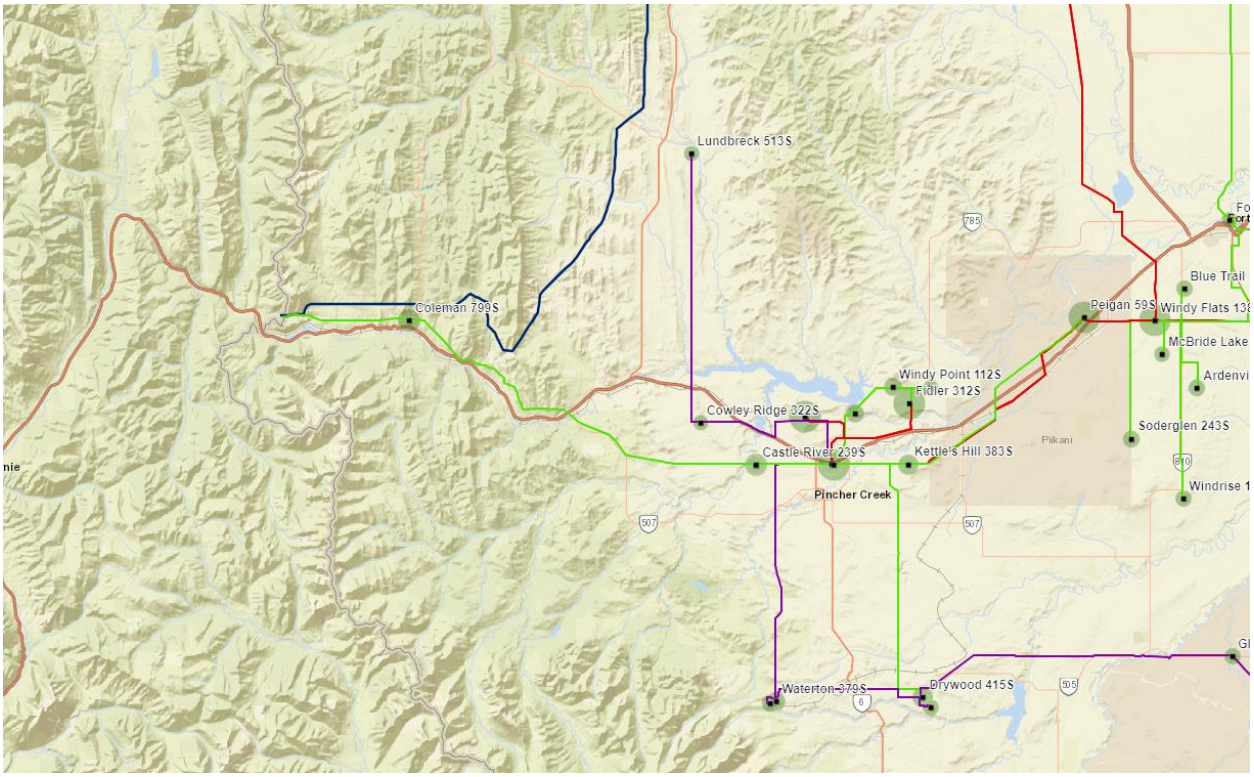


Figure 2: Map of transmission infrastructure within the MD of Pincher Creek

The interconnection capacity is calculated for each line at the substations it connects to. The total generation hosting capacity approaches the reported value as the distance to the substation decreases.

Substation Infrastructure

The hosting values for each substation are displayed below in Table 2. There are four substations with multiple voltage levels, while the remainder are isolated to a single transmission voltage. Goose lake, Castle Rock Ridge, and Fidler substations have the most hosting capacity at over 350 MW respectively.

Table 2: Substation voltage and generation hosting capacity within the MD of Pincher Creek

Substation	Bus	Voltage	Hosting Capacity
Lundbreck 513S	Bus 347	69 kV	7 MW
Cowley Ridge 322S	Bus 264	69 kV	7 MW
Pincher Creek 396S	Bus 223	69kV	54 MW
	Bus 224	138 kV	153 MW
Russell 632S	Bus 656	138 kV	154 MW
Castle River 239S	Bus 234	138 kV	72 MW
Castle Rock Ridge 205S	Bus 221	240 kV	355 MW
Goose Lake 103S	Bus 346	240 kV	354 MW
	Bus 296	138 kV	330 MW
Shell Waterton 502S	Bus 231	69 kV	45 MW
Waterton 379S	Bus 227	69 kV	66 MW
Drywood 415S	Bus 233	138 kV	116 MW
	Bus 226	69kV	74 MW
Rangeland Yarrow 995S	Bus 228	69 kV	24 MW
Oldman River 806S	Bus 230	138 kV	65 MW
Windy Point 112S	Bus 543	138 kV	65 MW
Summerview 354S	Bus 336	138 kV	17 MW
Fidler 312S	Bus 751	240 kV	356 MW
	Bus 752	138 kV	214 MW
Kettle's Hill 383S	Bus 402	138 kV	113 MW

Each circuit connects to one of the substations listed above. The following section will provide an overview of the transmission line circuits where generation projects can be connected through a T-tap or directly at a substation.

Transmission Lines

The following section displays each transmission circuit within the MD and the hosting capacity available at each substation connection point. Each circuit is recorded and shown below along with its substation connections and range of interconnection capabilities in Table 3. For circuits that have a different hosting capacity at each substation, the values are displayed in the order of substations identified within the row equivalent to that circuit. There is no data available for the 500 kV circuit or the 138 kV 893L from Goose Lake to Oldman River substations therefore those are not included.

Table 3: Transmission Line circuit voltage and generation hosting capacity within the MD of Pincher Creek

Circuit	Substations	Voltage	Hosting Capacity
514 L	Lundbreck 513s Cowley Ridge 322s Pincher Creek 396S	69 kV	7 MW
185 L	Pincher Creek 396S Waterton 379S	69 kV	46-48 MW
591L	Waterton 379S Shell Waterton 502S	69kV	45 MW
185 L	Waterton 379S Drywood 415S	69 kV	65/49 MW
185AL	Drywood 415S Rangeland Yarrow 995S	69 kV	24 MW
162L	Glenwood 229S Drywood 415S	69 kV	28/36 MW
164L	Goose Lake 103S Drywood 415S	138 kV	99/116 MW
170L	Coleman 799S Russell 632S	138 kV	156/154 MW
412L	Pincher Creek 396S Russell 632S	138 kV	153/154 MW
613L	Goose Lake 103S Pincher Creek 396S	138 kV	116/153 MW
616L **616AL**	Peigan 59S Goose Lake 103S Kettle's Hill 383S	138 kV	98/141/113 MW
893L **893AL** **893BL**	Oldman River 806S Fidler 312S Windy Point 112S	138 kV	65/93/65 MW
624L	Fidler 312S Summerview 354S	138 kV	17 MW
1071L	Castle Rock Ridge 205S Fidler 312S	240kV	355/356 MW
1072L	Goose Lake 103S Castle Rock Ridge 205S	240kV	354/355 MW
994L	Goose Lake 103S Fidler 312S	240 kV	354/356 MW
955L	Goose Lake 103S Peigan 59S	240 kV	354/350 MW
956L	Goose Lake 103S Peigan 59S	240 kV	354/350 MW

With the capacity noted above there are two projects proposed to the Alberta Utilities Commission (AUC) for construction which will be presented in the next section.

Proposed Projects

According to the AESO connection list[3] there are currently two projects that have applied for AUC approval that are shown below in Figure 3. The first project is a battery storage facility at the Oldman River currently, the second is the Sunrise Solar project Northwest of the Town of Pincher Creek. The Sunrise Solar project has been withdrawn as of November 30, 2024.

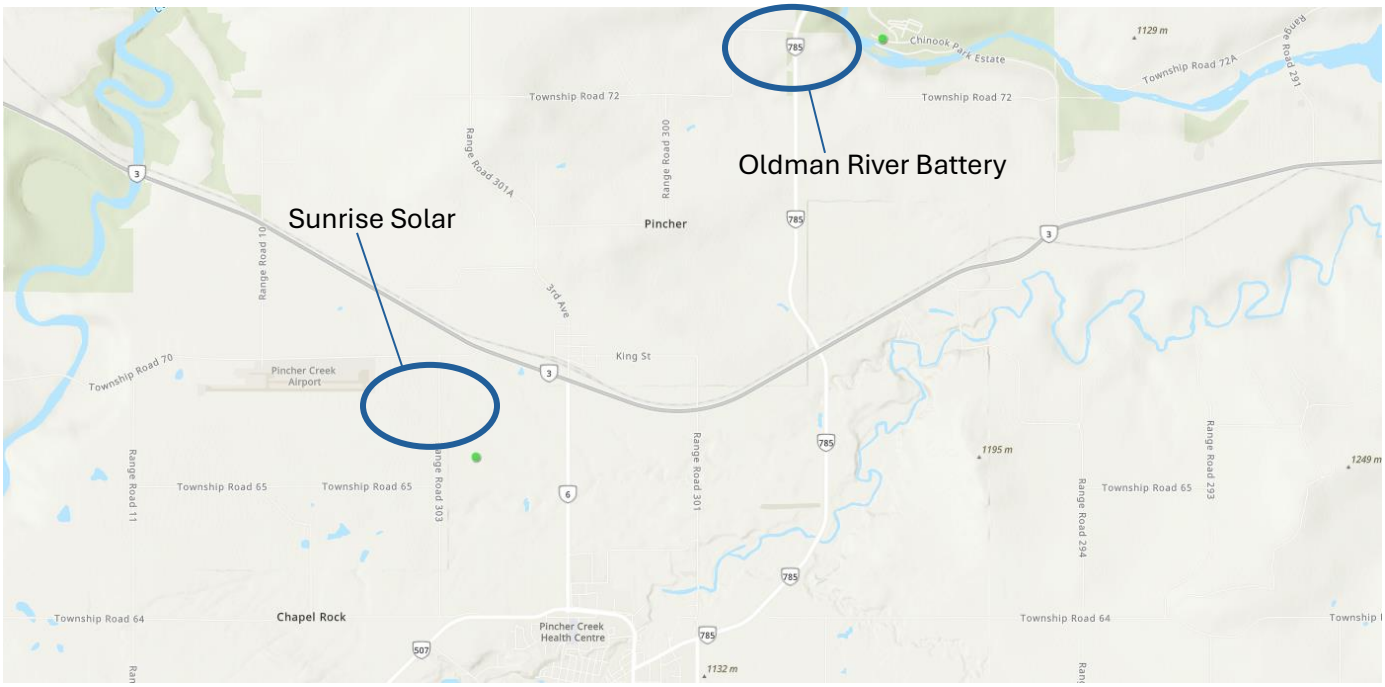


Figure 3: Location of proposed projects within the MD of Pincher Creek; Sunrise Solar and Oldman battery

The Battery project is at stage two of the AUC application process, and the Sunrise solar project is at stage three however has now been withdrawn as of November 30, 2024. The six stages of AUC application process[4] are shown below in Table 4 and range from application through the permitting process and finally to closeout.

[3] 'Connection Project Reporting » AESO' (n 1).
[4] 'Connection Process » AESO' <https://www.aeso.ca/grid/connecting-to-the-grid/connection-process/> accessed 31 July 2024.

Table 4: Generator connection application process description

Stage	Description	Timeline
0	**Application:** Submit a request for a new project to the AESO	2 weeks
1	**Scope:** Develop project plan and scope submission.	8 weeks
2	**Assessment:** Engineering studies for connection, cost and design along with land use evaluation.	14 weeks
3	**Regulatory Preparation:** Develop filing application to the AUC.	32 weeks
4	**AUC Application:** Submission of application to the AUC and review	N/A
5	**Construction:** Construction of transmission facilities and preparation for energization	N/A
6	**Close out:** Commissioning and final reporting	N/A

The proposed project statistics are shown below in Table 5. The Sunrise Solar project is expecting to energize a total of 75 MW in December 2026 pending successful applications. The Oldman River Battery is behind the fence of an existing generating facility and expects to be completed by July 2026 pending successful application.

Table 5: Proposed generation project statistics in the MD of Pincher Creek

Project	Size	Stage	Expected completion date
Oldman River Battery	23 MW	2	July 2026
Sunrise Solar	75 MW	3	December 2026

The municipal responsibilities and regulations for the approval process will be reviewed in future reports as indicated in the following next steps section.

Renewable Energy Tax Estimates

The inputs and factors used for the purpose of this analysis include the tax rate, depreciation table, and the Linear property Assessments. The tax rate shown in Table 6 was found under the "Non-Residential, Linear, Machinery & Equipment & Designated Industrial Property" classification in the 2024 Municipal District of Pincher Creek taxation Bylaw 1350-24 and assumed to stay constant throughout the entire analysis.

Table 6: Municipal District of Pincher Creek 2024 Linear Industrial Property Tax Rate

Tax rate
10.4890

The depreciation table used in the assessment process for wind assets was provided under confidentiality by the MD Assessor and is shown in Figure 4 below. The factors presented in this table are used to develop the assessed value of the wind assets based on their original value and age of the infrastructure. As noted, there is an immediate reduction in assessment value to 75%, and then a steady decrease until year 24 where the asset is considered valued at 20% of original until it is removed.

TABLE 2.27 SCHEDULE C FACTORS FOR APPROPRIATE ACCS AS IDENTIFIED IN TABLE 2.01

Chronological Age	Schedule C Factor	Chronological Age	Schedule C Factor	Chronological Age	Schedule C Factor
0	0.750	9	0.636	18	0.330
1	0.750	10	0.598	19	0.303
2	0.750	11	0.560	20	0.277
3	0.750	12	0.524	21	0.252
4	0.750	13	0.489	22	0.228
5	0.750	14	0.455	23	0.206
6	0.750	15	0.421	24	0.200
7	0.717	16	0.389	>24	0.200
8	0.676	17	0.360		

Figure 4: Wind asset depreciation table provided by MD Assessor.

The valuation of each renewable energy asset in the Municipal District was found in the publicly available Linear Tax Assessment Roll. Process and results are detailed further in the next section.

Assessment Value

The assessment value of energy generation infrastructure is found under the Linear Assessment Tax Roll. The Municipal District of Pincher Creek publishes this database each year on its website. For the purpose of this analysis, the most recent Linear Tax Assessment report from the 2023 Assessment Year was used. Based on the analysis provided in the Progress report submitted to the MD on July 31, 2024 there are nine wind farms with a total of 255 turbines within the MD. Additional electrical generation assets include the Windcharger battery facility, the Drywood natural gas

generator, and The Oldman River Hydro facility. This analysis considers only the wind assets as depreciation tables were not available for the other infrastructure classes.

The nine wind farms are owned by four separate companies; Enel Green Power, Enmax, Ikea, and TransAlta. The owners and their corresponding wind farms are shown below in Table 7.

Table 7: Wind farm companies in the Municipal District of Pincher Creek

Owner	Wind Farm
Enel	Castle Rock 1
	Castle Rock 2
	Riverview
Ikea	Oldman 2
Enmax	Kettles Hill
Transalta	Castle River
	Cowley Ridge
	Summerview 1
	Summerview 2

To identify the individual assessments, the tax roll was filtered into the "EPG- Electric Power Generation" classification. The Assessees under this category are shown below in Table 8, along with their assumed wind generation assets. This analysis does not include the Sinott farm, Robert Reid, or 2183270 Alberta Ltd, which are assumed to be privately owned assets with limited data available. The Bow Ark facility and the Hydro facility owned by ATCO were also not included as they do not own wind farm assets.

Table 8: Assessee name and associated wind farm assets

Assessee	Assets
ATCO Power Ltd Attn Property Tax West Building 200-5302 FORAND ST SW CALGARY, AB T3E 8B4	N/A
ENMAX Kettles Hill Inc. c/o Enmax Energy Corporation 141 50 AVE SE	Kettles Hill Wind Farm
Canadian Hydro Developers Inc. TransAlta Place c/o TRANSALTA 1400-1100 1 ST SE CALGARY, AB T2G 1B1	Castle River Wind Farm Summerview 1 Wind Farm Summerview 2 Wind Farm
Castle Rock Ridge Limited Partnership c/o Enel Green Power NorthAmerica 300-100 BRICKSTONE SQ ANDOVER, MA 01810 US	Castle Rock Wind Farm
Sinnott Farm Services PO BOX 426 PINCHER CREEK, AB T0K 1W0	N/A
BowArk Energy Ltd. Devon Tower 3405-400 3 AVE SW	N/A
Enel Alberta Wind Inc. c/o Enel Green Power North America Inc. 300-100 Brickstone Square Andover, MA 01810 US	Castle Rock 2 Wind Farm
Riverview Limited Partnership c/o Enel Green Power North America Inc. 300-100 Brickstone Sq Andover, MA 01810 US	Riverview Wind Farm
Oldman 2 Wind Farm Ltd. ATTN: Mark Menjak 1065 PLAINS RD E	Oldman 2 Wind Farm
2183270 Alberta Ltd. 59430 HWY 831 RR 1 WASKATENAU, AB T0A 3P0	N/A
Robert F. Reid Robert F. Reid PO BOX 29	N/A
Cowley Ridge Wind Power Inc. TransAlta Place c/o TRANSALTA 1400-1100 1 ST SE CALGARY, AB T2G 1B1	Cowley Ridge Wind Farm

Within each Assessee title, the assets and their equivalent assessment value were analyzed to determine the total valuation of each wind farm. For Assessees with multiple wind farms, namely TransAlta, the assessment values were analyzed to match the number of wind turbine assets within each wind farm.

This was done for the three separate TransAlta wind farms owned under the Canadian Hydro Developers moniker, the results of which are shown below in Table 9. Based on data from the TransAlta website the Castle River wind farm started with one V44 turbine and installed 59 total V47 turbines in the following years from June 2000 to July 2021 [3]. Within the data set there is one unit valued at $208,170 which is assumed to be the V44 installed first. There are an additional 15 units valued at $231,890 and 44 units valued at $256,650 which is assumed to make up the phased

installation of the remaining V47 turbines. The total value of the windfarm was then estimated to be $14,979,120. The Summerview 1 wind farm has 38 V80 turbines. Within the dataset there are 37 assets valued at $1,297,660. It is assumed a final turbine was brought online in a subsequent year and is valued at $1,443,950. This asset was selected due to its location within the 8th Township land description indicating proximity to other assets within the Summerview 1 windfarm. Summerview 2 has 22 total turbines [5]. Under the Canadian Hydro Developers Classifications there are 22 assets valued at $2,803,140, therefore it is assumed these are the turbines within the Summerview 2 wind farm and the wind farm's total valuation is $61,669,080.

Table 9: Canadian Hydro Developers TransAlta 2023 valuation of wind farm assets in the MD of Pincher Creek

Wind Farm	Unit valuation	Total valuation
Castle River	1 x V44 @ $208,170 15 x V47 @ $231,890 44 x V44 @ $256,650	$14,979,120
Summerview 1	37 x V80 @ $1,297,660 1 x V80 @ $1,443,950	$49,457,370
Summerview 2	22 x 3 MW @ $2,803,140	$61,669,080
Total		$126,105,570

There is a total of $146,576,590 in assets owned by TransAlta, $10,196,450 of which is associated with the Windcharger battery facility. This leaves an additional $10,274,570 in assessed value across 8 assets, which is assumed to make up ancillary systems and associated infrastructure. Valuations of ancillary electrical equipment were not included in the tax income analysis as it is not possible to accurately determine which asset corresponds to which site.

For Assessees owning only one wind farm, all assets categorized to them were assumed to be part of that wind farm and the results are shown in Table 10. The Enel wind farms, although all owned by Enel Green Power were separated into distinct ownership groups which facilitated the determination of each wind farm's value. There is an anomaly in the data for the Cowley Ridge Wind Farm which indicates only one asset despite there being 15 operational Nordex N60 Turbines on the site. For the purpose of this analysis, the value represented in the assessment roll will be used, however it should be acknowledged it is likely not reflective of the actual asset valuation for this wind farm. The Riverview wind farm has the largest valuation, followed closely by the Castle Rock wind farm which aligns with the size and operational dates of the wind farms in the region.

Table 10: Enel, Enmax, and Ikea wind farm 2023 valuations in the MD of Pincher Creek

Wind Farm	Total valuation
Kettles Hill	$58,589,830
Cowley Ridge	$11,410
Riverview	$99,527,130
Oldman 2	$53,885,640
Castle Rock 1	$80,094,300
Castle Rock 2	$25,308,760
Total	$212,014,010

The valuations established through this review are used to determine the tax revenue projections that will be outlined in the following section.

Taxation projections

Using the valuations estimated from the review of the 2023 Municipal District of Pincher Creek Linear Tax Assessment Roll, the original valuations of each wind farm were extrapolated using the age and the depreciation table provided. For example, the Kettles Hill wind farm started operations in 2006, making it 17 years old and has depreciated to 36% of its initial value. These valuations were then used to develop a projection of the tax income that will be earned over each respective lifetime. The valuations at commercial operations date for each wind farm are shown below in Table 11.

Table 11: 2023 and original valuations of wind farms in the MD of Pincher Creek

Wind Farm	Commercial Operation Date	2023 Valuation	Initial Valuation
Kettles Hill	2006	$58,589,830	$162,749,527.78
Cowley Ridge	2001	$11,410	$50,043.86
Riverview	2020	$99,527,130	$132,702,840.00
Oldman 2	2014	$53,885,640	$84,725,849.06
Castle Rock 1	2012	$80,094,300	$143,025,535.71
Castle Rock 2	2020	$25,308,760	$33,745,013.33
Castle River	1997	$14,979,120	$74,895,600.00
Summerview 1	2004	$49,457,370	$163,225,643.56
Summerview 2	2010	$61,669,080	$126,112,638.04
Total		$443,522,640.00	$921,232,691.34

Using the tax rate noted above, the tax received from the wind farms in 2023 was estimated to be $4,652,108.97, broken down by wind farm in Table 12 below. The bulk of the payments come from the larger Riverview, Castle Rock, Summerview, and Kettles Hill projects.

Table 12: 2023 estimated tax income from wind farms in the MD of Pincher Creek

Wind Farm	2023 Valuation	2023 Tax
Kettles Hill	$58,589,830	$614,548.73
Cowley Ridge	$11,410	$119.68
Riverview	$99,527,130	$1,043,940.07
Oldman 2	$53,885,640	$565,206.48
Castle Rock 1	$80,094,300	$840,109.11
Castle Rock 2	$25,308,760	$265,463.58
Castle River	$14,979,120	$157,115.99
Summerview 1	$49,457,370	$518,758.35
Summerview 2	$61,669,080	$646,846.98
Total		$4,652,108.97

Comparing this revenue to the total tax base of the MD of Pincher Creek in 2023 of $14,094,850, the wind farms make up 33% of total municipal tax income. The breakdown is displayed in graphical format in Figure 5 below. The remaining $9,442,741.03 making up 67% of Municipal revenue is assumed to come from a combination of residential, farm, commercial, and industrial properties. The removal of the income from renewable energy generation would require an increase in tax rate for the remaining assets should equal service levels be desired.

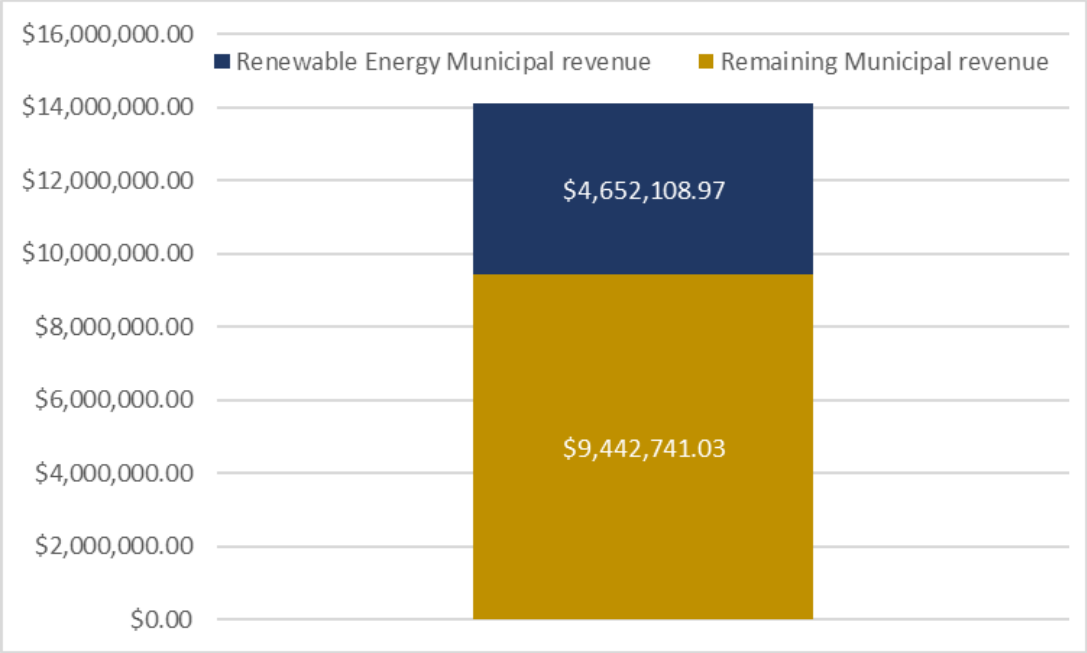


Figure 5: Municipal Revenue from renewable energy and other sources

Using the deprecation table provided and the estimated original infrastructure value at commercial operation date, the estimated tax revenue from the beginning of the Castle River wind farm to the closure date of Riverview and Castle Rock 2 are shown below in Figure 6. Each wind farm is estimated to have an operational lifetime of 30 years, with decommissioning occurring in the 31st year. There are two notable peaks in 2014 when the Oldman 2 wind farm came online shortly after Summerview 2 and Castle Rock wind farms, and in 2020 when the Riverview and Castle Rock 2 wind farms came online. Prior to 2014, tax revenue steadily increased with each new wind farm that came online from $589,000 per year, to $1.8 Million in 2004, $3.0 Million in 2006, and up to $3.9 Million in 2010. Since the peak in 2010 there has been an overall downward trend besides the two peaks in 2014 and 2020 due to the main asset base of wind farm infrastructure entering the later years of production and thus depreciating at an accelerated rate. From the peak in 2020, it is expected that tax revenue from the wind farms will steadily decrease unless there are repowering activities or new developments. This reduction in income will bring tax revenues down to $3 Million by 2029, below $2 Million by 2036, and below $1 Million in 2041. It is expected tax revenue will cease completely in 2050.

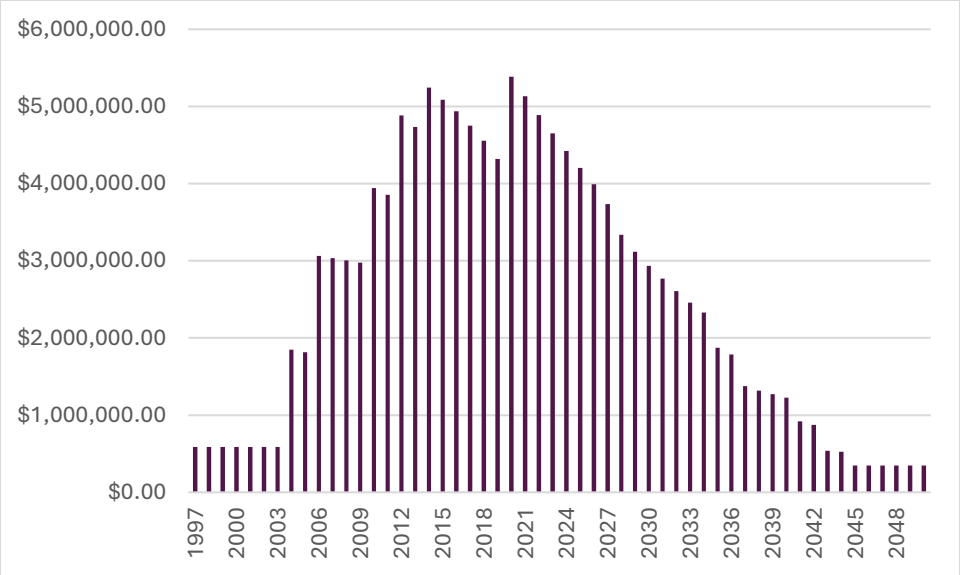


Figure 6: Estimated historic and projected tax revenue from renewable energy assets in the MD of Pincher Creek

The option of repowering provides interesting opportunities for sites with large amounts of turbines as they can be replaced with fewer units that generate more power. For instance the 60 Castle River turbines could be replaced by 10-15 larger turbines when they reach end of life.

Recommendations:

1. **Pursue Repowering Existing Turbines:** To mitigate the expected decline in tax revenue, the MD should consider working with wind farm operators to explore repowering opportunities. Repowering involves replacing older turbines with newer, more efficient models, which could extend the life of the wind farms, maintain or even increase energy production, and stabilize or increase the associated tax revenues. Given the age and depreciation of some assets, this approach could offer a practical way to sustain the economic benefits of wind energy in the region.
2. **Explore Development in Other Spaces:** The MD should actively pursue opportunities to diversify its development portfolio. Exploring projects such as the Captus generation facility, industrial manufacturing, or modern compute facilities can reduce reliance on wind energy alone.
3. **Explore Renewable Development aligned with Community Values:** As renewable energy presents one of the most accessible and profitable resources in the MD, further strategy around encouragement aligned with community values offers an avenue to financial sustainability. This includes ensuring that projects do not interfere with existing land uses, such as agriculture or recreational activities, and that they provide tangible benefits to local residents. Engaging the community in the planning process will help to ensure that new developments are supported and contribute positively to the local economy and environment.

By focusing on these strategies, the Municipal District of Pincher Creek can secure a more stable and sustainable economic future while continuing to lead in renewable energy development.

Bylaw Review

The Land use bylaws (LUBs) of neighboring jurisdictions with similar regional features, such as population, topography, and renewable energy policies, were evaluated for the purpose of identifying opportunities to improve the MD LUB. The review varied based on the relevancy and content of each bylaw as shown below in Table 13.

Table 13: Municipal Land use bylaw review level

Jurisdiction	Review
Municipal District of Pincher Creek	Detailed review
Municipal District of Ranchland	Cursory review
Municipal District of Willow Creek	Detailed review
County of Paintearth	Detailed review
Vulcan County	Cursory review
Municipal District of Taber	Detailed review
County of Forty Mile	Cursory review
Cardston County	Cursory review

Based on the review completed of similar jurisdictions throughout Alberta, bylaws that contained differentiating criteria from that of the MD of Pincher Creek are presented in this report to provide an opportunity to enhance the MD's bylaw. The LUBs selected for comparison include the MD of Taber (MDT), the MD of Willow Creek (MDWC), and County of Paintearth (CPE). MDT is undergoing a revision of their LUB, therefore this document references the draft version, published in April 2024. Based on comparison with other LUBs, MDWC has one of the most extensive and in-depth LUBs that includes many strong points which may be beneficial to the MDPC's LUB.

The following section provides a description of each jurisdiction, which is followed by a description of the solar and wind sections in each resCPEtive LUB. The final section of the report summarizes the key differences in each bylaw section and outlines some recommendations that can be integrated into the Municipal District of Pincher Creek's LUB.

Municipal District of Pincher Creek

The Municipal District of Pincher Creek (MDPC), located in southwestern Alberta, is a rural area with a population of approximately 3,200. While agriculture, particularly cattle ranching and grain farming, remains the backbone of the local economy, the district has become a leader in renewable energy, specifically wind power.

The district's largest population center is the Town of Pincher Creek, with approximately 3,500 residents. As the primary economic and administrative hub, it provides services to the surrounding rural communities and has strong ties to the renewable energy industry. The Hamlets of Lundbreck,

Beaver Mines and Pincher Station, though smaller, play an important role in supporting the region's agricultural, tourism and energy sectors.

In addition to its focus on energy and agriculture, the MDPC benefits from its proximity to Waterton Lakes National Park, and Castle Mountain Resort, which enhance its appeal for tourism. The district is committed to sustainable development, balancing economic growth with environmental conservation. Its Land Use Bylaw (LUB), last updated in April 2024, supports this commitment by creating a regulatory framework that promotes both agricultural activities and renewable energy projects while preserving the traditional Western Canadian lifestyle.

Municipal District of Willow Creek

The Municipal District of Willow Creek, located in southern Alberta, is a predominantly rural area with a population of approximately 6,100. The largest town in the district is Claresholm, with a population of around 3,400. Another key center is Fort Macleod, a historic town with approximately 3,300 residents, known for its early role in Alberta's settlement and agricultural development. Nanton, a smaller town with around 2,000 people, is a local hub for agriculture and is recognized for its aviation museum and historic attractions. The Village of Stavely, with a population of about 500, serves the surrounding rural community, while the Hamlet of Granum, with approximately 400 residents, was once a village but was dissolved into the MD in 2020.

The district's economy is primarily driven by agriculture, with cattle ranching and crop production being the main activities. In recent years, the MD has seen an increase in renewable energy development, particularly wind and solar projects, which have become increasingly important contributors to the local economy.

The MD of Willow Creek places a strong emphasis on sustainable land use and environmental stewardship. Its Land Use Bylaw, most recently updated in 2023, reflects ongoing efforts to balance economic development with environmental considerations. The district has prioritized sustainable practices in agriculture and energy development, ensuring that growth aligns with long-term environmental goals.

Renewable energy development in the region is supported by favorable natural conditions for wind energy and abundant solar resources, positioning the MD as an important player in Alberta's growing renewable energy sector. The Claresholm Solar Project is one of the largest solar farms in Canada at 132 MW. The district continues to review and update its land use regulations to accommodate the evolving needs of both traditional agriculture and emerging energy technologies.

Municipal District of Taber

The Municipal District of Taber located in southcentral Alberta, approximately 50 kilometers east of Lethbridge, is a region focused on agriculture and, more recently, renewable energy development.

As of the 2021 Census, the population of the MD of Taber is about 7,500, with an additional 8,900 residents in the town of Taber, bringing the total population to approximately 16,400.

The district's economy is primarily based on agriculture, with key activities including crop production (notably sugar beets, potatoes, and corn), livestock farming, and food processing. The area is supported by an extensive irrigation infrastructure, making it a highly productive agricultural zone. In addition to agriculture, the oil and gas sector has historically contributed to the local economy, though its significance has diminished with the rise of renewable energy.

In recent years, the MD of Taber has become a center for renewable energy projects. Several wind farms operate in the area, including the Vauxhall Wind Farm, which benefits from favorable wind conditions in southern Alberta. Additionally, large-scale solar projects such as the Taber Solar Project contribute to the district's renewable energy capacity. The region also has smaller-scale hydroelectric projects tied to its irrigation systems, further supporting localized renewable energy generation.

County of Paintearth

County of Paintearth (CPE), located in central Alberta, is a predominantly rural area with a strong focus on agriculture, particularly cattle ranching, grain farming, and oilseed production. The county has a population of approximately 2,100 and is home to several small communities that support the surrounding agricultural economy. In recent years, renewable energy has emerged as an important economic driver in Paintearth, with significant development in wind and solar power.

County of Paintearth is home to notable renewable energy projects, including the Halkirk Wind Project, one of Alberta's larger wind farms, with a capacity of 150 MW. Additionally, the Capital Power Paintearth Wind Project provides further wind energy generation in the area. Solar development is also gaining traction, reflecting the county's growing role in clean energy.

The main population centers in County of Paintearth include the Town of Castor, which serves as the administrative and service hub for the region with a population of around 900. Coronation, another town within the county, has a population of approximately 800 and provides essential services to the local agricultural community. Smaller hamlets such as Halkirk also contribute to the county's economic and social structure.

County of Paintearth is committed to sustainable land use practices, integrating its agricultural base with renewable energy development. The Land Use Bylaw (LUB) has been adapted to facilitate the growth of renewable energy projects while ensuring that agricultural activities remain a central focus. The county's efforts to balance economic growth and environmental sustainability are reflected in its approach to land use planning and development, ensuring that both traditional agriculture and emerging energy technologies can coexist and thrive.

Solar

The Province of Alberta is home to some of the best solar resources in Canada and has seen a steady increase in solar development to meet growing energy demand. The following section will provide a background on solar development in Alberta, followed by a bylaw review outlining differences from the MDPC bylaw.

Solar Development in Alberta

Alberta's first significant solar farm, Brooks Solar, began operations in 2017. It was the first utility-scale solar project in the province, with a capacity of 17 MW. Developed by Elemental Energy, Brooks Solar marked the beginning of large-scale solar energy projects in Alberta and set the foundation for further expansion in the sector. The largest solar farm currently operating in Alberta is Travers Solar, located in Vulcan County. This solar project, developed by Greengate Power, has a capacity of 465 MW and became operational in 2022.

Solar development in Alberta has been rapidly progressing in recent years due to its natural abundance of sunlight and alignment with environmental goals. As of 2024, Alberta has 1,500 MW of solar installed on its grid. The deregulated electricity market in Alberta makes the solar industry attractive to private businesses and those looking to attain renewable energy credits to offset corporate emissions. Despite significant advancements, developers still face barriers, especially near urban centers and populated regions.

Project Lifespan and Maintenance

Solar panels typically have a lifespan of 25 to 35 years. To ensure optimal performance and longevity, solar farms require regular maintenance. This includes managing weeds and vegetation to prevent shading and potential damage to the panels. Cleaning the panels is also essential, as dirt and debris can reduce their efficiency. Additionally, continuous monitoring of the infrastructure is necessary to detect and address any issues promptly. Corrective maintenance, such as repairing or replacing faulty components, is performed as needed to maintain the system's reliability.

Despite these maintenance needs, solar farms generally require minimal staffing. The number of employees needed depends on the size of the project, but it typically involves only a few individuals. These staff members are responsible for routine inspections, maintenance tasks, and ensuring the overall smooth operation of the solar farm. This low staffing requirement makes solar farms a cost-effective and efficient solution for renewable energy production.

Land Requirements

Solar developments are land-intensive and require the proposed site to meet various prerequisites. Large areas of land are needed for commercial-scale projects, which can compete with agriculture. Lower-quality agricultural land and flat or gently sloping terrain are preferable as they simplify

installation. Technological advancements have made it possible to install solar panels on a wider range of terrain. Proximity to transmission infrastructure is crucial for easy integration into the electrical grid, reducing the need for grid updates. Panels must be oriented to avoid glare on neighboring roads and buildings, and site reclamation must be considered. Given the extensive land needed for solar developments, developers are often encouraged to adopt agrivoltaics or enhance space efficiency by incorporating animal grazing beneath the panels.

Regulatory Oversight

The Alberta Utilities Commission (AUC) oversees the approval of solar projects, ensuring they meet regulations and align with public goals. Additionally, the municipality where the project is located must approve it. Municipal districts, as primary stakeholders, need to create bylaws that reflect their goals and allow decisions that serve the best interests of residents.

The following section will review the Municipal District of Pincher Creek's Land use Bylaw as it relates to solar development, and compare it to other Municipal Bylaws, providing opportunities for adjustment and improvement.

Municipal District Pincher Creek LUB solar review

The MDPC LUB was updated in April 2024 and is one of the most recent bylaws among similar jurisdictions. Solar energy systems in the MDPC LUB are classified into two different categories: household and commercial/industrial. The bylaw balances environmental considerations with community impact, and contains a standard layout outlining land preference, information to accompany development applications, setbacks, conditions of approval.

Municipal District of Willow Creek LUB solar review

The MDWC LUB was published in April 2019 and emphasizes the integration of renewable energy systems with minimal disruption to existing land uses [10]. It outlines specific criteria for site selection, including proximity to infrastructure and compatibility with surrounding land uses. Compared to other similar bylaws, the Willow Creek LUB places a stronger focus on balancing renewable energy development with agricultural and residential land preservation, ensuring that solar projects do not negatively impact the community's primary land uses. The bylaw categorizes solar energy systems into Individual (roof/wall mounted), Individual (free standing), or industrial scale solar energy systems. For the purposes of this study, only sections relevant to the industrial scale solar energy systems in this LUB will be considered.

Differences

The MDWC Land Use Bylaw outlines more specific criteria for preferred land suitable for solar developments.

Preferred Land: Although the MDWC's LUB on solar energy systems shares many similarities with the MDPC's LUB, one distinction lies in the phrasing regarding preferred installation sites. The following are excerpts from the Willow Creek Land Use Bylaw relating to the preferred land;

- "The Development Authority will consider the following as preferable sites:
  - use of the poor quality lowest productive land and dry corners is preferred;
  - use of cut-off, fragmented, irregular shaped parcels is preferred;
  - to the extent possible, use of irrigated agricultural land should be avoided/minimized; and
  - the use of an unsubdivided quarter section of high-quality agricultural land that has or could contain irrigation system infrastructure shall not be considered as suitable unless the Development Authority determines special or unique circumstances may warrant its inclusion. Consideration of the proximity to electrical sub-stations and feeder distribution infrastructure in relation to the location of the development may be considered as part of the special circumstances present."

Municipal District of Taber LUB solar review

The MDT LUB defines solar systems as class A/B/C. Class A systems have a generation capacity of less than 150 kW, Class B systems have a generating capacity between 150kW – 5 MW, and Class C systems have a capacity greater than 5 MW. Class C systems direct their generated electricity to the transmission grid and are primarily intended for offsite consumption. Sections in the LUB concerning Class C systems will be emphasized for this study.

Differences

MDT LUB's contain more detailed guidelines for the public consultation process prior to a development application submission and encourages developers to schedule a meeting with the municipality prior to submitting an application.

Pre-Application Guidelines: A pre-application section is included in the MDT LUB, which is not present in the MDPC LUB. This section outlines the actions that the developer must take before submitting a development permit application and emphasizes community consultation and communication with the MD. The following are excerpts from the MDT LUB pertaining to the pre-application guidelines;

- "Prior to submitting a development permit application for a Solar Energy System Class C development, the applicant shall:
  - Schedule a pre-application meeting with the MD of Taber Planning and Development Department to discuss the proposed development and review municipal requirements. Applicants are encouraged to schedule the preapplication meeting prior to submitting an application to the Alberta Utilities Commission.

- Host a public information meeting to solicit the views of the public regarding the proposed development, which meets the following criteria:
  - direct notification of the meeting is provided to landowners within a 2 mile (3.2 km) radius of the project boundary;
  - direct notification of the meeting is provided to the Municipal District of Taber;
  - notification is provided at least 21 days prior to the meeting

Application Requirements: The application requirements in the MDT LUB are more detailed, explicitly requiring descriptions of any soil disruption, soil management, and outlining the expectations regarding reporting on any public consultation. The following are excerpts from the MDT LUB pertaining to the application requirements;

- "a detailed description of any proposal to disturb, displace, remove, relocate, move, strip, undermine, affect, stockpile, etc., topsoil or ground cover on the site during the construction period and the rationale or need for doing so,
- site plan delineating areas of topsoil or groundcover to be disturbed, displaced, removed, relocated, moved, stripped, undermined, affected, stockpiled, etc., during the period of construction, including estimated acreage of affected areas and stockpile volumes and detailed information on how and where stripped soils will be stockpiled, and
- detailed description of the soil management/conservation practices and erosion control measures proposed to mitigate the impacts associated with wind and water for the period of both construction and post-construction, including sCPEifics on how blowing soil will be managed during winds which are prevalent in the MD of Taber.
- a summary of public consultation completed to date, including a detailed report of the comments received at the public information meeting required under section 4.1(b)"

County of Paintearth LUB solar review

County of Paintearth (CPE) updated their LUB in June 2024, with a particular emphasis on operational standards and waste management. The LUB encourages agricultural collaboration and combines much of the regulations concerning solar systems and wind systems in the same section. Solar systems are categorized into "Microgeneration" and "Macrogeneration – Solar Farms". For the purposes of this overview, only bylaw sections pertaining to solar farms will be considered.

Differences

The CPE LUB provides detailed specifications on preferred land for solar projects, with an emphasis on soil quality and selection. The LUB also outlines the expectations for an Emergency Response Layout plan, reclamation funding, site security measures, and encourages agricultural collaboration. Additionally, in contrast to others, the CPE LUB includes an extensive Battery Storage section and detailed waste management protocols.

Preferred Land: Similar to other bylaws, CPE outlines characteristics of land that is more desirable for solar developments. The following are excerpts from the CPE LUB pertaining to the preferred land;

- "Lands suitable and preferred for use:
  - lands with soil classification of AB Soil Classes 3 to 4 or lower. No solar installations shall be permitted to occupy lands with soil classifications of 2 or higher as classified by the Alberta Land Suitability Rating System (LSRS), unless they meet provincial government regulations to demonstrate coexistence with crops and/or livestock
  - lands not currently being cropped or in production of hay. Grazing lands would be preferred lands for minimal soil disturbance or erosion issues"

Emergency Response Layout Plan: Compared to other LUBs, the CPE LUB provides more specific details concerning an Emergency Response Plan. The following are excerpts from the CPE LUB pertaining to the emergency response layout plan;

- "Layout considerations - internal access roads shall be shown on a layout of the solar arrays and shall include space for:
  - perimeter access of the arrays for adequate fire fighting apparatus;
  - internal access roads spaced at intervals within the arrays for adequate fire fighting apparatus;
  - separation distance of at least 50 m from a property line for any substation or inverter collection points."

Reclamation: The CPE LUB specifically states that funds to cover costs of decommissioning and reclamation must be demonstrated by the developer. The following are excerpts from the CPE LUB pertaining to reclamation of solar sites;

- "provide an overview of how sufficient funds are secured and available at the project end of life to cover the cost of decommissioning and reclamation
- the Development Authority may require the establishment of a security trust to be held for decommissioning purposes at a value determined by its discretion."

Site Security: CPE includes security requirements for commercial solar farms, and further defines the specifications of the required safety infrastructure. The following are excerpts from the CPE LUB pertaining to the pre-application guidelines;

- "Site security – all lands hosting macro solar farm installations shall be perimeter fenced with a minimum of 4' high barbed wire fence (4 wire).
- all equipment or electric circuit collection points and substation facilities are to be enclosed with a chain link security fence of at least 6'."

Agricultural Collaboration: The CPE LUB suggests using agrivoltaics to maximize space efficiency. The following is an excerpt from the CPE LUB regarding agricultural collaboration;

- "Collaborative agricultural use – where possible all macro solar installations are encouraged to allow grazing or animal access use."

Battery Storage: The CPE LUB includes a section on battery storage which isn't addressed in any other LUB reviewed, and provides direction for facilities that intend to store generated energy from solar systems. The following are excerpts from the CPE LUB pertaining to battery energy storage systems;

- "All BESS – battery energy storage systems – for any renewable energy power plant shall be considered as accessory buildings to the power plant as allowed in the Districts permitted, and must meet the following requirements at a minimum to ensure safety of the surroundings and emergency response access:
  - Location selected shall be developed in such a manner that the grounds on and around the BESS facilities shall be of a fire retardant, non-combustible material such as rock, concrete or other similar material for at least 30m and no flammable structures are contained within that surface;
  - Any BESS shall be set back from any residence a minimum of 300 m;
  - All BESS facilities shall have a means of direct access to/from a County road and shall be constructed in such a manner as to allow heavy truck traffic to convey across unimpeded;
  - All BESS facilities shall be perimeter fenced with at least a 6' high security chain link fence with barbed wire overhang;
  - All BESS facilities shall be signed on the perimeter fence gate or side nearest the access road with a sign indicating:
  - the danger of stored energy/electricity
    - access is restricted
    - Emergency response number of company iv) any other pertinent information sCPEific to stored energy"

Waste Management: CPE describes more specific instructions in their LUB for waste management of solar projects, with an emphasis on recycling and waste management practices. The following are excerpts from the CPE LUB pertaining to waste management protocols;

- "All transport bracings, dunnage, crating or wrapping/packing material to be identified for removal (or recycling where possible)
- Temporary office site produced materials of paper products, office general garbage, or any compostable or biodegradable products
- All wastes are required to be removed offsite and disposed of at the sanitary landfill located north west of the Town of Coronation.
- Applicants/Developers/Operators will all be responsible for the cleanup of any litter escaping the lands being used or developed within an approved Development Permit"

Wind

Wind energy development has a long history in Alberta and continues to play a significant role in supplying power to the grid, particularly in the southern portions of the Province. The following section will provide a background on wind development in Alberta followed by a bylaw review outlining differences from the MCPD bylaw.

Wind Energy Development in Alberta

Alberta has been a leader in wind energy development in Canada, benefiting from its vast wind resources, particularly in the southern regions. The Province's first significant wind project, Cowley Ridge Wind Farm, began operations in 1993 near Pincher Creek. With an initial capacity of 16.5 MW, Cowley Ridge was one of the first commercial wind farms in Canada, setting the stage for future wind developments.

Alberta's largest wind farm is the Whitla Wind Project, located in the County of Forty Mile, with a total capacity of 353 MW. Developed by Capital Power, Whitla Wind was completed in phases, with the final phase becoming operational in 2022. Other notable projects include the Blackspring Ridge Wind Farm, a 300 MW project located near Vulcan, Alberta. As of 2024, Alberta has over 3,800 MW of installed wind capacity, with new projects continually being added.

Alberta's deregulated electricity market allows private wind developers to sell power directly into the grid or through power purchase agreements (PPAs) with corporate buyers, making wind energy a viable economic option for reducing carbon emissions.

Project Lifespan and Maintenance

Wind turbines typically have a lifespan of 20 to 30 years. Regular maintenance is required to ensure optimal performance and prevent mechanical failures. Key maintenance tasks include routine inspections, component replacements, and lubrication of moving parts. Wind farms are often

equipped with remote monitoring systems that detect performance issues and provide alerts for preventive or corrective actions.

The number of technicians required for wind turbine maintenance varies depending on the size and scale of the wind farm. For small wind farms with 1 to 10 turbines, typically 1 to 3 technicians are needed for routine maintenance, inspections, and minor repairs. As the scale increases, larger wind farms generally require 5 to 10+ technicians to manage regular inspections, preventive maintenance. Technicians perform scheduled inspections and emergency repairs when needed. Predictive maintenance technologies help to optimize operations by addressing potential failures before they result in costly downtime. Wind turbines also require large capital maintenance activities such as gearbox replacements, blade repair, and others which necessitate specialized skills and often have contractors brought in to complete.

Land Requirements

Wind farms are relatively land-efficient, allowing agricultural activities such as cattle grazing or crop production to continue around turbines. However, selecting appropriate locations for wind farms involves considering factors like wind speed, terrain suitability, and proximity to transmission infrastructure.

Wind turbines are often located in rural areas with strong and consistent wind resources, particularly in southern Alberta, where the geography and wind conditions are optimal. Wind turbines are spread out to reduce wake effects, typically requiring large tracts of land for utility-scale projects. However, the actual physical footprint of a turbine is relatively small, allowing multiple land uses.

Regulatory Oversight

In Alberta, the Alberta Utilities Commission (AUC) regulates wind energy projects, ensuring that they meet environmental and land-use requirements. Developers must comply with AUC regulations regarding noise, visual impacts, and wildlife protection. Environmental assessments are often required to evaluate the impact on birds, bats, and other wildlife, particularly in regions with high biodiversity.

Additionally, developers must adhere to municipal land-use bylaws (LUBs) established by the local government. These bylaws regulate setback distances, noise limits, and community impact. Municipal districts with extensive wind resources, such as Pincher Creek and Forty Mile, have adapted their LUBs to accommodate the growing demand for wind energy while protecting local communities and agricultural activities. The Alberta Environment and Parks (AEP) also plays a role in ensuring that wind projects align with provincial environmental goals, requiring measures to minimize the ecological footprint of wind energy development.

MD Pincher Creek LUB wind review

The MDPC LUB categorizes Wind Energy Conversion Systems (WECS) into Category 1, 2 and 3 WECS, where Category 1 and 2 WECS are individual structures and Category 3 WECS have heights greater than 35 m or farm systems. The WECS section includes application requirements,

setbacks, height restrictions, noise and visual impact regulations, and environmental considerations, but only provides a high-level overview of these topics [4].

MD Willow Creek LUB wind review

MDWC defines two types of Wind Energy Conversion Systems (WECS) – Individual, which consists of a single structure that does not supply power to the grid, and Industrial Scale, consisting of one or more structures designed for commercial purposes. Overall, the WECS section of the MDWC LUB is very thorough and provides an in-depth guide for developers looking to apply for a WECS farm. The bylaw also includes factors that may influence the developing authority's decision to approve an application, more detailed setbacks, impact minimization factors, a diagram of a WECS, and a statement on collector lines.

Differences

The MDWC LUB is extremely detailed and provides specific points for developers to follow. The site plan requirements are more comprehensive, clearly outlining the necessary elements to be included in the submitted plan. Other requirements are included in the development application requirements, notably a historical resource analysis and water mapping for landowners with water wells that may be affected by developments.

Development Application Requirements – Site Plan Requirements: The requirements of the site plan to be submitted with the development application are more extensive in the MDWC LUB. The following are excerpts from the MDWC LUB relating to developing an accurate site plan:

- "if a non-tubular design is proposed, the anchor design, location of any guy wire anchors, and how the tower is to be secured from unauthorized access or use;
- existing topography with contours at 3.0 m (10 ft.) intervals of the land;'=
- the project boundary including all lands (full quarter section and individual parcels) which area under lease or contract for the development of the multiple WECS / Industrial Scale Wind Farm"

Development Application Requirements – Other points: There are several points, as listed below, that are required to accompany any Industrial scale wind farm proposal in the MDWC LUB. This includes road impacts, construction and reclamation plans, environment consideration analysis, fire and emergency plans, landowner and neighbor response plans, historical resource analysis, public consultation process results, and pre-existing water infrastructure testing. The following are excerpts from the MDWC LUB pertaining to development application accompaniments;

- "any impacts to the local road system including but not limited to:
    - a plan showing ingress and egress from the property or parcel detailing any impacts to the local road system including required approaches from public roads having regard to the Municipal District's Road standards; and

- identification of the road or roads to be used to bring construction to be used to remove construction materials/debris and equipment from the property or parcel;
- a construction transportation plan which includes lay down yard parking areas and an employee and equipment transportation plan

- post-construction decommissioning and reclamation plan as required by the Conservation and Reclamation Directive for Renewable Energy Operations (Alberta Environment (2018/09/14);
- an analysis of environmental consideration including roadways, on-site potential for fluid leaks, impact upon wildlife, or any other identified issues;
- a fire and emergency response plan prepared by a qualified professional approved by the municipality and the plan is to be reviewed and approved by the MD of Willow Creek Emergency Services; and
- a Landowner and Neighbor Emergency Response Plan prepared by a qualified professional which addresses safety, education, and response plans of affected landowners.
- the results of the historical resource analysis, if required by Alberta Culture; and
- the results of the public consultation process initiated by the developer; and
- an analysis of private water wells, where landowners give consent, within 2.0 km (1.2 miles) of any proposed turbine which includes water well mapping, water quality and flow test benchmarking conducted by the applicant prepared by a qualified professional approved by the municipality,

Case-by-Case conditions: The MDWC includes factors that may be considered depending on the project. These factors may increase or decrease a project's potential for being approved but allow the authority to make decisions on project approvals with consideration of the factors. The following are excerpts from the MDWC LUB pertaining to the factors;

- "3.4 The Development Authority may approve multiple WECS / Industrial Scale Wind Farm on a case-by-case basis having regard for:
- proximity to other adjacent land uses;
- density of WECS;
- consideration of the cumulative effect of all WECS approved or proposed within 5 km (3 miles) of the proposal;
- underlying utilities;

- information received through the circulation process and at the development hearing."

Impact minimization: Several factors are considered by MDWC to minimize impacts on surrounding regions. Setbacks are highlighted for the different areas such as highways, parks, municipal/provincial boundaries, and residential areas. The following are excerpts from the MDWC LUB concerning impact minimization regions;

- "In balancing existing land uses and the development of a multiple WECS / Industrial Scale Wind Farm, the Development Authority may require developers to minimize impacts:
  - within 1.6 km (1.0 miles) of a Provincially controlled highway;
  - within 3.2 km (2.0 miles) of the boundary of a Municipally, Provincially or Federally designated parks;
  - within 2 km (1.2 miles) of a developed Group Country Residential land use designation or Hamlet or Town boundary."

Setbacks: The MDWC LUB outlines setbacks dwelling units, specifically citing AUC Rule 012, and also mentions that setbacks can be increased, depending on the location of the proposed multi-WECS project. The following are excerpts from the MDWC LUB pertaining to setbacks;

- "A WECS shall be setback from a dwelling unit within the wind farm project boundary (lands leased for wind energy development) not less than 500 m or as meets AUC Rule 012 permitted levels, whichever is greater.
- In the case of multiple WECS, setbacks can be increased from the minimum setback requirements in the district depending upon the number of WECS in a group and the prominence of the location, in order to reduce the impact to a residence, building, public roadway or highway, or land use."

Diagram of a WECS: The MDWC LUB includes a diagram of a WECS shown below in Figure 7, which is unique to this LUB. The following is the diagram from the MDWC LUB depicting a WECS;

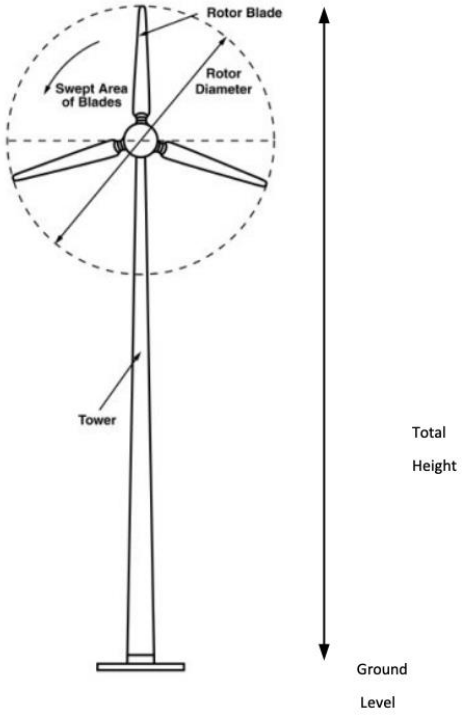


Figure 7. Diagram from the MDWC LUB depicting a typical WECS

Collector lines: The MDWC LUB includes information regarding the connection of the WECS farm to the electrical grid and specifies the location of collector lines and notes any considerations that may be made regarding collector lines. The following are excerpts from the MDWC LUB regarding the location of collector lines;

- "required to connect WESC from one quarter section to another shall be underground except where the Development Authority approves overhead installation; and
- any collector line necessary to service the development shall be located on private land and not located in developed or undeveloped municipal road allowances.
- Notwithstanding Section 3.16 (c), the Municipality will consider collector lines which cross a developed or undeveloped municipal road allowance through the execution of a road crossing agreement approved by the Municipality."

MD Taber LUB wind review

While the MDT LUB is less extensive than the MDWC LUB, the section concerning WECS includes information on the decommissioning that is not shown in other LUBs. There are no separate

sections for individual WECS and WECS farms – referred to as "Multi-WECS" in this particular bylaw. The WECS section of the LUB contains the expected zoning requirements, setbacks, environmental and visual considerations, community consultation expectations, and decommissioning processes.

Differences

The MDT LUB places more emphasis on the decommissioning processes compared to other LUBs and provides more detail into the development application requirements. The MDT LUB includes information about warning systems for aircrafts, depending on the region of the wind farm.

Application Requirements: The MDT LUB provides more specific requirements regarding applications for wind energy development projects. This includes a request for specification of the anchor design of the proposed system, environmental management plans, and an assessment conducted by a qualified professional to demonstrate site suitability. The following are excerpts from the MDT LUB concerning application requirements;

- specifications on the foundations and/or anchor design, including location and anchoring of any guy wires;
- revegetation and weed management plan that addresses both the construction period and the projected life span of the development;
- soils management/conservation and erosion control plan during the period of construction and post-construction;
- environmental assessment review prepared by a qualified professional and/or other studies and reports to demonstrate site suitability;

Decommissioning Process: The decommissioning process in the MDT LUB is comprehensive and outlines the expected procedure to be outlined regarding the decommissioning process for WECS. The following are excerpts from the MDT LUB regarding decommissioning;

- "decommissioning/reclamation of footings, pads, wires; and other associated equipment and infrastructure;
- decommissioning/reclamation of roads, driveways, pathways, and other similar disturbances;
- containment of hazardous materials;
- haul routes for disposal of materials;
- timeline for completion of decommissioning plan;
- financial security for implementation of decommissioning; and

- any other matters required by the Municipal Planning Commission."

Warning System: The MDT LUB includes a statement on the installation of a warning system if the conditions are deemed appropriate in the "Conditions of Approval for Multi-WECS" section. The following is an excerpt from the MDT LUB detailing the potential need for a warning system;

- "require that a proximity warning system be installed which will reduce the extent of light pollution emanating from the project, including but not limited to, a passive radar sensor system that is able to use radio frequencies to determine if there is an aircraft in the vicinity, its distance, position, and velocity;"

County of Paintearth LUB wind review

Although the WECS section of the CPE LUB is shorter compared to other bylaws, the county still highlights many similar sections as found in other bylaws. Overall, the bylaw balances the perspective of local residents while allowing for development in the wind energy sector. The CPE LUB was last updated in June 2024, and provides a modern perspective on development in County of Paintearth.

Differences

The CPE LUB contains detailed information on the expected public consultation process and a section concerning battery energy storage system specifications. There is also mention of how wind farm density will be determined by the developing authority.

Wind Farm Density: The CPE LUB includes a section on wind farm density and outlines how the amount and placement of WECS will be determined. The following is an excerpt from the CPE LUB concerning wind farm density;

- Wind Farm Density The amount and placement of all WECS will be based upon the setback requirements and spacing as well as the technical alignment for maximum efficiency.

Public Consultation Process: The public consultation process outlined in the CPE LUB concerning WECS are very detailed and demonstrate the expectations of public consultation by developers very clearly. The following are excerpts from the CPE LUB concerning the public consultation process;

- Public consultation must be conducted prior to any application submission and shall include:

  - Public meeting hosted and advertised by either general mail out or newspaper advertising at least two weeks in advance, with the applicant's contact information being provided in either.

- Adjacent landowners to proposed WECS sites must be notified in writing, with copies of notice and landowners contacted provided with application information.
- Information provided at meeting must address all points required in the development permit application as identified in (2) below.
- Opportunity for feedback from the public must be allowed.
- Summary of consultation and feedback to be included with application as requested

Battery Storage: The CPE LUB includes a section on battery storage which are not addressed in any other LUB and provides direction for facilities that intend to store generated energy from solar systems. The following are excerpts from the CPE LUB pertaining to battery energy storage systems;

- "All BESS – battery energy storage systems – for any renewable energy power plant shall be considered as accessory buildings to the power plant as allowed in the Districts permitted, and must meet the following requirements at a minimum to ensure safety of the surroundings and emergency response access:
- Location selected shall be developed in such a manner that the grounds on and around the BESS facilities shall be of a fire retardant, non-combustible material such as rock, concrete or other similar material for at least 30m and no flammable structures are contained within that surface;
- Any BESS shall be set back from any residence a minimum of 300 m;
- All BESS facilities shall have a means of direct access to/from a County road and shall be constructed in such a manner as to allow heavy truck traffic to convey across unimpeded;
- All BESS facilities shall be perimeter fenced with at least a 6' high security chain link fence with barbed wire overhang;
- All BESS facilities shall be signed on the perimeter fence gate or side nearest the access road with a sign indicating:
- the danger of stored energy/electricity
- access is restricted
- Emergency response number of company iv) any other pertinent information specific to stored energy"

Bylaw Review Summary

Upon review of each jurisdiction's LUB and how they relate to solar energy conversion systems, there were several opportunities identified to update the MDPC LUB. These areas include the implementation of a preferred land location section, a pre-application process and detailed community consultation records, emergency response plan, detailed plans on soil control and reclamation, emphasizing agricultural collaboration, implementing a battery energy storage systems section, and including detailed waste management practices.

Upon reviewing each jurisdiction's LUB in relation to wind energy conversion systems, several opportunities were identified for updating the MDPC LUB, with the MDWC LUB being the most comprehensive. These include enhancing the comprehensiveness of development application requirements, mandating an analysis of private infrastructure such as water wells, clearly communicating the factors considered for project approval, providing a detailed decommissioning process, implementing a warning system, and establishing guidelines for battery energy storage systems.

Bylaw Recommendations

- Specify Preferred Land Criteria:
    - Define what constitutes "preferred land" for solar and wind energy projects, including acceptable soil ratings and guidelines that encourage coexistence with agricultural activities.
- Pre-Application Meeting Requirement:
    - Mandate that developers schedule a pre-application meeting with the municipality before submitting a development permit application.
- Public Consultation Expansion:
    - Enhance public consultation requirements, including detailed guidelines on notification procedures, meeting formats, and incorporating public feedback.
- Detailed Soil and Erosion Control Measures:
    - Include comprehensive soil and erosion control measures for both the construction and post-construction phases.
- Detailed Decommissioning Plan:
    - A thorough decommissioning plan, outlining specific actions for site restoration, including funding for decommissioning activities.
- Emergency Response Layout Plan:
    - Develop an emergency response layout plan for renewable energy installations, including access for firefighting and emergency services.
- Solar Farm Security Measures:
    - Outline specific security measures for solar farms, such as fencing, monitoring systems, and secured access to key infrastructure.

- Encourage Agricultural Collaboration:
  - Promote the use of agrivoltaics or other forms of agricultural collaboration to ensure efficient land use.
- Battery Energy Storage Systems Section:
  - Add a dedicated section on battery energy storage systems, specifying safety requirements, setback distances, and emergency response considerations.
- Waste Management Practices:
  - Provide detailed requirements for waste management, including recycling of construction materials and proper disposal of operational waste.
- Specific Development Application Requirements for Anchoring and Turbine Design:
  - Include specific requirements for the anchoring and design of wind turbines to ensure stability and safety.
- Comprehensive Environmental Impact Analysis:
  - Require a more detailed analysis of potential environmental impacts of energy projects, covering aspects like wildlife, soil, and water resources.
- Analysis of Impact on Private Infrastructure:
  - Require developers to assess the potential impact on private infrastructure, such as water wells and other utilities, during the application process.
- Collector Line Location Information:
  - Specify requirements for providing detailed information on the location of collector lines and their potential impacts.
- Detailed Aircraft Warning System Requirements:
  - Mandate the inclusion of an aircraft warning system for wind turbines to enhance aviation safety.
- Explicit Decision-Making Process for Farm Density:
  - Make the decision-making process more explicit regarding acceptable energy development density on farmland to ensure transparency.
- Battery System Section for Wind Energy Systems
  - Add a section on battery energy storage systems for wind energy projects, similar to that for solar systems, including specific safety measures and operational guidelines.

Community Consultation

The community consultation portion of this project includes an open house and accompanying survey to gather feedback from residents concerning renewable energy developments in the region. This initiative aligns with the district's commitment to exploring sustainable energy solutions that can support long-term environmental and economic goals.

The open house hosted on October 16, 2024 aimed to foster an inclusive space for residents to discuss the potential benefits, challenges, and community impacts of renewable energy projects. Through several informational, participants gained insight into the types of renewable technologies under consideration, such as wind, solar, and energy storage systems.

The accompanying survey was open for two weeks post open house to gather detailed community feedback on renewable energy topics, allowing residents to voice their perspectives on aspects such as site selection, environmental concerns, economic benefits, and long-term sustainability.

Structure

The open house was advertised online through the website and social media channels as well as local newspaper. It featured five posters shown in Appendix A, each depicting information on renewable energy developments ranging from maps of existing generation and transmission infrastructure, land types, and the Municipal Land Use Tool (MLUST), to the tax projections from renewable energy systems. Participants were encouraged to explore the displays, engage in discussions, and complete a survey before leaving. A survey was provided in paper format at the open house and MD office for two weeks after the event, in addition to being available and advertised online through social media avenues and the MD website.

Results

Approximately 20 individuals attended the open house, where the discussion was primarily focused on repowering, maintaining farmland, and optimizing the use of existing developed areas for new projects. The survey received 87 responses from residents of Pincher Creek and the surrounding areas including Lundbreck, Beaver Mines, Cowley, and Livingstone Range. Overall, the majority of residents expressed little to no support of wind and solar development as shown in Figure 8 and 9 within the MD.

For the first question, 38% of respondents indicated no support at all for the development of renewable wind conversion systems within the MD, while the remaining 62% of participants indicated some support for wind development. Of this population, 20 individuals indicated that showed "little support", 6 individuals were neutral on wind development, 12 individuals supported wind development moderately, and 16 individuals showed full support for wind development within the MD.

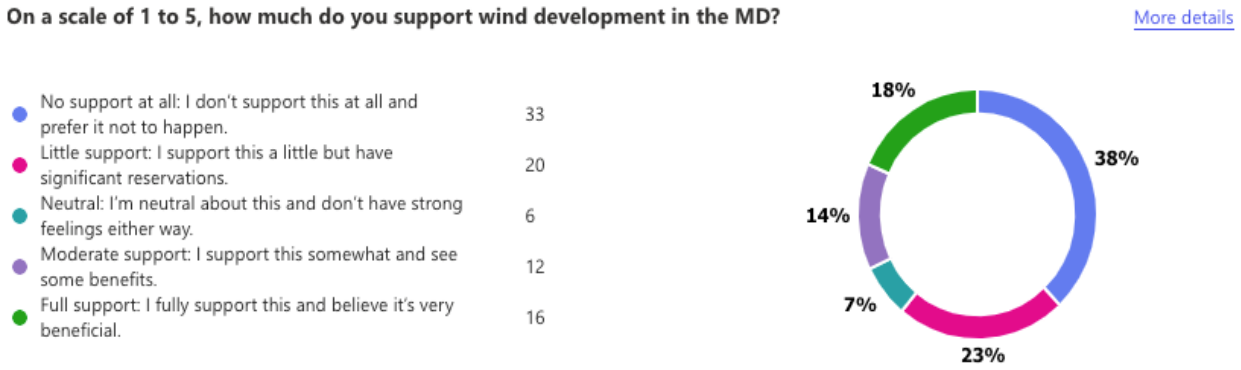


Figure 8. Graph showing public responses regarding support of wind development in the MD of Pincher Creek.

Respondents showed less support for solar development within the MD as seen in Figure 9 compared to wind development, with 39% of respondents indicating no support at all and the remaining 61% of participants indicating varying levels of support. Of all responses, 26% indicated significant reservations around solar development within the MD, 6% remained neutral, 14% somewhat indicated support for solar development, and 15% indicated full support for solar development within the MD.

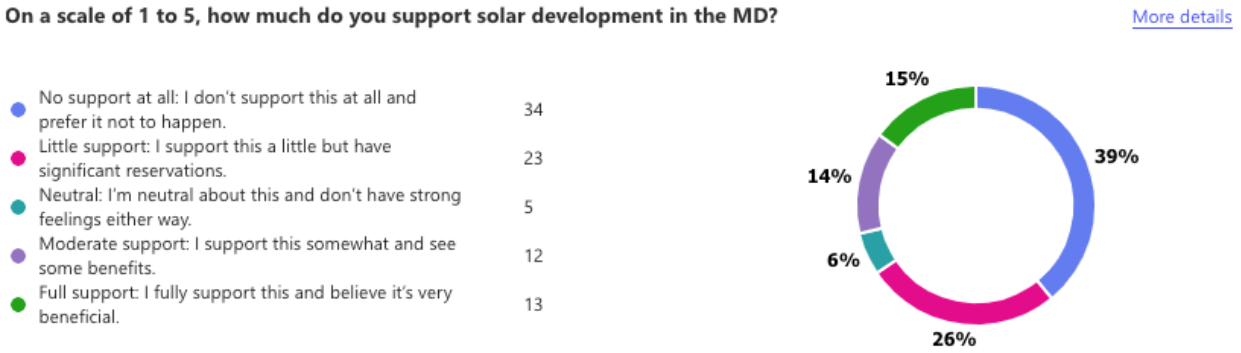


Figure 9. Graph showing public responses regarding support of solar development in the MD of Pincher Creek.

When asked about public concerns regarding the number of turbines within the MD, 10% of participants indicated that they had no concerns, while the remaining 90% of participants indicated varying levels of concern. 49% of respondents (43 responses) indicated they were very concerned about the number of turbines within the MD, as shown in Figure 10. The second highest option selected was "moderately concerned" with 22 responses, 12 selecting "slightly concerning", 9 selecting "no concern at all", and only 1 participating indicating that they were "neutral" regarding the number of turbines within the MD.

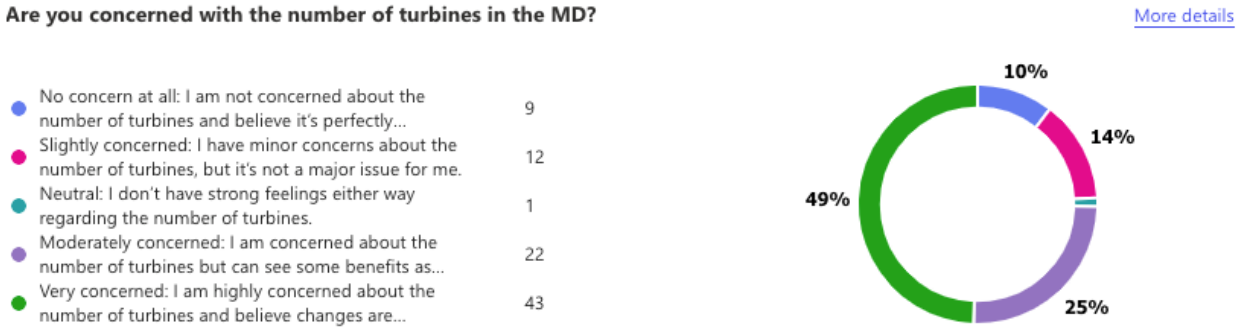


Figure 10. Graph showing public responses regarding the opinion of wind turbines in the MD of Pincher Creek.

When asked about the redevelopment of sites, 35% of responses expressed no support for redevelopments, while the remaining 65% indicated varying levels of support for redevelopments. The two most selected answers were "No redevelopment" at 30 responses, and "redevelopment at the same scale" at 22 responses, followed closely by "redevelop at a smaller scale" with 20 responses all shown in Figure 11. Of all responses 9% of participants indicated that they would like to see existing sites redeveloped at a larger scale, and 6% of respondents indicated that they would like to see new site development. The tendency towards redevelopment at same or smaller scale aligns with question 3 which indicated there was significant concern with the amount of turbines in the MD.

Figure 11. Graph showing public responses regarding the redevelopment of existing sites.

When asked about preferences regarding development on brownfield sites, 31% of participants indicated that they strongly supported development on brownfield sites, shown in Figure 12. No development on brownfield sites was selected by 28% of respondents, while 24% indicated that they generally support development on brownfield sites, and 18% were satisfied with the current approach to brownfield site developments.

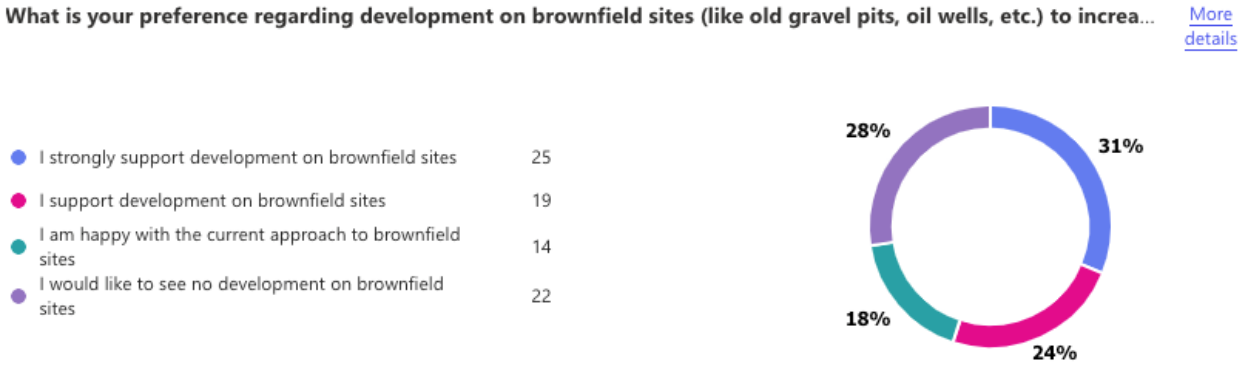


Figure 12. Graph depicting public responses regarding developments on brownfield sites. The full question reads "What is your preference regarding development on brownfield sites (like old gravel pits, oil wells, etc.) to increase value and support reclamation?"

A majority of 73% of participants indicated that they expect developers to engage with the community as early as possible at the site selection phase, as illustrated by Figure 13. 16% of respondents indicated that preliminary design of developments would be an acceptable time for developers to engage with the community, while 5% and 6% indicated that transmission planning and pre-AUC submission would be the expected time for community engagement, respectively.

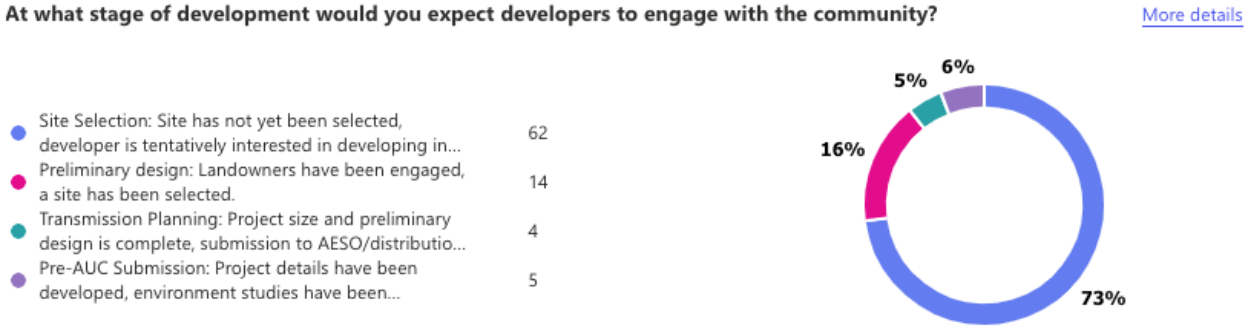


Figure 13. Graph illustrating public responses on the anticipated stage of development for community engagement.

Participants were asked about their opinion on the role that Municipal Land Use Suitability Tool (MLUST) conflict maps and public sentiment have in guiding preferred development zones, shown in Figure 14. The majority of responses (65% of participants) indicated that they believe that both the MLUST maps and public opinion are equally as important in guiding preferred development zoning, 22% of respondents supported that public opinion should be prioritized, and 13% of respondents indicated that they believe that MLUST maps should take priority over public opinion.

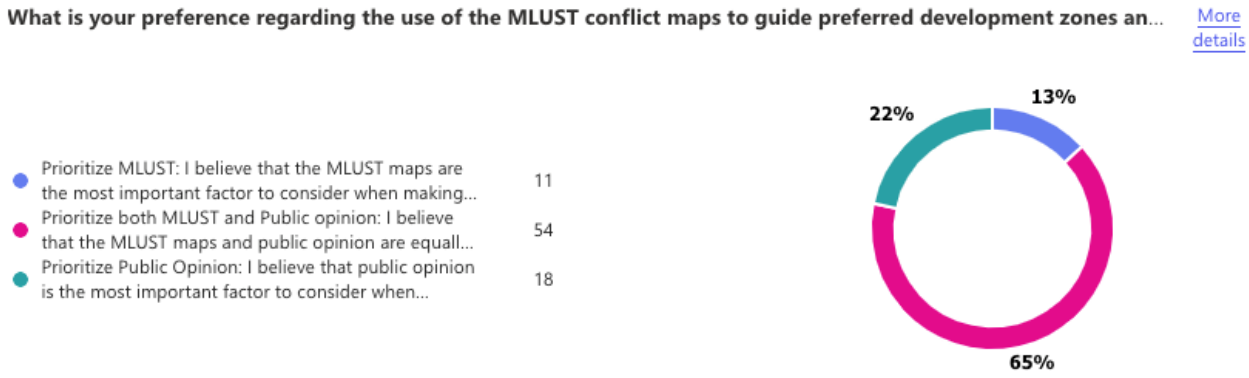


Figure 14. Graph illustrating responses concerning the importance of MLUST and Public opinion when making development decisions. "What is your preference regarding the use of the MLUST conflict maps to guide preferred development zones and restricted zones in the MD of Pincher Creek Land Use Bylaw?"

When asked about preferred community benefits for future renewable energy developments, 70% of participants indicated that they would like to receive discounted energy as their preferred method of community benefit, shown in Figure 15. The remaining responses showed varying levels of interest with 23% indicating that the preferred method of benefit would be a community benefit fund for local nonprofits, while 6% of participants indicated that they preferred community sponsorship of events.

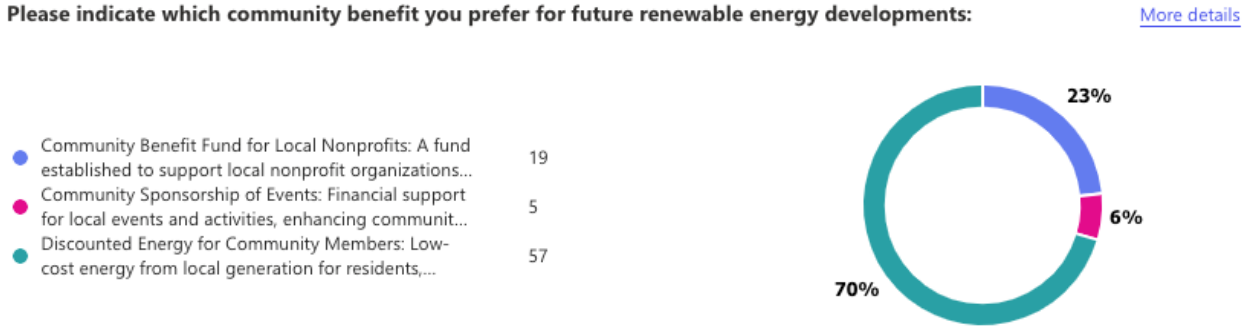


Figure 15. Graph depicting public opinion on the preferred method of community benefit from renewable energy developments.

The participants were asked to rank potential development concerns from 1 to 5, with 1 being the concern they believe should be highest in priority, and 5 being the lowest priority. Figure 16 shows a summary of the responses, with reclamation and waste management ranking 1, closely followed by agricultural collaboration. Erosions and topsoil planning was ranked 3rd, water management ranked 4th, and traffic and access ranking 5th.

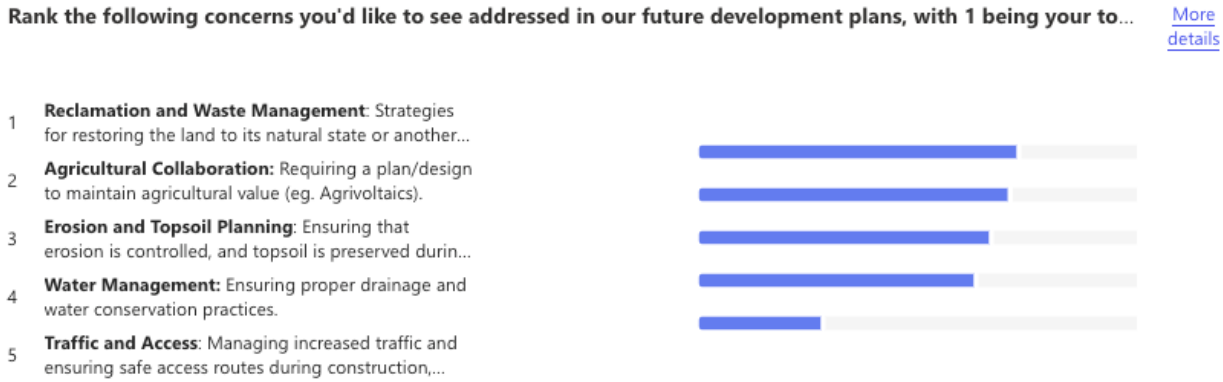


Figure 16. Concerns addressed in future development plans, ranked from 1 (highest concern) to 5 (lowest concern). The full question reads "What is your preference regarding the use of the MLUST conflict maps to guide preferred development zones and restricted zones in the MD of Pincher Creek Land Use Bylaw?"

Traffic and access was ranking 5th by a large margin, and was not ranked 1st by any participants, as displayed in Figure 17 which shows a detailed breakdown of the survey responses, displaying the frequency of each ranking for the concern.

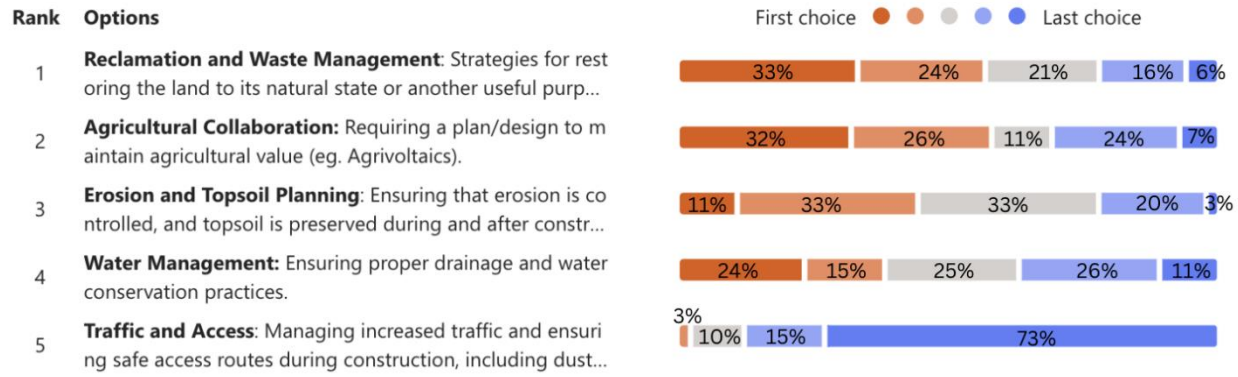


Figure 17. Detailed breakdown of the ranking of each concern.

Participants were asked to rank their priorities for guiding future construction and redevelopment, with 1 being their highest perceived priority and 5 being their lowest perceived priority. Figure 18 shows the summarized ranking. Construction close to existing transmission lines was ranked 1st, followed by development on existing sites and brownfield sites. Maintaining the visual buffer zone and landscape ranked 3rd, construction on low agricultural value ranked 4th, and maximization of energy potential and revenue ranked 5th.The first four choices were relatively close in frequency, while the fifth option lagged significantly behind.

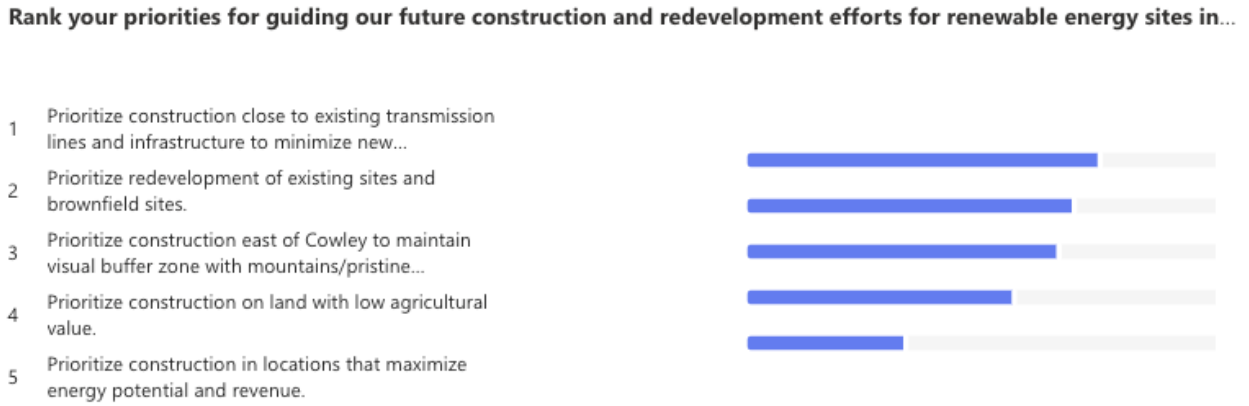


Figure 18. Summary of considered priorities ranked from 1 (highest concern) to 5 (lowest concern). The full question reads "Rank your priorities for guiding our future construction and redevelopment efforts for renewable energy sites in the MD of Pincher Creek, with 1 being your top priority and 5 being your lowest priority."

Figure 19 shows a detailed breakdown of the response frequency for each priority to the previous question.

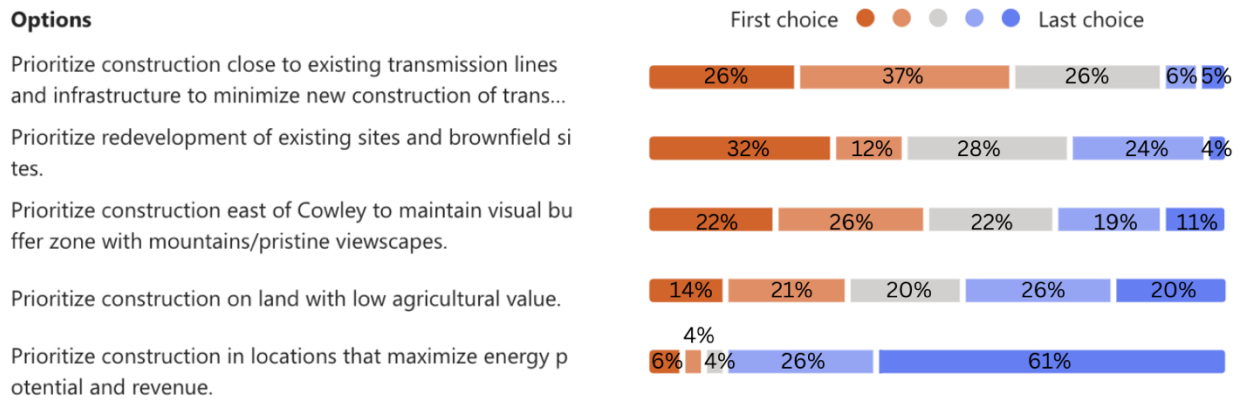


Figure 19. Detailed breakdown of the ranking of each priority.

Discussion

Overall, the survey results indicate a divided community sentiment towards renewable energy projects. While there is some support for wind and solar developments, a significant portion of the community remains opposed or has reservations. Specifically, 38% of respondents opposed wind development, and 39% opposed solar development. This suggests a need for more community engagement and education to address concerns and build broader support.

A major concern among participants is the number of wind turbines, with 90% expressing varying levels of concern. This highlights the importance of carefully planning turbine placements and considering visual and environmental impacts. Additionally, while 65% of respondents supported the redevelopment of existing sites, preferences varied, with many

favoring redevelopment at the same or smaller scale. This indicates a cautious approach towards expanding renewable energy infrastructure.

There is some support (55%) for developing renewable energy projects on brownfield sites, which can help mitigate the use of agricultural land and address environmental reclamation. Furthermore, 73% of participants expect developers to engage with the community at the site selection phase, emphasizing the importance of early and transparent communication to build trust and address concerns.

The survey revealed that 65% of participants believe both the Municipal Land Use Suitability Tool (MLUST) maps and public opinion should equally guide development zoning. This underscores the need for a balanced approach that incorporates technical assessments and community feedback in decision-making processes.

A significant majority (70%) of respondents indicated a preference for discounted energy as a community benefit from renewable energy projects. This suggests that tangible, direct benefits to residents can enhance support for such developments. Other preferred benefits included community benefit funds for local nonprofits and sponsorship of community events.

Participants ranked reclamation and waste management as the highest priority concerns for future developments, followed by agricultural collaboration, erosion and topsoil planning, water management, and traffic and access. These priorities reflect the community's desire to ensure that renewable energy projects are environmentally responsible and considerate of local agricultural practices.

Additional Comments and Recommendations

Participants also provided additional comments, expressing a desire for consistent policies across all industrial developments, not just renewables. There was interest in innovative solutions like installing solar panels in parking lots to provide shade and reduce the need for agricultural land. Concerns about viewscapes and environmental impacts were also noted, highlighting the need for careful planning and mitigation strategies.

Conclusion

In conclusion, the Municipal District of Pincher Creek's Renewable Energy Conversion Study reviewed the existing infrastructure and the associated tax projections, analysed similar land use bylaws from neighbouring jurisdictions and conducted community consultation to understand critical concerns about sustainable development, land use, and long-term economic viability. The study found that renewable energy projects currently contribute approximately $4.6 million annually, or 33% of the MD's tax base. However, this revenue is projected to decline steadily as infrastructure ages and depreciates, with complete decommissioning anticipated by 2050 unless

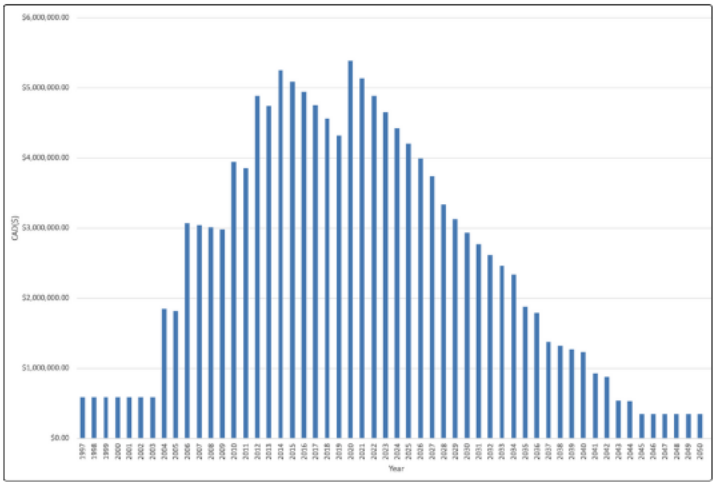
repowering or new developments occur. Public feedback collected through an open house and survey revealed significant concerns about the current density of wind turbines, with 90% of respondents expressing some level of concern. There was limited support for further wind and solar developments, with a preference for focusing on brownfield sites and existing infrastructure. Novel community benefit structures for projects and early consultation were highlighted as high priority along with use of the MLUST tool and leveraging existing infrastructure, brownfields, and assets.

The report recommends several next steps to address these findings. First, the MD should prioritize working with developers to repower aging wind farms to maintain or increase energy production while stabilizing tax revenues. This could involve replacing older turbines with fewer, more efficient models. Second, the MD should update its Land Use Bylaw to incorporate best practices from similar jurisdictions, including more detailed requirements for site selection, community consultation, and environmental impact assessments. Finally, the district should explore brownfield developer and new community benefit strategies, such as direct reductions in local energy costs, and strengthen early consultation processes to align future projects more closely with community values. By adopting these measures, the MD can continue to lead in renewable energy while ensuring sustainable growth and long-term economic stability.

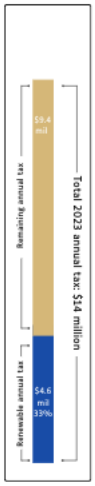
Appendix A

Renewable Energy Tax Projections

MD of Pincher Creek Renewable Energy Tax Projections (1997-2050)

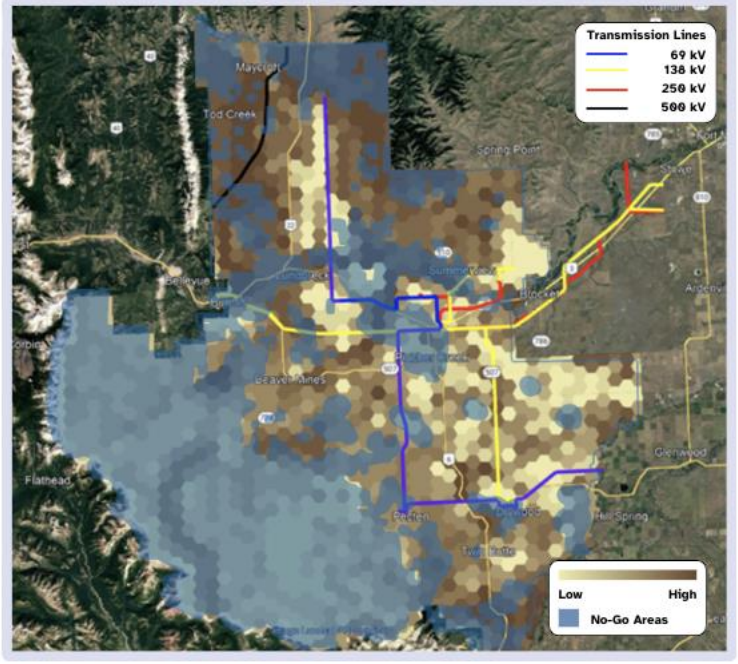


2023 Tax Revenue



- In 2023, the municipality earned 4.6 million dollars from renewable energy taxes.
- This makes up 33% of total municipal tax revenue ($14.1 million dollars) in 2023
- The first estimated wind revenue begins in 1997 with the Cowley Ridge and Castle River #1 wind farms
- From 2003 to 2007, revenue starts to increase with the installation of the Kettles Hill and Summerview 1 wind farms.
- From 2008 to 2011, there is rapid growth, peaking between $3-4 Million by 2011 with the installation of the Summerview 2 wind farm.
- 2012 to 2020 shows the highest revenue levels, consistently between $4 Million and $5 Million based on installation of Castle Rock #1, Oldman #2, Riverview, and Castlerock #2 wind farms.
- Starting from 2021, revenue begins a gradual decline as no new farms have been built.
- Should there continue to be no new farms, between 2025 to 2030, revenue decreases steadily to about $3 million, reflecting the decommissioning of Castle River wind farm.
- 2031 to 2040 shows continued decline with decommissionining of the Cowley Ridge, Summerview #1 & #2, and Kettles Hill wind farms.
- Revenue decreases to zero by 2050 with the final decomissioning of the Riverview, Oldman #2, and Castle Rock #1 & #2 wind farms.

Solar Conflict Map



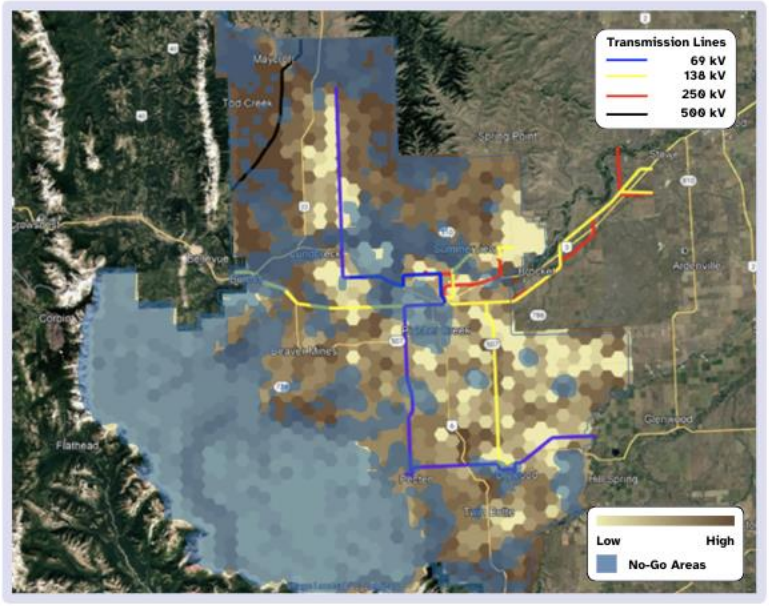
Map of the MD of Pincher Creek highlighting areas of high and low land conflict for solar development.

Instructions: Use the stickers to indicate your area(s) of preference for solar developments on the map above

- Transmission lines are depicted in the black, yellow, red, and blue lines
- Blue lines: 69 kV transmission lines, concentrated around Pincher Creek, North of Lundbreck along Highway 22, and South to the gas plant.
- Yellow lines: 138 kV transmission lines run south to Drywood, and east west along Highway 3
- Red lines: 250 kV transmission lines connect the region to the main load centers in Calgary
- Black lines: 500 kV transmission line is visible in the northwest and interconnects Alberta and BC
- Based on the Municipal Land Use Sustainability tool (MLUST) report conducted in 2020, regions shaded in brown indicate higher challenges for installing solar, lighter regions have less conflict
- The MLUST review took into account high quality agricultural land, ecosystems, and cultural areas, while
- Lighter areas represent fewer obstacles and easier conditions for solar installation
- Regions shaded in blue indicate "no-go" areas, where development is not allowed within the MD. No-go areas reflect existing settlement and infrastructure

view the 2020 MLUST report here

Wind Conflict Map



Map of the MD of Pincher Creek highlighting areas of high and low land conflict for wind development.

Instructions: Use the stickers to indicate your area(s) of preference for wind developments on the map above

- Transmission lines are depicted in the black, yellow, red, and blue lines
- Blue lines: 69 kV transmission lines, concentrated around Pincher Creek, North of Lundbreck along Highway 22, and South to the gas plant.
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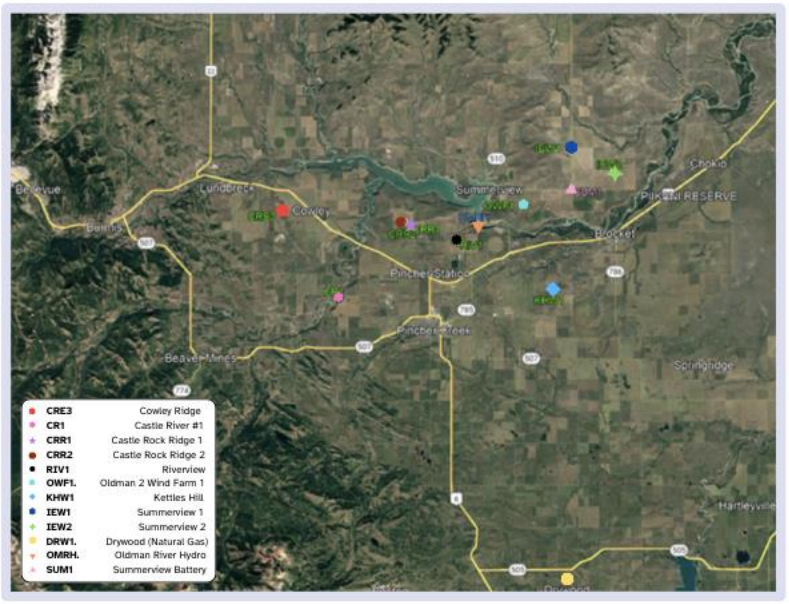
view the 2020 MLUST report here

Existing Renewable Energy Generation

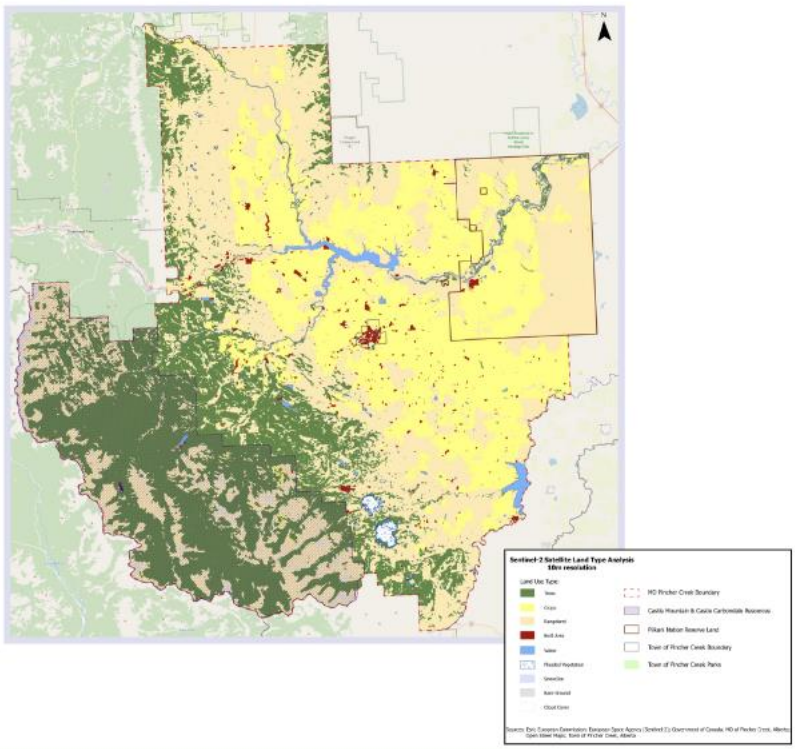


Map of existing generation in the MD of Pincher Creek and surrounding region.

Table 1: Existing generation statistics in the MD of Pincher Creek

	Site Name	Commissioning Date	Site Capacity	Generator capacity	Total Generators
Wind	Cowley Ridge	2001	20 MW	1.3 MW	15
	Castle River #1	2001	39 MW	660 kW	60
	Castle Rock	2012	77 MW	2.3 MW	33
	Castle Rock 2	2020	29 MW	4.2 MW	7
	Riverview	2020	105 MW	4.2 MW	25
	Oldman 2	2014	46 MW	2.3 MW	20
	Kettles Hill	2006	63 MW	1.8 MW	35
	Summerview 1	2004	66 MW	1.8 MW	38
	Summerview 2	2010	66 MW	3 MW	22
	Total Wind	-	511 MW	-	255
Batteries	Summerview	2020	10 MW/20 MWh	10 MW/20 MWh	1
Natural Gas	Drywood	2020	6 MW	1.475 MW	4
Hydro	Oldman River	2002	32 MW	16 MW	2
Total	-	-	559 MW	-	262

Current Land Use Map



- Community Energy Association conducted a GIS mapping survey of land uses as part of the Net Zero Communities Accelerator Program
- Land categories are broken down into Rangeland, Built Area, Trees/Crops, Water, and Bare Ground

High level breakdown of land areas are shown below:

- 42% of MD is Rangeland (170,000 hectares) - mainly on outer fringes of MD
- 26.5% crops (105,000 hectares) - central MD and more to southeast
- 28% trees (110,000 hectares) - mainly in parks to southwest
- 0.8% bare ground (3,100 hectares)
- 0.8% built area (3,300 hectares)