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Energy solutions for a brighter tomorrow™

GEOTHERMAL HVAC BUDGETARY PROPOSAL

This is a preliminary proposal with an estimate of installation cost and a financial analysis to determine the feasibility of upgrading to geothermal. If facility personnel would like to proceed, a complete engineering study will be conducted.

OBJECTIVE:

- Reduce operating and maintenance cost by upgrading the South East Wing HVAC system to Geothermal
- Receive "Straight A Fund" grant, Duke Energy Grant, and/or about **$49,000** in Duke Energy incentives
- Utilize geothermal system to enhance current academic curriculum

COST/SAVINGS:

- **$781,000** installation cost after estimated Duke incentive of $49,000
- **$560,000** additional cost compared to a traditional system
- **$45,000**/year reduction in operating and maintenance cost
- Expected component lifetime: Ground-source heat pump=20 years, Ground Heat Exchanger=50+ years

FINANCIAL ANALYSIS:

Depending on total inflation rate, the savings-to-investment ratio is between **1.09** and **1.19**. This means that over the life of this project, the facility will receive between **$1.09** and **$1.19**, in present value dollars, for every one dollar invested. The Simple Payback Period compared to a traditional system is **12.5** years.

20-YEAR FINANCIAL ANLYSIS SUMMARY

Total Inflation:	5% General=3% Energy =2%	6% General=3% Energy =3%
Net Present Value (NPV)	$68,067	$149,460
Savings to Investment Ratio (SIR)	1.09	1.19
Internal Rate of Return (IRR)	5.8%	6.8%
Simple Payback Period (SPP)	17.5	17.5
Return on Investment (ROI)	5.7%	5.7%

Melink would like to thank Grant Career Center for the opportunity to work together. We truly appreciate the chance to help make your facility more energy-efficient and sustainable.

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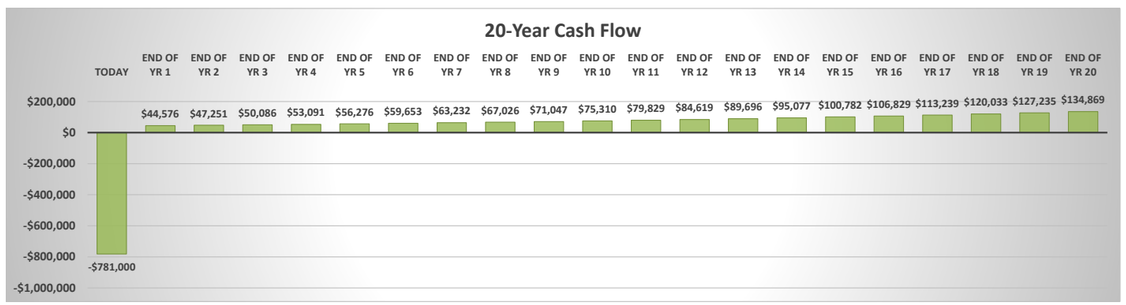
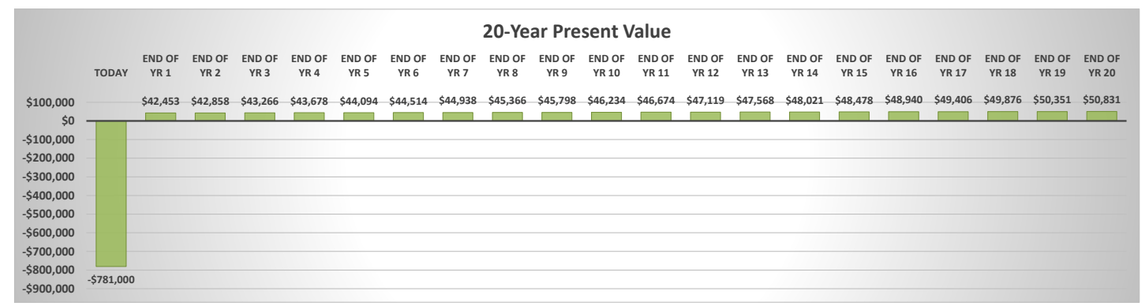
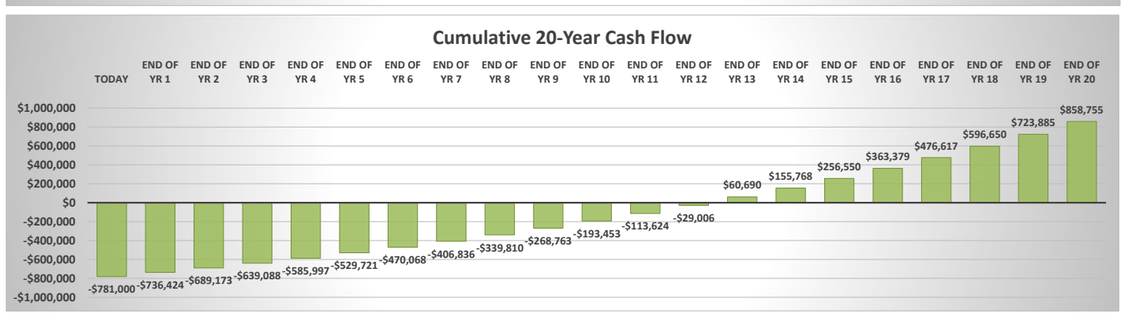
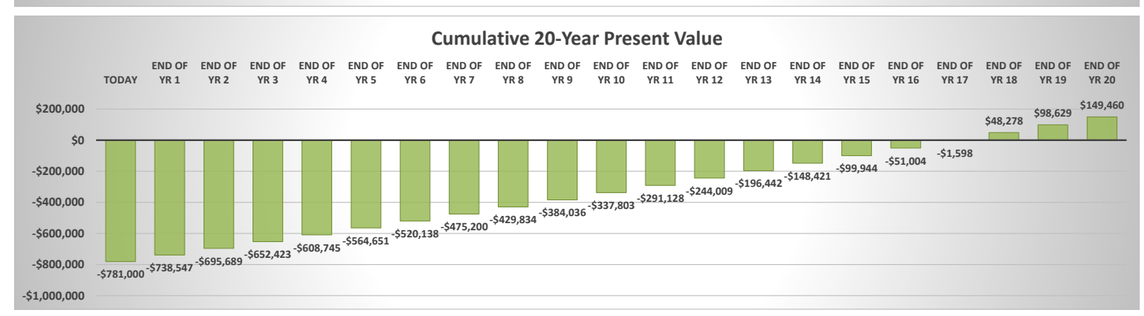
Budgetary Financial Analysis of Geothermal HVAC
Simulating Streams of Cash Inflows and Outflows

Assumptions:

Discount Rate:	5%
Inflation Rate	6%

Date:	Today 0	End of YR 1 1	End of YR 2 2	End of YR 3 3	End of YR 4 4	End of YR 5 5	End of YR 6 6	End of YR 7 7	End of YR 8 8	End of YR 9 9	End of YR 10 10	End of YR 11 11	End of YR 12 12	End of YR 13 13	End of YR 14 14	End of YR 15 15	End of YR 16 16	End of YR 17 17	End of YR 18 18	End of YR 19 19	End of YR 20 20
CASH OUTFLOWS (after Date 0 rebates)																					
Geothermal Investment	$ (830,000)																				
Rebate/incentive offset rec'd at Date 0 [1]	$ 49,000																				
SUBTOTAL OUTFLOWS	$ (781,000)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CASH INFLOWS																					
Energy savings		$ 39,576	$ 41,951	$ 44,468	$ 47,136	$ 49,964	$ 52,962	$ 56,139	$ 59,508	$ 63,078	$ 66,863	$ 70,875	$ 75,127	$ 79,635	$ 84,413	$ 89,478	$ 94,846	$ 100,537	$ 106,569	$ 112,963	$ 119,741
Maintenance savings		$ 5,000	$ 5,300	$ 5,618	$ 5,955	$ 6,312	$ 6,691	$ 7,093	$ 7,518	$ 7,969	$ 8,447	$ 8,954	$ 9,491	$ 10,061	$ 10,665	$ 11,305	$ 11,983	$ 12,702	$ 13,464	$ 14,272	$ 15,128
SUBTOTAL INFLOWS	$ -	$ 44,576	$ 47,251	$ 50,086	$ 53,091	$ 56,276	$ 59,653	$ 63,232	$ 67,026	$ 71,047	$ 75,310	$ 79,829	$ 84,619	$ 89,696	$ 95,077	$ 100,782	$ 106,829	$ 113,239	$ 120,033	$ 127,235	$ 134,869
Annual Cash Flow	$ (781,000)	**$ 44,576**	**$ 47,251**	**$ 50,086**	**$ 53,091**	**$ 56,276**	**$ 59,653**	**$ 63,232**	**$ 67,026**	**$ 71,047**	**$ 75,310**	**$ 79,829**	**$ 84,619**	**$ 89,696**	**$ 95,077**	**$ 100,782**	**$ 106,829**	**$ 113,239**	**$ 120,033**	**$ 127,235**	**$ 134,869**
PV of Outflows (for SIR calculation)	*$ (781,000)*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*
PV of Inflows (for SIR calculation)	*$ -*	*$ 42,453*	*$ 42,858*	*$ 43,266*	*$ 43,678*	*$ 44,094*	*$ 44,514*	*$ 44,938*	*$ 45,366*	*$ 45,798*	*$ 46,234*	*$ 46,674*	*$ 47,119*	*$ 47,568*	*$ 48,021*	*$ 48,478*	*$ 48,940*	*$ 49,406*	*$ 49,876*	*$ 50,351*	*$ 50,831*
Annual Present Value	$ (781,000)	**$42,453**	**$42,858**	**$43,266**	**$43,678**	**$44,094**	**$44,514**	**$44,938**	**$45,366**	**$45,798**	**$46,234**	**$46,674**	**$47,119**	**$47,568**	**$48,021**	**$48,478**	**$48,940**	**$49,406**	**$49,876**	**$50,351**	**$50,831**

20-Year Financial Analysis Results

NOTE THAT CERTAIN RETURNS VARY DEPENDING ON THE LENGTH OF THE ANALYSIS TERM

		1-YEAR	2-YEAR	3-YEAR	4-YEAR	5-YEAR	6-YEAR	7-YEAR	8-YEAR	9-YEAR	10-YEAR	11-YEAR	12-YEAR	13-YEAR	14-YEAR	15-YEAR	16-YEAR	17-YEAR	18-YEAR	19-YEAR	20-YEAR
Net Present Value (NPV)	$ 149,460	($738,546.67)	($695,689.02)	($652,423.20)	($608,745.32)	($564,651.47)	($520,137.67)	($475,199.94)	($429,834.22)	($384,036.45)	($337,802.51)	($291,128.25)	($244,009.47)	($196,441.94)	($148,421.39)	($99,943.50)	($51,003.91)	($1,598.24)	$48,277.97	$98,629.19	$149,459.94
Savings to Investment Ratio (SIR)	1.19	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.2
Internal Rate of Return (IRR)	6.8%	-94.3%	-72.4%	-52.8%	-38.4%	-28.1%	-20.6%	-14.9%	-10.6%	-7.2%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%
Simple Payback Period (SPP)	17.5																				
Return on Investment (ROI)	5.7%