

Bellaire Hydro Possibilities

Antrim County Public Works Meeting

August 5, 2013



William Stockhausen
Elk Rapids Hydroelectric Power



Outline

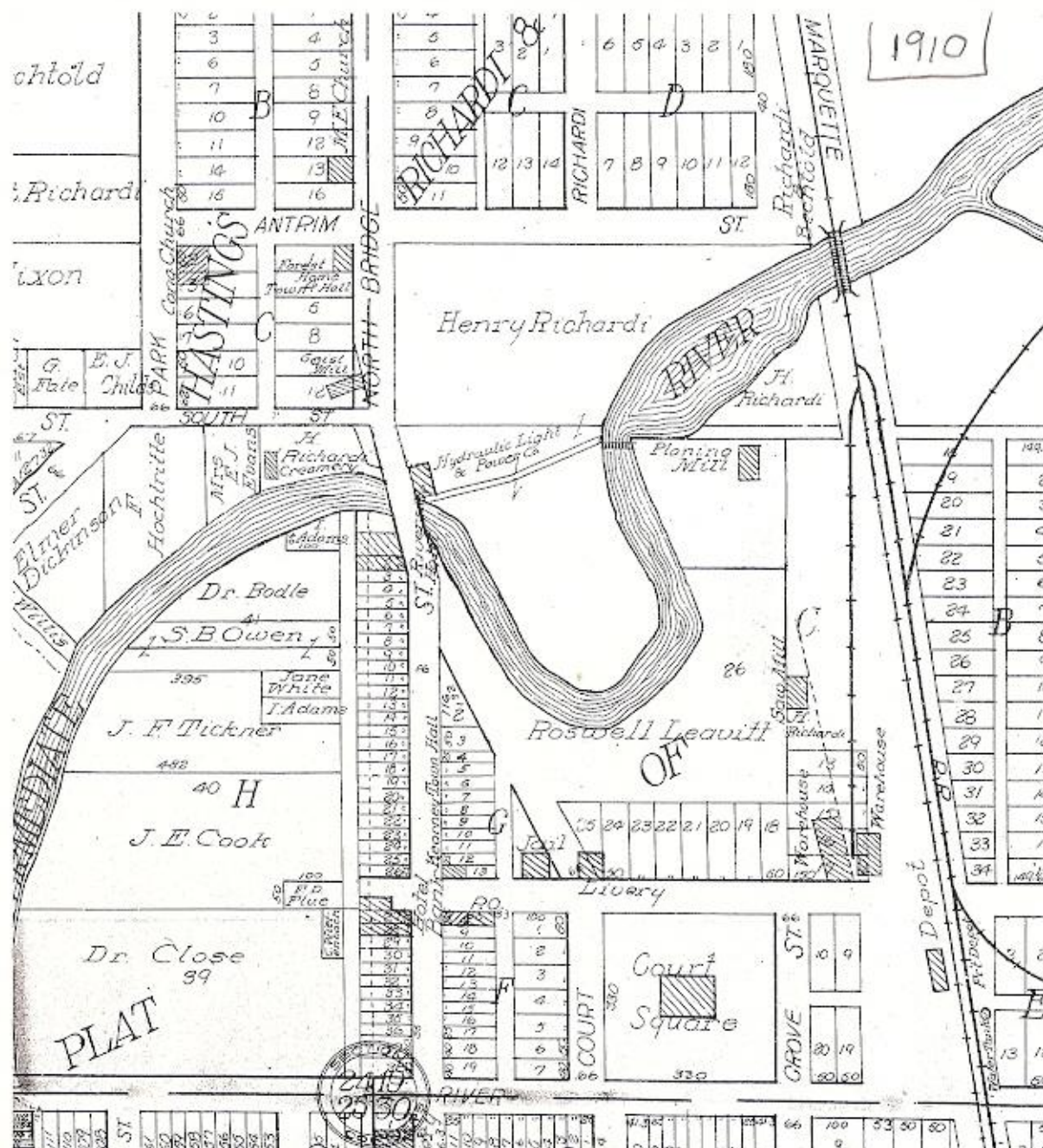
- Historical & Background
- Interconnection Requirements
- Generation & Load Mismatch
- Equipment
- Bottom Line
- Thoughts & Conclusions

History & Background

Historical plat maps, pictures, and
articles are courtesy of:

Beverly Johnson,
Bellaire Historical Museum





Charlevoix Light Plant

Dam and plant were built in 1906 by Henry Richardi. 1000 poles were strung over the 25 miles to Charlevoix to supply city street lighting.



Powerhouse Removal - 1974



Generators Going to Scrap



e Decided by Tuesday's Vote

ACN- 4/18/1974



RECONSTRUCTION is well underway at the Intermediate River Dam in Bellaire. Work includes construction of a new Spillway as well as repair of the existing spillway structure. The old power house, seen in the background, will be removed as part of the overall improvement plans. John Arfel of Bellaire contracted to do the work.

Mancelon voters will nity to vot \$4,700,000 which bos members of a major oc in light of rollment.

The amon construction school buil remodeling ges in the The press would be cafeteria ad tary buldin remodeled, added, and room added

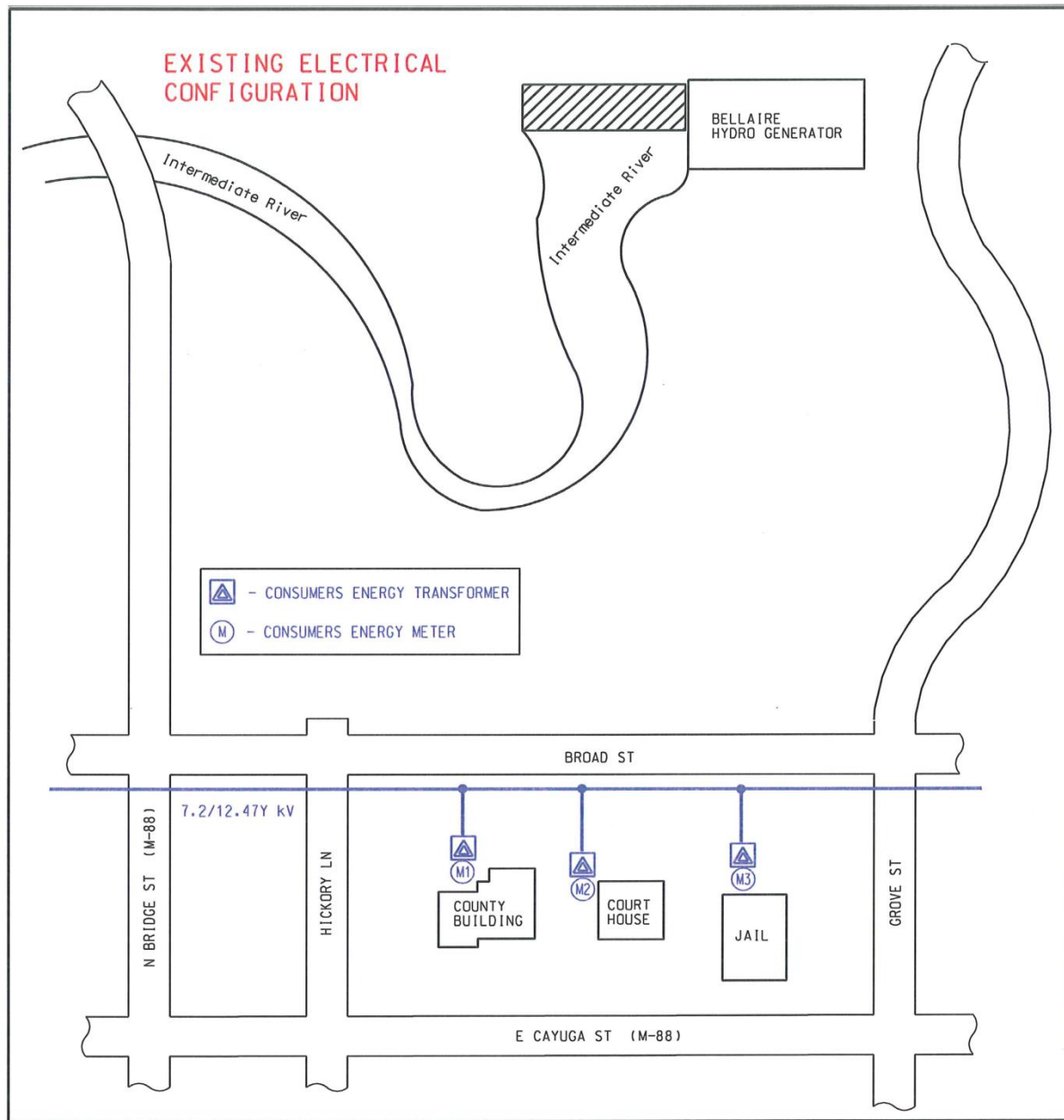
Remodeling Elementary included in

At the at tion last ap ed down a proposal w provided for ing and add isting buildi 305 to 230.

When that approved pu ditional relo which brou number of units now scho ol. Incl has brought ing condition feels can b through a n gram.

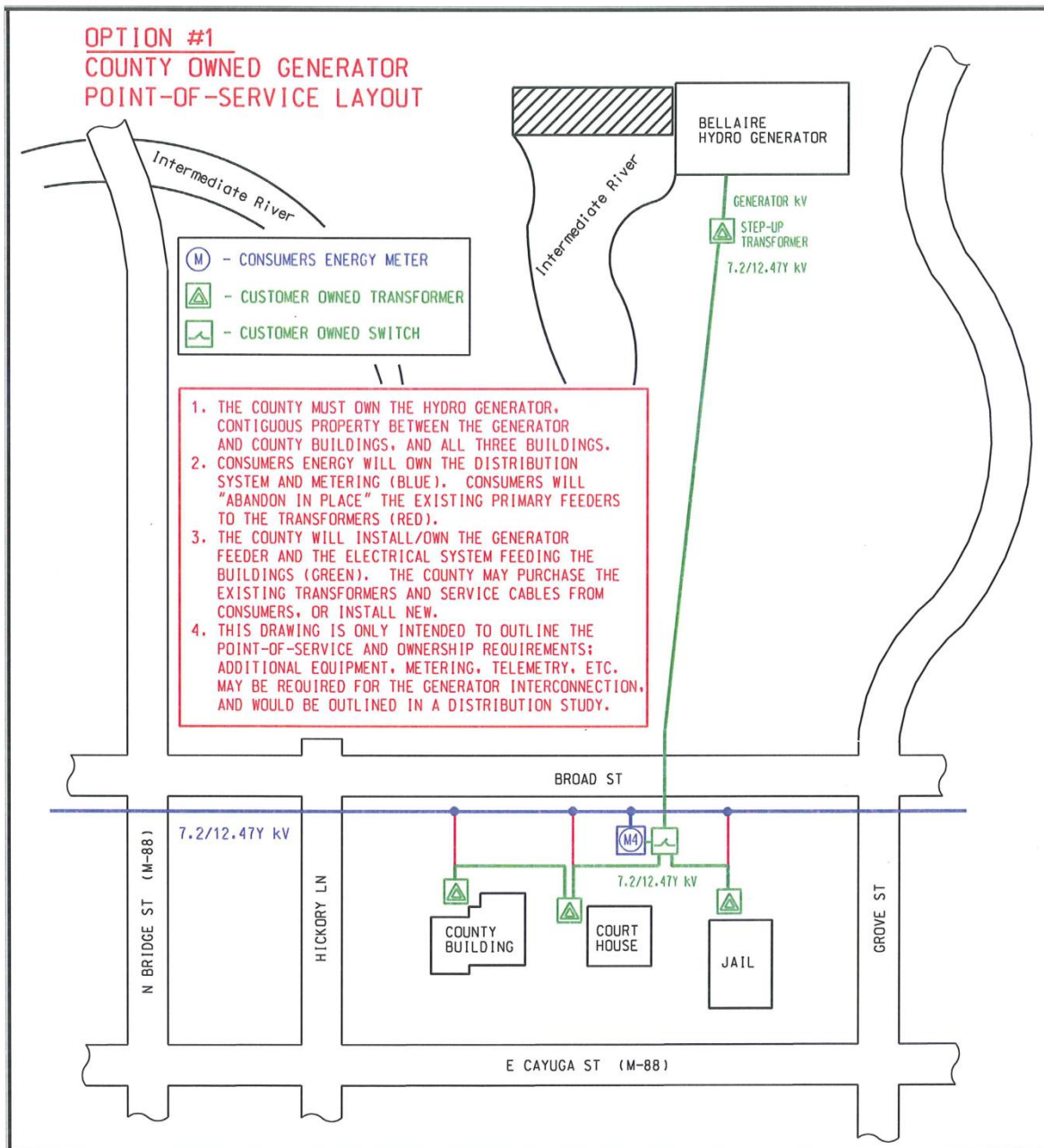
When en this year l bringing the trict to a making Man school distri the board studies and sion to seek \$4,700,000 b

Dam Rebuilt 1974



Existing Consumers- Antrim County Complex Interconnection

OPTION #1
COUNTY OWNED GENERATOR
POINT-OF-SERVICE LAYOUT



Proposed Consumers- Antrim County Complex Interconnection

Consumers' Rates & Tariffs

- Netmetering
 - Does not pay delivery charges (~25% of bill)
 - Does have demand and standby charges
 - Category 3 (150 – 550 kW) currently for methane digesters only – no customers in this category
- Self Generation – GSG-1
 - Does pay delivery charges (~25% of bill)
 - Does not have demand and standby charges
 - No customers in this Category 3 (150 – 550 kW)

101-265-921

Detail of Current Charges

Elec Gen Sec Rate GSD Com

Rate: 1120

Billing Demand: 113.0

Power Factor: 0.88

Meter Number: 57079724

POD: 0000003569713

Meter Begin Read: 19762

Meter End Read: 19946

Read Type: actual

Differential: 184 Constant: 200

Total Metered Energy Use: 36800 kWh

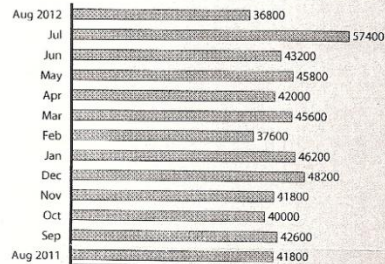
Electric Power Supply Charges

Capacity kW	113 @ 9.000000	\$1,017.00
Energy	36800 @ 0.071036	\$2,614.12
PSCR	36800 @ 0.003800-	\$139.84
Renewable Energy		\$10.80

Electric Delivery Charges

System Access		\$30.00
Capacity kW	113 @ 1.000000	\$113.00
Distribution	36800 @ 0.023825	\$876.76
Energy Efficiency		\$44.29
Securitization	36800 @ 0.001365	\$50.23
Securitization Tax	36800 @ 0.000761	\$28.00
UETM Surcharge	1 @ 0.070000	\$0.07
Stranded Costs	36800 @ 0.000900	\$33.12

Total Electric \$4,677.55



Sep 2011 - Aug 2012 Usage	527200 kWh
August electric use	36800 kWh
Electric use per day	1415 kWh
Electric cost per day	\$179.91

Summary of Charges

Account Number: 1000 0016 4036

Service:

ANTRIM COUNTY AIRPORT

205 W CAYUGA ST #A

BELLAIRE MI 49615-9683

Last Month's Account Balance	\$7,113.32
Payment 08/08/12 - Thank You	\$7,113.32
Balance Forward	\$0.00

Payments applied after Aug 28, 2012 are not included.

Total Electric	\$4,677.55
Total Energy Charges	\$4,677.55

Total Amount Due \$4,677.55

Billing Period	07/31/12 - 08/25/12
Bill Month	August
Days Billed	26
Invoice	201269073464

Your next scheduled meter read date is on or around 09/26/2012.

Your payment is due September 20, 2012. After the due date, the unpaid balance is subject to a 2% late payment charge.

News You Can Use

If Consumers Energy is your natural gas provider, call us immediately at (800) 477-5050 in a gas emergency. To report an electric outage or if you have questions about Consumers Energy billing, rates or services call: (800) 805-0490 or visit us at www.ConsumersEnergy.com.

Questions about your bill? Get an explanation of all charges and learn more about the sections of your bill at www.ConsumersEnergy.com/business.

Maximize your heating and cooling efficiency and savings. Heating and cooling can account for as much as 30 percent of a building's annual energy use. Get rebates, incentives and applications at www.ConsumersEnergy.com/eeprograms.

FREE facility energy assessment online. Spend a few minutes with our Online Facility Assessment Wizard and uncover a wealth of information that can lower your energy costs, increase efficiency and improve your bottom line. Visit www.ConsumersEnergy.com/eeprograms. Choose "Business" tab, then "Evaluation Tools."

Lighting Efficiency Pays Every Day: Lighting accounts for 30 to 60 percent of annual electric costs for most businesses. Consumers Energy offers incentives that make it easy to switch to energy efficient lighting. Visit www.ConsumersEnergy.com/eeprograms. Choose "Business" tab, then "Lighting."

Consumers Energy

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Visit: www.ConsumersEnergy.com

Call us: (800) 805-0490

County Building Electrical Bill August, 2012

Billing Demand: 113.0

Power Factor: 0.88

Historical Max kW: 167.0

Meter Number: 57079724

POD: 0000003569713

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Total Metered Energy Use: 36800 kWh

Electric Power Supply Charges

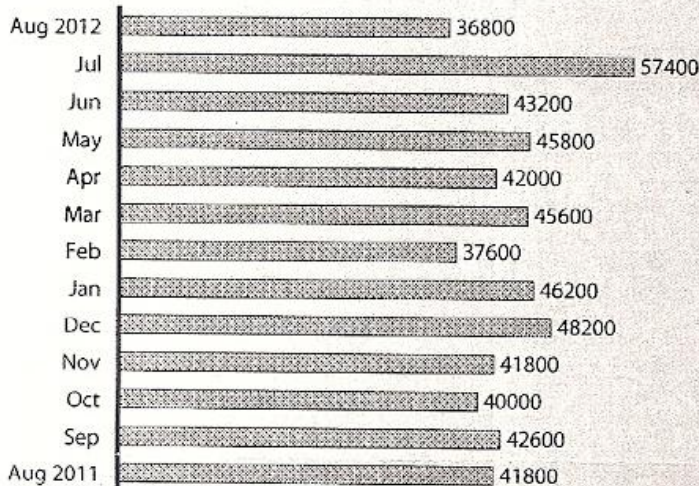
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Total Electric

\$4,677.55



Sep 2011 - Aug 2012 Usage 527200 kWh

August electric use 36800 kWh

“Capacity” is
“Demand” and is
same as Power
(horsepower or kW)

“Energy” is “Power
over Time”
(same as distance
traveled or kWhr)

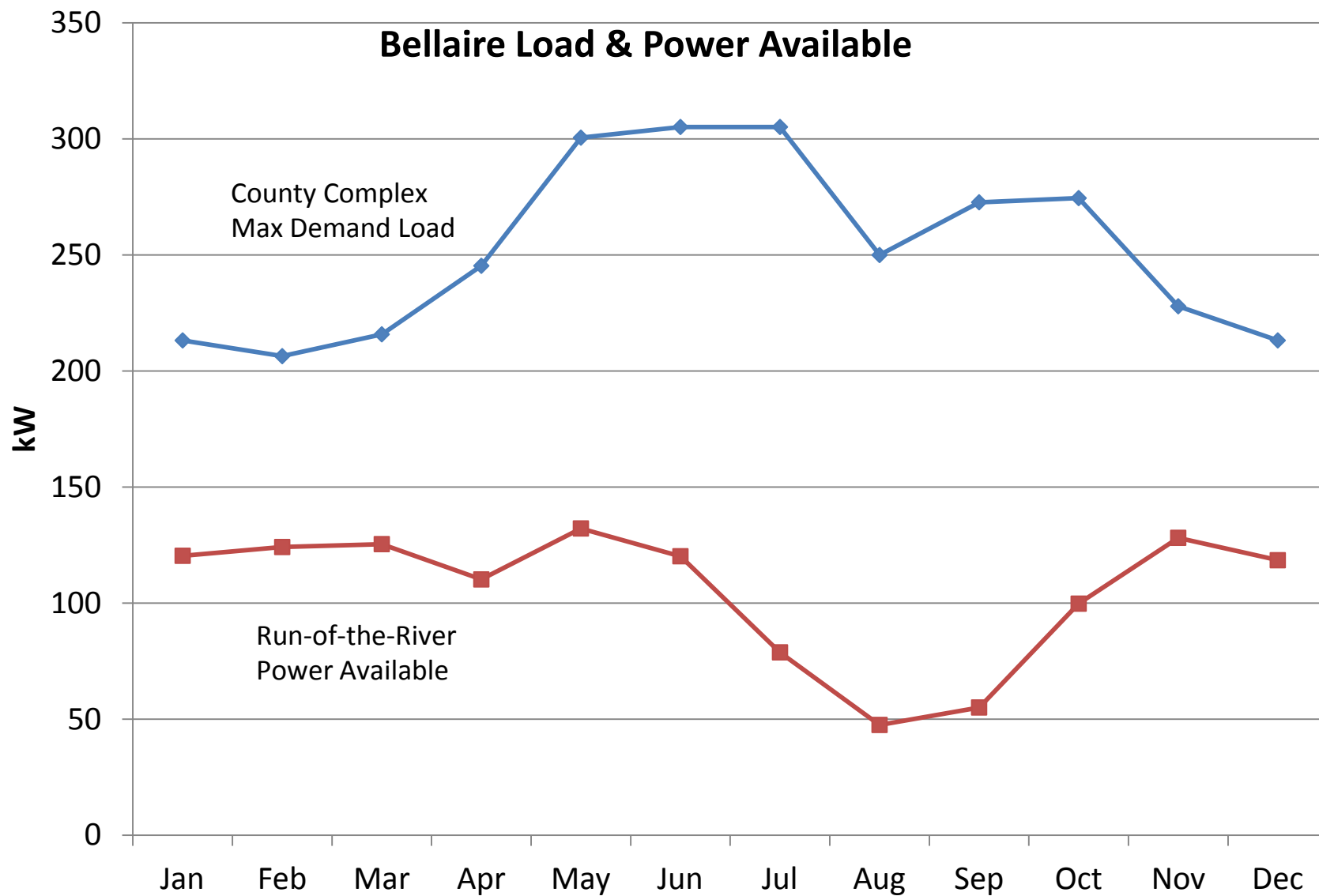
Overall cost is about
\$.12/kWhr

Bellaire - Generation vs Load

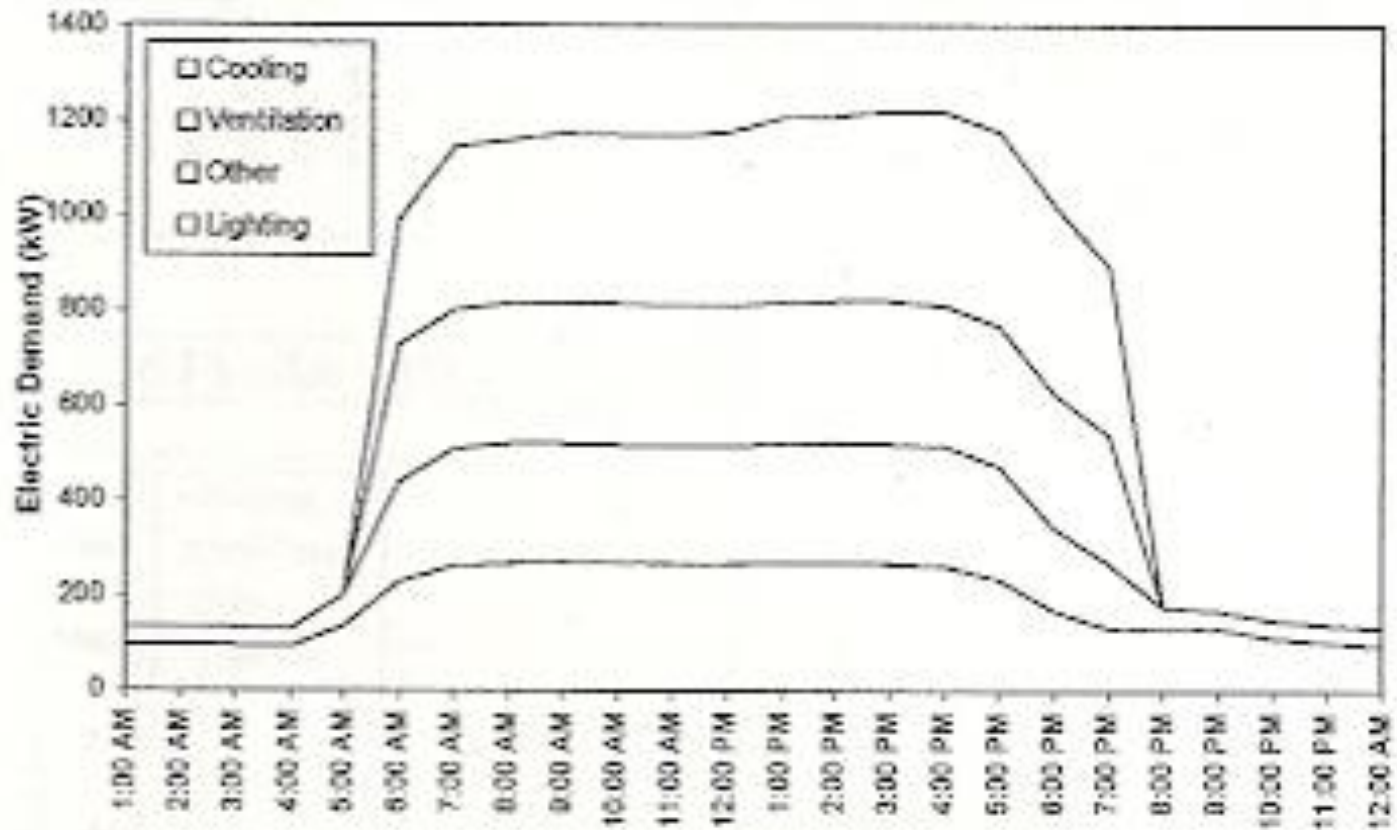
	Head	Design Flow	Nameplate	Annual Energy
	(feet)	(ft ³ /sec)	(kW)	(kWhr)
Elk Rapids	8.5 - 11.5	720	700	2,500,000
Bellaire at Dam	11.7	210	160	770,000
Bellaire at Bridge	14.5	210	200	920,000
County Complex	-	-	300	1,030,000

- Elk Rapids is shown for reference purposes
- Note Elk Rapids could provide most of the County Load – too far distant
- Note close matchup of Bellaire and County Load in regards to Energy, but significant shortfall on Demand (Power)

Bellaire Load & Power Available

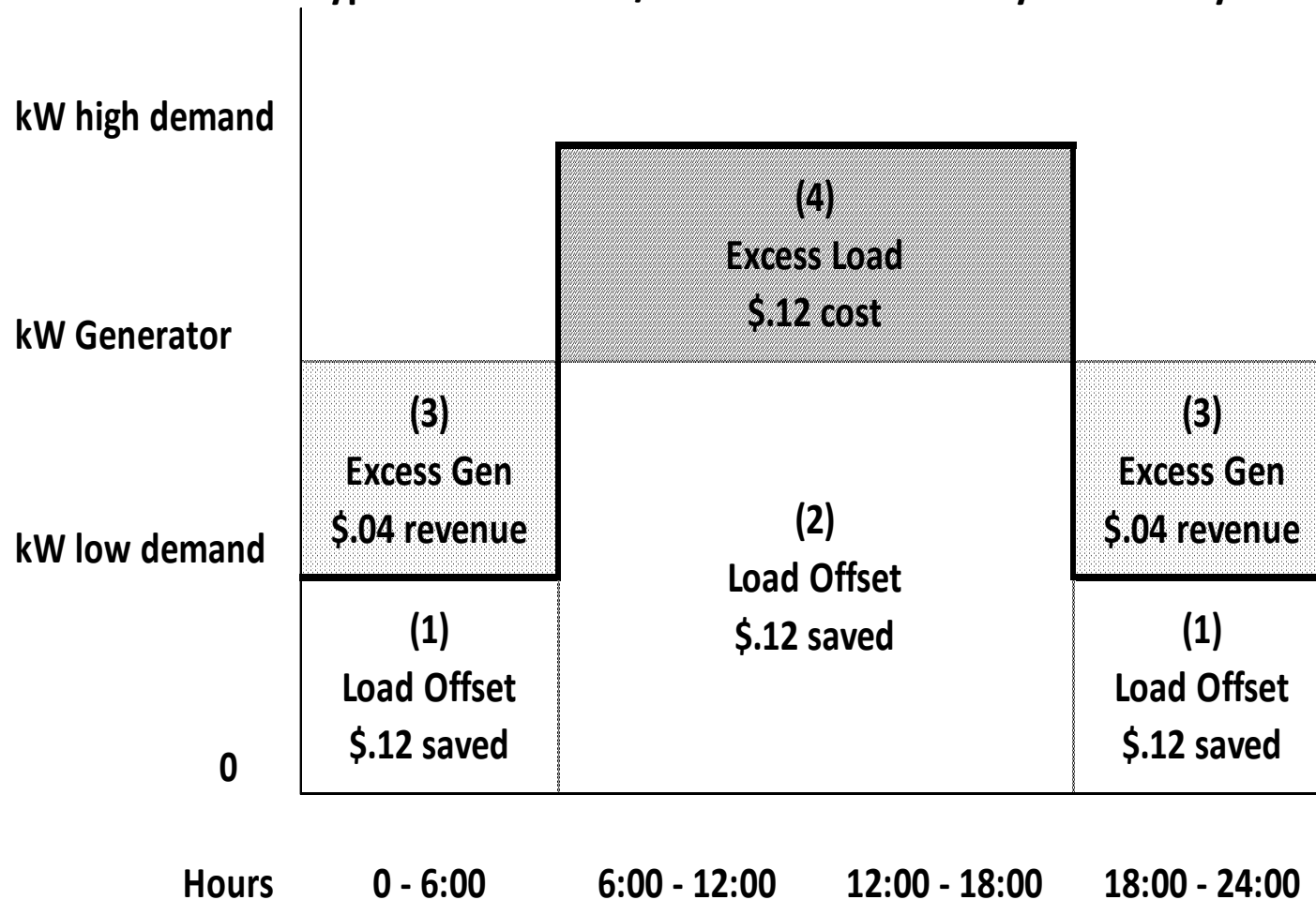


Typical Office Building Load Profile – Baseline Scenario



High electrical demand load during day, low at night & weekends.
To obtain an accurate Load Profile hourly recording meters installed over a year's time would be needed.

Typical Generation/Load Profile - Monday thru Friday



Typical Generation/Load Profile - Saturday & Sunday

kW high demand

kW Generator

kW low demand

0

(3)
Excess Gen
\$.04 revenue

(1)
Load Offset
\$.12 saved

Hours

0 - 6:00

6:00 - 12:00

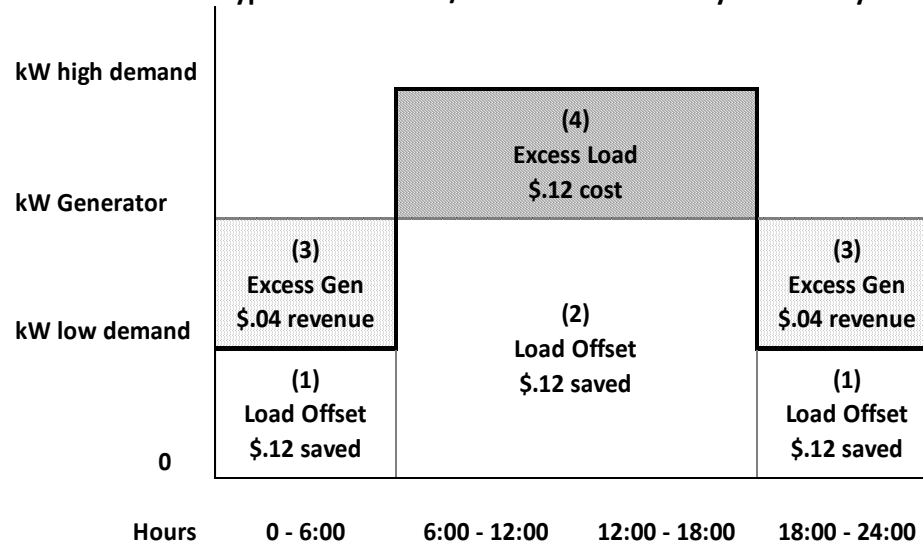
12:00 - 18:00

18:00 - 24:00

Antrim Complex Electric Cost and Potential Savings

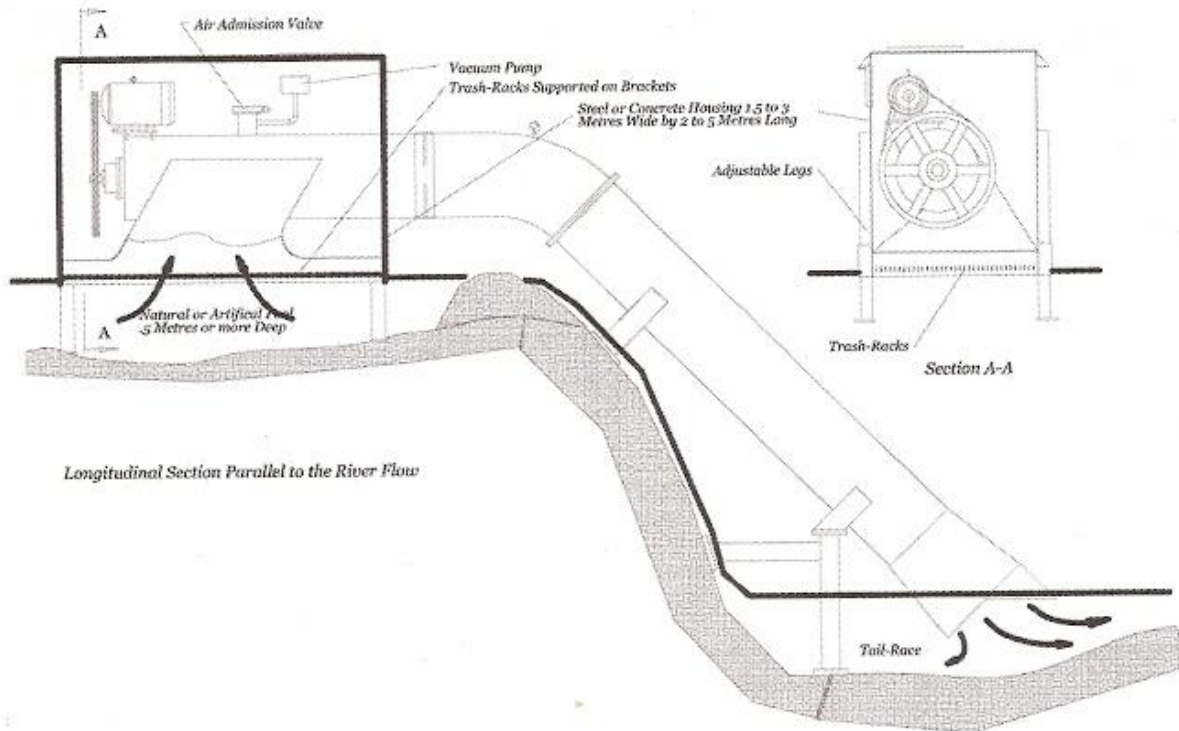
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Antrim Total	Current Use		\$9,851	\$7,730	\$9,702	\$8,804	\$9,653	\$11,858	\$13,638	\$10,071	\$11,534	\$8,304	\$8,789	\$10,363	\$120,298
Area (1)	Low Demand		\$3,619	\$2,281	\$3,394	\$1,864	\$868	\$1,656	\$3,097	\$1,435	\$2,418	\$280	\$2,342	\$4,132	\$27,386
Area (2)	Hi Demand		\$3,519	\$3,278	\$3,666	\$3,118	\$3,863	\$4,018	\$2,721	\$1,641	\$1,840	\$2,916	\$3,624	\$3,463	\$37,668
Area (3)	Excess Gen		\$987	\$1,316	\$1,165	\$1,363	\$2,213	\$1,716	\$554	\$467	\$275	\$1,807	\$1,521	\$764	\$14,149
	Net Savings		\$8,126	\$6,876	\$8,225	\$6,344	\$6,944	\$7,390	\$6,372	\$3,543	\$4,532	\$5,003	\$7,487	\$8,359	\$79,203
															^
															Net Savings

Typical Generation/Load Profile - Monday thru Friday



Products & Services

ECO-SIPHON PACKAGED HYDRO STATION "Good things come in small packages."



Siphon Type Turbine

Budgetary
Estimate:
\$595,000



Clean Energy Turbinator

Sealed,
direct drive,
permanent
magnet

The Bottom Line

	At Dam	At Bridge St
Engineering	\$30,000	\$35,000
Equipment	\$700,000	\$750,000
Civil Works	\$40,000	\$80,000
Interconnection	\$60,000	\$60,000
License/Exemption	\$100,000	\$100,000
Total	\$930,000	\$1,025,000

Net Savings	\$79,203
Less O&M	-\$13,000
Annual Savings	\$66,203

Payback in years

15.5

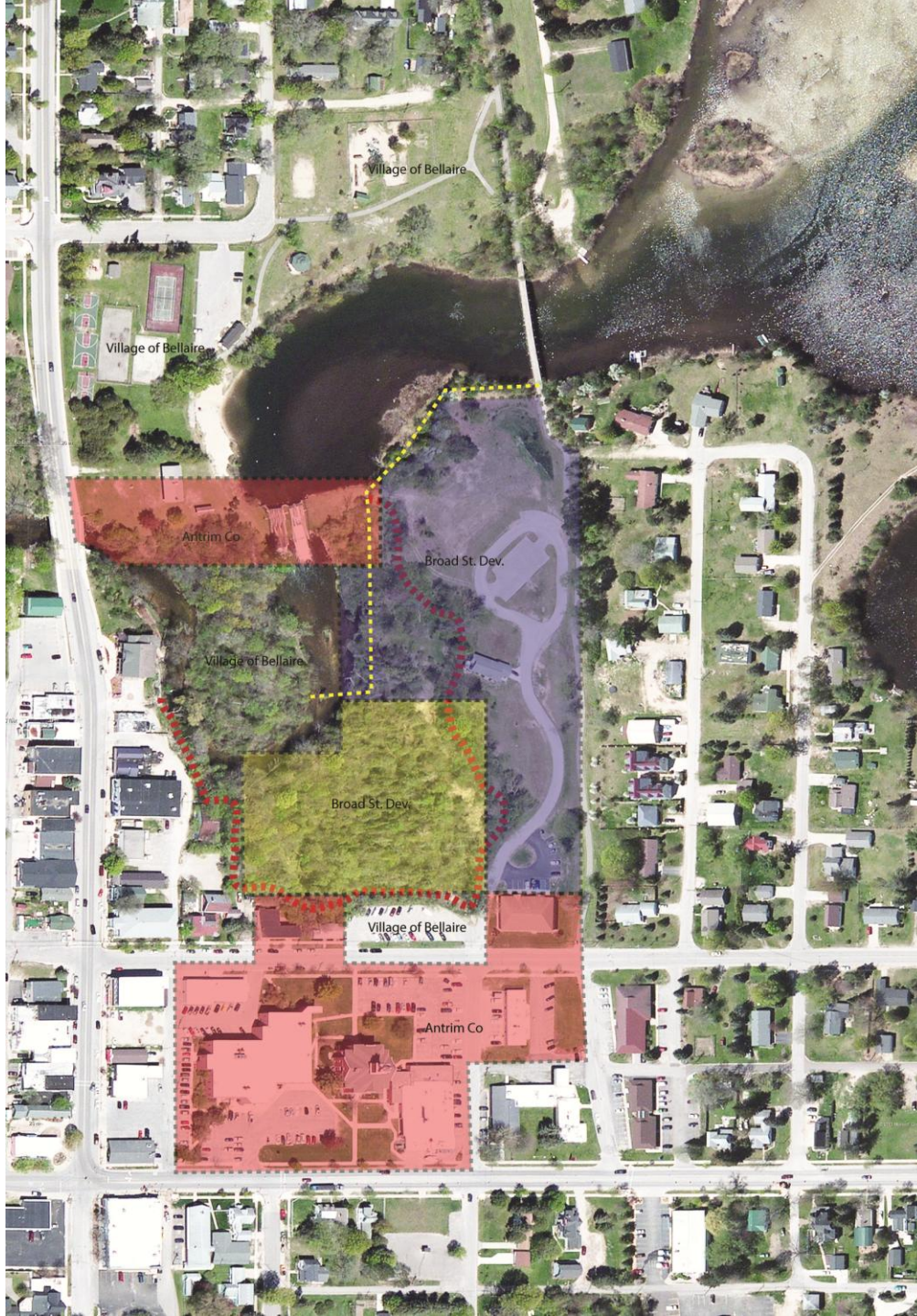
Note: Most of these costs are SWAGGED

Thoughts & Conclusions

- Off-setting electrical loads can be complex – the devil is in the details
- Like Elk Rapids, the County has a unique opportunity in electrifying the Bellaire Dam
- Longevity of this type of equipment is 25 years or more, and despite recent low-cost natural gas supplies, energy costs are sure to increase in the future.



"The electricity is off in the whole area. Find out what happened."



Landuse
Mark
Stone

The End –
Did you want more?

