

Summary - Bayfield County Energy Usage in County Owned Infrastructure													
	2020 Usage	2019 Usage	2018 Usage	2017 Usage	Conversion Factor to BTU's	2020 Million BTUs	2019 Million BTUs	2018 Million BTUs	2017 Million BTUs	2020 Cost	2019 Cost	2018 Cost	2017 Cost
Electricity (kWh)	0	986,938	989,434	973,802	3412	0	3,367	3,376	3,323	\$0	\$74,042	\$85,774	\$97,368
Transportation													
gasoline (gal)	0	38,290	35,811	39,344	114000	0	4,365	4,082	4,485	\$0	\$72,386	\$82,589	\$81,330
diesel (gal)	0	69,218	65,287	77,534	138874	0	9,613	9,067	10,767	\$0	\$172,275	\$166,321	\$167,411
CNG (therms)	0	4,760	3,596	3,750	100000	0	476	360	375	\$0	\$2,833	\$2,395	\$2,355
Heating													
natural gas (therms)	0	80,491	74,916	67,715	100000	0	8,049	7,492	6,772		\$50,567	\$50,918	\$44,290
propane (gal)	0	16,668	17,678	15,220	91502	0	1,525	1,618	1,393		\$19,151	\$16,264	\$11,948
Total						0	27,395	25,994	27,114		\$391,254	\$404,261	\$404,702
Solar Electric Generation													
Renewable Energy Generation	kW dc	Estimated Annual Generation (kWh)	Conversion to BTUs	Million BTUs	Estimated Savings in 2020	2019 - % Electricity from Solar	2019 - % Solar PV to Total Energy						
Onsite solar PV (kW dc)	174	207,220	3412	707	\$17,342								
Offsite Community Solar	195	214,091	3412	730	\$16,351								
Total	369	421,311		1438	\$33,693	43%	5.2%						
Note: This data is totaled from other sheets in this Workbook. Don't enter things here!													

Bayfield County Electric Meter Data

Location	Address	2020kWh on Electric bills	2020 All-in Cost Electricity	2019kWh on Electric bills	2019 All- in Cost Electricity	2018kWh	2018 All- in Cost Electricity	2017kWh
Sheriff's Department	34425 Fire Tower Rd, Bayfield			15,431	\$1,992	11,008	\$1,492	12,002
Cable Garage	43645 Kavanaugh Rd., Cable, WI			2,112	\$450	2,700	\$493	1,475
Courthouse	117 E 5th St, Washburn			299,680	\$18,460	298,400	\$24,125	300,000
Fairgrounds	7080 N Main St, Iron River			183	\$458	80	\$443	66
Forestry Bldg	380 1st Ave E, Washburn			11,002	\$1,522	12,420	\$1,698	9,957
Washburn Highway Garage	311 Central Ave, Washburn			56,880	\$7,661	60,400	\$7,550	54,240
Highway C	311 Central Ave, Washburn			1,789	\$425	3,205	\$566	2,917
Highway E (Mason Station)	24990 County Highway E., Mason, WI			5,527	\$841	3,792	\$626	3,710
Mason Station (see note)	24990 County Highway E., Mason, WI			2,070	\$458	4,089	\$795	5,833
Iron River Garage	8205 US Highway 2, Iron River, WI			13,038	\$1,694	14,007	\$1,810	11,561
Jail	615 N 2nd Ave E			549,840	\$37,526	562,000	\$43,941	557,280
Port Wing Garage	8705 State Highway 13, Port Wing, WI			5,895	\$879	5,118	\$781	4,449
Russell Garage				8,669	\$1,676	7,035	\$1,454	6,582
Solar generation not included in electric bills				14,821		5,180		3,730
		0	\$0	986,938	\$74,042	989,434	\$85,774	973,802
Note: Source of total kWh and costs is from Xcel History Report. Costs include community solar discount and have been reconciled with actual utility bills Note: Mason Station electric usage = on-site solar + purchased starting Oct. 2018. Full usage equals 2070 + 5880 (see Renewable Electricity tab) Note: BEC subtracts community solar generation from kWh used. Full 2019 usage at Russell Garage equals 8669 + 4246 (see Renewable Electricity Tab)								
Blue shaded cells are 2020 data entry cells								

Natural Gas Entry Form								
Location	2020 Therms	2020 NG expense	2019 Therms	2019 NG expense	2018 Therms	2018 NG expense	2017 Therms	2017 NG expense
Sheriff's Department			0	0	0	0	0	0
Cable Garage			0	0	0	0	0	0
Courthouse			23,543	\$14,012	20,784	\$13,843	19,569	\$12,291
Fairgrounds			949	\$913	420	\$603	51	\$340
Forestry Bldg			999	\$1,015	904	\$987	708	\$800
Washburn Highway Garage			0	\$0	0	\$0	0	\$0
Highway C			16,989	\$11,082	15,132	\$10,213	12,519	\$8,394
Highway E (Mason Station)			0	\$0	0	\$0	0	\$0
Mason Station (see note)			0	\$0	0	\$0	0	\$0
Iron River Garage			7,282	\$4,964	7,172	\$5,018	5,562	\$3,922
Jail			30,729	\$18,581	30,504	\$20,254	29,306	\$18,543
Port Wing Garage			0	\$0	0	\$0	0	\$0
Russell Garage			0	\$0	0	\$0	0	\$0
CNG			-4,760	-2,833	-3,596	-2,395	-3,750	-2,355
	0	\$0	80,491	\$50,567	74,916	\$50,918	67,715	\$44,290
Blue shaded cells are 2020 data entry cells								

Propane Entry Form					
	2020	2019	2018	2017	2016
Propane Delivered		\$19,151	\$16,264	\$11,948	\$9,676
Unit Cost	0	\$1.15	\$0.92	\$0.79	\$0.92
Gallons Purchased	0	16,668	17,678	15,220	10,517

Bayfield County, WI Renewable Electricity

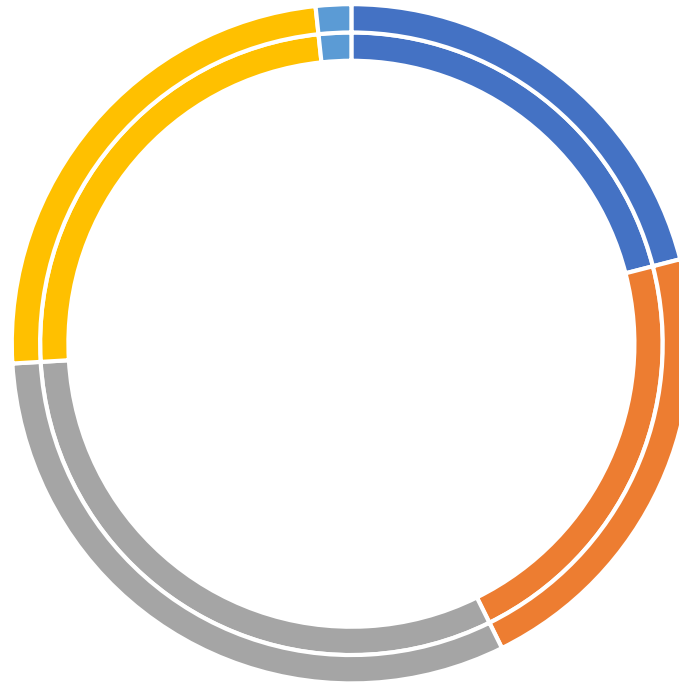
Estimated solar generation

Site	Type	kW dc	kWh/kW/yr	Average Electric Rate	1st yr savings	Annual Generation kWh	2019 kWh on electric bill	2019 Solar Generation in addition to kWh on Electric Bills
Forestry Bldg	on-site	8.4	1200	\$0.12	\$1,210	10,080	11,002	
Washburn Highway Garage	on-site	44.3	1200	\$0.08	\$4,253	53,160	56,880	
Mason Station	on-site	4.9	1200	\$0.12	\$706	5,880	2,070	5,880
Jail pre-2020	on-site	5	1200	\$0.08	\$480	4,420	549,840	4,420
Jail, starting 2020	on-site	111.4	1200	\$0.08	\$10,694	133,680	0	
Russell Garage	off-site	5.1	985	\$0.14	\$633	4,521	8,669	4,521
Xcel Community Solar	off-site	190	1103	\$0.075	\$15,718	209,570		
On-site Solar		174			\$17,342	207,220		
Off-site Solar		195			\$16,351	214,091		
Total		369			\$33,693	421,311	628,461	14,821
						2019 Total Building Usage	643,282	
Notes:								
25 shares BEC Comm.Solar is attached to Russell Garage. Generation is subtracted from usage on bill								
190kW Xcel Comm.Solar. Generation is not subtracted from kWh usage on electric bills, only \$ amount								
	2020 kWh/kw	2019 kWh/kw	2018 kWh/kw	2017 kWh/kw	Average			
BEC Community Solar		831	1026	1098	985			
Xcel Community Solar		1071			1103			
Note: Xcel CS- 1103 kWh/kW/yr is from Xcel; 1071 kWh/kW/yr is actual adding 2019 electric bills								
BEC CS- gen numbers are downloaded from eGauge								
		mWh est.	kWh/kW/yr					
Xcel Community Solar 984 kW dc		1275	1296					
Cashton Solar Garden 998 kW dc tracking		1500	1503					

Xcel Renewable*Connect Program Details							
Location	2019 kWh Total Usage on Electric bill	Estimated New Onsite 2020 Solar Generation	Community Solar Generation	Maximum kWh that could be offset in Renew*Conn. Program	Carbon-free Electricity		
					Xcel Carbon-free in Generation Mix (56%)	kWh to Offset in Renewable* Connect	Round
Sheriff's Department	15,431	0		15,431	(8,641)	6,790	6,800
Cable Garage	2,112	0		2,112	(1,183)	929	900
Courthouse	299,680	0	(150,890)	148,790	(83,322)	65,467	65,500
Forestry Bldg	11,002	(10,080)		922	(516)	406	400
Washburn Highway Garage	56,880	(53,160)		3,720	(2,083)	1,637	1,600
Highway C	1,789	0		1,789	(1,002)	787	800
Highway E (Mason Station)	5,527	0		5,527	(3,095)	2,432	2,400
Mason Station	2,070	0		2,070	(1,159)	911	900
Jail	549,840	(133,680)	(58,680)	357,480	(200,189)	157,291	157,300
Port Wing Garage	5,895	0		5,895	(3,301)	2,594	2,600
Xcel Total	950,226	(196,920)	(209,570)	543,736	(304,492)	239,244	239,200
Additional kWh County wants to offset						0	0
Total to Offset in Renewable*Connect Program							239,200
Renewable*Connect Annual cost at \$.59/100kWh							\$1,411
kWh not covered in Xcel Renewable*Connect Program - BEC & Dahlberg							
Location	2019 kWh Total Usage	Estimated Onsite 2020 Solar Generation	Community Solar Generation	2020 Estimate kWh Purchase	BEC/Dahlberg RE in Generation Mix (24%)	kWh to Offset in Other Programs	Round
Fairgrounds	183	0		183	(44)	139	100
Russell Garage	13,190	0	(4,521)	8,669	(2,081)	6,588	6,600
Dairyland Total	13,373	0	(4,521)	8,852	(2,124)	6,728	6,700
Dairyland Power's Evergreen Program annual cost at \$1.00/100kWh							\$67
Iron River Garage	13,038	0		13,038	(3,129)	9,909	9,900
Arcadia Power Program annual cost at \$1.50/100kWh							\$149
Grand Total	976,638	(196,920)	(214,091)	565,626	(309,746)	255,881	255,800
2019 Solar Gen. Behind Meter	10,300						
Total Solar Generation			421,311	<i>Proof</i>			\$1,627
Total 2019 kWh Building Use	986,938	<i>Proof</i>					

Bayfield County Path to 100% Carbon-free Electricity

100% Carbon-free Electricity



- Self-generated Solar PV
- Community Solar
- Carbon-free energy in utility generation mix
- Renewable*Connect
- Other Utility Green Program

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- ~Going forward into 2020 and beyond, the onsite solar generation needs to be included in Total (Year) kWh, for example solar generation is entered in Renewable Electricity Tab and summed up in Electricity Entry Tab it is added in cell E17
- ~This is necessary because buildings use solar generated electricity before any excess goes to the grid. If you just use the electric meter for usage, you are not showing the full kWhs used.
- ~Not showing the full building usage would skew numbers like the percentage of electricity that comes from renewable sources
- ~The solar generation numbers can be found through the inverter's web-based software
- ~In 2019 Mason Station was the only onsite solar generation in 2019 reflected on a utility bill. Small Jail PV was absorbed behind the meter and,
- ~The Forestry Building had solar generation in 2019 but was not credited to the electric bill. This was corrected in Jan/Feb 2020
- ~I could not find Dahlberg's renewable energy percentage in their generation mix. They are a distribution utility and likely buy their electricity from MISO. I used 24% as a placeholder, but it is statistically insignificant.
- ~This tracking spreadsheet will likely evolve to include data from the Jail and Washburn Garage eGauge data.
- ~BEC has a "Green" program that could offset those few kWh, Dahlberg does not. Could use another program like Arcadia Power or offset through Xcel's Renewable*Connect
- ~BEC subtracts kWh of community solar generation from bill. Xcel does not, rather gives dollar amount credit. For full building usage, need to add BEC community solar generation to Russel Garage.
- ~Xcel's History Report numbers do not match electric bills. This has been reconciled through a spreadsheet called "Compare Bills to History Report". All the numbers are correct, they are just summing different things. Check it out.