

City of Elk River

Ice Arena Energy Improvements

Tim Simon & Rich Czech



This project was made possible by a grant from the U.S. Department of Energy and the Minnesota Department of Commerce through the American Recovery and Reinvestment Act of 2009 (ARRA)





Elk River has been known as "Energy City" since 1997 when the Minnesota Environmental Initiative chose it from over 30 other applying communities to act as a geographical focal point for the demonstration of efficient and renewable energy products, services, and technologies.

On October 11, 2010 the City Council passed a resolution authorizing Elk River to join Minnesota GreenStep Cities. The City has already completed 21 best practices.



Above: Elk River's Environmental Learning Center



Above: Elk River's Landfill Gas-to-Electric Power Plant

Project Conserve

Open to all households, Project Conserve is an outreach and education program designed to teach residents simple ways to conserve energy, reduce their heating, electrical, and water bills, and live a greener lifestyle.

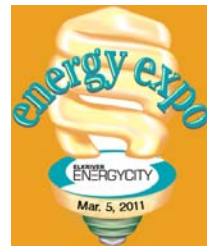


Energy City Commission

The commission is composed of fifteen members from community groups, area businesses, city staff, the school district, and power companies. The commission meets once a month to plan Energy City events and policies.

Energy City Expo

The Energy City Expo began in 2007. Each year, it attracts hundreds of visitors. This year, it will be held on Saturday, March 5th and will feature exhibits on energy conservation, children's activities, and Ron Schara.



Energy City Education Series

The Education Series recently began with "Trim Your Wasteline." Geared to business and property owners, the events show how "environmentally friendly" is good for the Earth and even better for your wallet.

Elk River Arena

The arena has been a vital part of the community since 1972. It plays home to Elk high school hockey, a program rich in tradition and success.

The arena has two ice sheets, and is used year-round for events, classes, and recreation.

We knew that the building was in need of new and efficient boilers, lighting, and roofing. Applied for EECBG grant and completed the projects in 2010.



The outside of the arena.



The inside of the older ice sheet, the Elk Barn.

Low-e Ceiling

The older ceiling radiated heat down on the ice sheet and increased the refrigeration load.

The new low-e ceiling provides a barrier that effectively reduces the amount of heat absorbed by the ice sheet.



PROJECTIONS:

- Cost of \$65,820
- Estimated savings of 144,319 kWh/yr
- Taxpayer savings of \$12,829 annually
- Payback of 5.13 years

New boilers

Two new 310,000 BTU boilers, operating at 93.3% efficiency, replaced two 80% efficient boilers at the ice arena.

They are used for the in-floor heating system in the locker rooms and to heat the water used to resurface both sheets of ice.



PROJECTIONS:

- Cost of \$20,730
- Estimated savings of 4,019 therms/yr
- Taxpayer savings of \$4,448 annually
- Payback of 4.66 years

New Lighting

Outdated lighting was replaced with high-efficiency fluorescent, ceramic metal halides, and LED fixtures.

The new system permits varied lighting levels during off-peak use.



PROJECTIONS:

- Cost of \$55,713
- Estimated savings of 116,103 kWh/yr
- Taxpayer savings of \$8,418 annually
- Payback of 6.62 years



Before

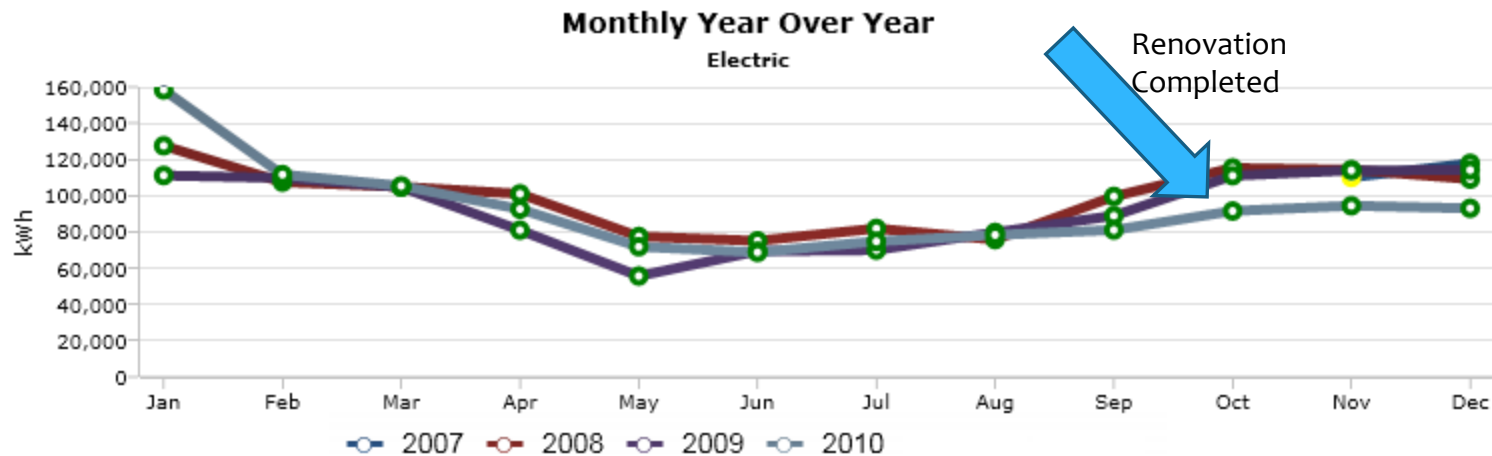


After

Elk River Ice Arena - Consumption Report

01/25/2011

City, Elk River



Year	Days	SF	Total kWh	Normalized Baseline kWh	Change from Baseline kWh	% Change	Total Energy Cost \$	Average Cost Rate \$ /kWh
2007	61	62,125	227,956	223,788	4,168	2%	\$7,503.15	\$0.03
2008	366	62,125	1,189,510	1,189,510	0	0%	\$104,621.45	\$0.09
2009	365	62,125	1,109,304	1,190,793	-81,489	-7%	\$105,110.74	\$0.09
2010	365	62,125	1,121,628	1,166,593	-44,965	-4%	\$107,328.34	\$0.10



Results So Far

- * Average of an 18.4% reduction in electric consumption from October to December 2010 vs. 2007-2009 averages.
- * Prevented 55 metric tons of CO₂ emissions from entering the atmosphere since retrofit.*
- * Currently estimate savings of \$11,995 per year from electric consumption reduction alone. (Demand charge not yet factored**)

*Natural Gas data not currently available for the Arena

**Demand charge was not factored due to anomalous increase in December 2010. More data required.

Project Planning/Prioritization

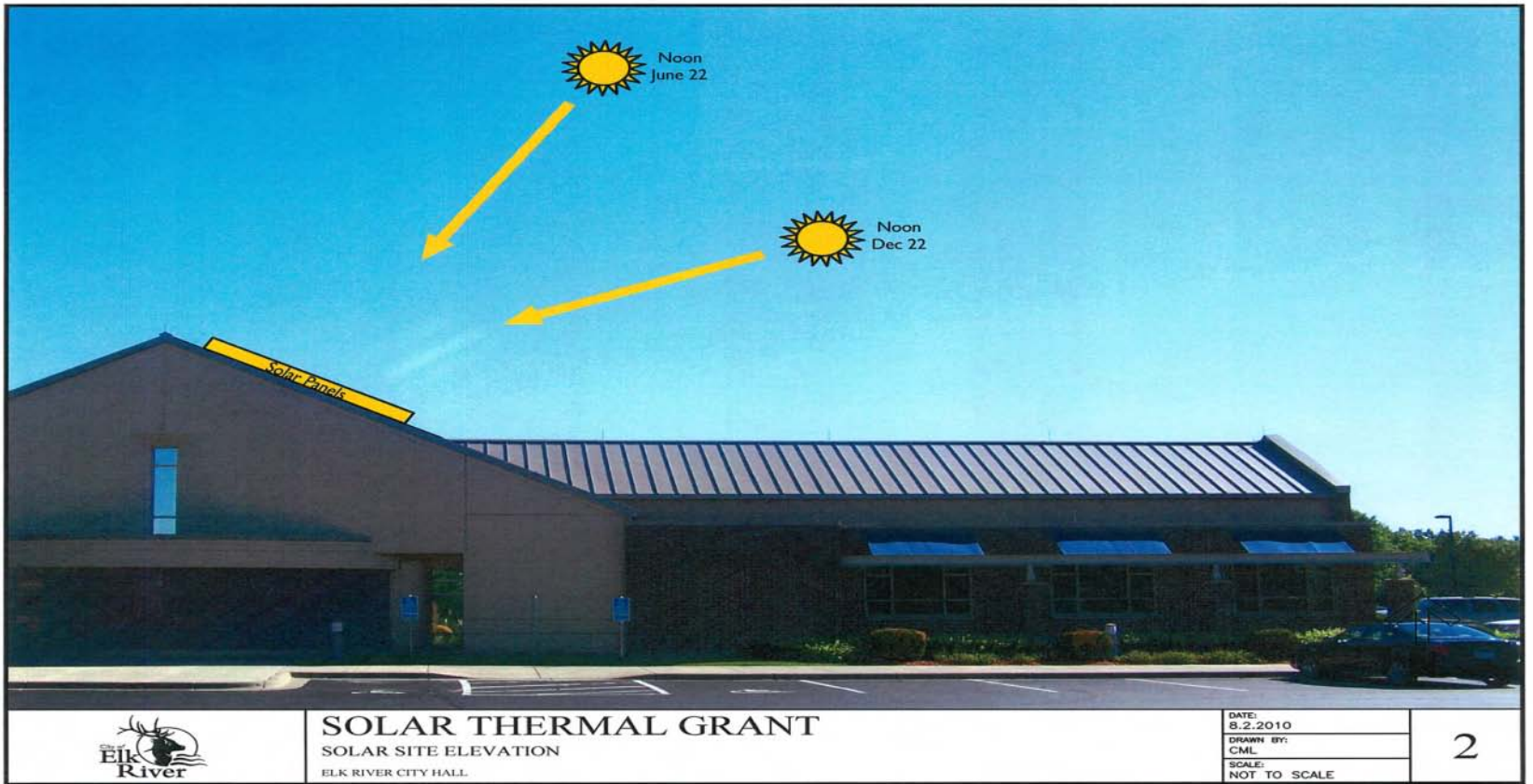
- Long-range planning for capital needs
- Perform a cost/project review analysis (Energy savings/needs/funding/scope/payback)
- Get feedback on contractors/products from other users
- Work with local utilities (rebates/letters of support)/review grant opportunities (OES website)

Ice Arena Project	Funding Breakout	%
EECBG- Grant	\$87,065	61%
Utility Rebates	12,936	9%
City Contribution	<u>42,262</u>	<u>30%</u>
Total project cost	\$142,263	100%

Lessons Learned

- Do homework on energy improvement ahead of time
- Really read the grant details (think about how to comply/ask questions)
- Allow enough time
- Pre-construction meeting
- Made in the U.S.A compliance (developed form)
- Labor outside U.S.A.

Summer 2011



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ATTACHMENT A