WEEKLY MEMO

Date: August 17, 2012

To: Mayor Lynn Stauss. Council President Craig Buckalew, Vice President Wayne Gregoire, Council Members Marc Demers, Ron Vonasek, Henry Tweten, Greg Leigh, and Mike Pokrzywinski.

From: Scott Huizenga

RE: Weekly Update

UPCOMING MEETINGS:

August 21, 2012 – 5:00 pm – Council Meeting – Council Chambers
August 28, 2012 – 5:00 pm – Work Session – Training Room
September 4, 2012 – 5:00 pm – Council Meeting – Council Chambers
September 11, 2012 – 5:00 pm – Work Session – Training Room

WEEKLY UPDATE:

East Grand Forks hosts energy efficiency event

On Wednesday, the East Grand Forks Civic Center hosted a regional Minnesota Clean Energy Resource Teams (CERTs) event on energy efficiency in ice arenas. The forum also discussed energy efficiency best practices and opportunities for all public buildings. There were about 30 attendees from several communities as far away as Brookings, South Dakota. East Grand Forks was able to present its recently-unveiled energy study of the City's three indoor arenas: the Civic Center, the VFW Arena, and the Blue Line Club Arena. The studies were partially funded by CERTs. The studies are attached and will be discussed at an upcoming work session. According to the studies, the City can save nearly 50 percent of its energy consumption at the Civic Center, representing total savings of over $40,000 annually, by performing relatively simple upgrades to items such as lighting, exterior walls, windows, door seams, and ceilings. The other arenas are more efficient than the Civic Center, but there are still improvements that can be made with relatively small investments. While actual savings can vary, the opportunities for the arenas look very promising. Most recommended upgrades have a payback period under five years. The forum also provided an opportunity to discuss newly unveiled programs from the State Department of Commerce. I spoke to Eric Rehm, the project manager for the Guaranteed Energy Savings Program (GSEP). We both feel that there are excellent opportunities for the City and the state to partner in these programs to provide long-term efficient solutions to most of the City's public buildings. Overall, the forum was well worth the three hour investment. And, the energy study will pay dividends for years to come as it relates both to the arenas specifically and to the statewide attention that our study garnered.

State Capital Bonding

The Department of Employment and Economic Development (DEED) is currently reviewing funding applications for the competitive Capital Projects Grant Program. The program was allocated $46.5 million from the state bonding bill of the last legislative session. Governor Dayton has indicated that he will personally review and select projects based upon recommendations from DEED. East Grand Forks requested $4.5 million in the program for waste water treatment improvements. Total requests are over $288 million for the $46.5 million total allocation. Award announcements are expected in late September. One can view a full list of the applications attached to this memo or at http://www.positivelyminnesota.com/About_Us/Competitive_Contract_Opportunities/Capital_Projects_Grant_Program.aspx.

Legacy Funds Dispute

There is a current disagreement between several Twin Cities parks agencies and the Greater Minnesota Regional Parks and Trails Coalition (GMRPTC) regarding the allocation of the state Legacy funding for parks and trails. In the past, metro parks and the Minnesota Department of Natural Resources (DNR) were each guaranteed 43 percent of total state parks and trails funding, while the remaining 14 percent was allocated to a statewide competitive process. Plus, any grants that were allotted from the 14 percent competition to outstate projects had a $500,000 cap, while metro allocations did not have a cap. The Greater Minnesota Parks and Trails Coalition was formed in part to respond to the unfair allocation that did not allocate any funding specific to Greater Minnesota. In the last legislative session, the GMRPTC was successful in obtaining new legislation that guaranteed the same 43 percent to metro parks while the DNR received 37 percent and Greater Minnesota was guaranteed 20 percent. While the GMPTC still considered a 20 percent allocation too low, it was giant leap from the previous legislation that guaranteed a vast majority of the funds to the metro area. Recently, the Twin Cities agencies passed resolutions calling the current allocation "unfair" because metro areas generate 64 percent of Legacy funding via the state sales tax, and 54 percent of the state's population is in the metropolitan area. Even taking the Twin Cities arguments at face value, the numbers would indicate that 36 percent of funding comes from Greater Minnesota and 46 percent of the population lives in Greater Minnesota, yet Greater Minnesota is guaranteed only 20 percent of the allocation. That analysis does not take into account the actual locations of regional and state parks. Yet, the Twin Cities groups maintain that Greater Minnesota receives a disproportionate share of Legacy funding. The debate will likely be a contentious issue in the next legislative session. Therefore, the GMRPTC is asking for member cities, including East Grand Forks, to adopt a resolution that supports the current allocation of 20 percent Greater Minnesota funding and to advocate for a larger Greater Minnesota share in the future. A good review by of the issue by the *St. Cloud Times* can be found at: http://www.sctimes.com/article/20120812/NEWS01/308120037/Battle-over-Legacy-fund-splits-outstate-metro-areas.

DEPARTMENT REPORTS:

Public Works, Jason Stordahl

Heritage Days starts 8/17/2012, and with this event there is a parade scheduled this Saturday from 9:30am-11am. See parade route on City Web, under "things to do". You can expect minor traffic delays downtown during the parade.

Police Department, Chief Mike Hedlund

EGFPD Seized/Forfeited Vehicle Auction

The East Grand Forks Police Department is going to be having an auction of vehicles that have been seized through drug investigations or DWI arrests. The vehicles are being prepared for sale and will be available for viewing in the East Grand Forks Police Department parking lot. Bidding for this auction is only possible online. Interested persons should go to www.govdeals.com for more information and to bid on any of the vehicles. Information should go online on Friday August 17, 2012.

EGFPD Awarded Alcohol Enforcement Grant

The East Grand Forks Police Department has been awarded a $4,000 grant from the Invitation Health Institute to pay for officers to work overtime on an "Enhanced College Enforcement" program. The program is designed to help prevent alcohol use and abuse by college age students through extra enforcement efforts by law enforcement. The EGFPD program will involve officers working in plain clothes and responding to loud party calls, working cooperatively with alcohol retailers to minimize opportunities for minors to gain access to alcohol and other related enforcement efforts. The program will target special events at both Northland Community and Technical College and the University of North Dakota.

Water and Light Department, Dan Boyce

The repairs and recoating project at the South water tower are essentially completed. The tank has been disinfected and passed the bacteriological test. The tank was returned to service as of Wednesday, August 15, 2012. The engineer and inspector are preparing the final punch list for the contractor to address in preparation for the contract close out.

The Water and Light Department also installed an active mixer in the tower to aid in maintaining disinfectant residuals and reduce ice formation in the tower the winter.

Library, Charlotte Helgeson

Preconstruction meeting for the Library's Roof Repair is scheduled for August 23 at 11:30 in the Library's large meeting room.

The Library's Art Collection is on display. All of the artwork is available for a two-month checkout to current patrons. The Collection includes original watercolor and acrylic paintings, photography and Deer Hunters Association prints.

The Library's next season of programming is being scheduled tentatively as the Library waits on the results of numerous grant applications.

Fire Department, Interim Chief Gary Larson
The Fire Dept was involved in many events over the last couple weeks. We had people down at Catfish days with the boat and medical equipment.

We sent people over to Grand Forks for National Night Out. The weather was not the best, but we took our pickup and boat as well as set up fire targets for the kids to spray water at with a fire hose. There was a good turn out by the public and by the different agencies.

Friday we had a team from B shift that went to Grand Forks to compete in the Float your Pote. They competed against Grand Forks Parks and Rec, and East Grand Forks Fire defeated them with style.

We had a good turnout for the 125th celebration. We had 7 units in the parade, we were at the fireworks, and put up the aerial to film the event downtown with the fireworks in the background, and we had a good turnout for the Tribute event. Overall I heard good things about the celebration and our guys had a good time.

Training this month has been on some of our new nozzles that we purchased from the last grant. It went well and is some very nice equipment. The rope rescue team met and did some additional training at the bean plant in EGF. They are working on a lot of high level rappelling and removing victims from high levels. They do a very good job.

AGENDA ITEMS:
The consent agenda includes a gaming permit, a new On Sale Liquor License, and the request to fill a vacancy for City Clerk in the Administration Office.

Item 8 is to reconsider the resolution to affirm the waste water interconnect project and to direct staff to update projections. Mayor Stauss vetoed the resolution. The City Charter requires six votes to override the veto.

Item 9 requests approval of an asphalt overlay on 5th Street NE to level some large dips and bumps.

Item 10 declares the old aerial platform truck as surplus property. The Interim Fire Chief has attempted solicited buyers. But the truck may not be worth significantly more than the approximately $8000 in salvage value. I recommend that the Interim Fire Chief dispose of the property in any expedient and cost effective manner, including scrap, if necessary.

Item 11 requests approval of an agreement with the Grand Forks Air Force Base for Mutual Aid Fire Protection and Hazardous Materials Incident Response. The City Attorney has reviewed and approved the agreement.

Item 12 is a resolution to support the Great Minnesota Regional Parks and Trails Coalition position on state Legacy funding. The background of the resolution is contained in the Weekly Memo.

Item 13 considers a request to grant a Temporary Right to Construct to the Minnesota Department of Transportation. MnDOT proposes to reconstruct several curbs that are adjacent to crosswalks so that they meet ADA regulations. There is no cost to the City for project. MnDOT is offering $500 for each of eight total parcels. The primary downside to the proposal is that some sidewalk corners that are currently brick pavers will be replaced by concrete. That will affect the crosswalk areas only. I have asked MnDOT to design the areas so that as much brick paving as possible can remain while allowing for ADA compliance. The preliminary draft plans are contained in the packet. Additionally, the Council may choose to reconstruct the downtown crosswalks at the same time next year. The current crosswalks are stamped concrete to appear as gray stone pavers. The crosswalks are aesthetically pleasing, but they are not convenient for those with mobility limitations. They also tend to chip and crack more readily from the elements and from snow removal. That project will be discussed during the 2013 Budget process. The motion for Tuesday is simply to allow MnDOT to reconstruct the sidewalks and curbs.

I will also discuss the 2013 Preliminary Budget. I will introduce the projections for the General Fund on Tuesday. I will follow with a more thorough discussion of the 2013 budget at the August 28 work session.

EAPC
ARCHITECTS ENGINEERS

East Grand Forks Blue Line Club Arena
Energy Savings Study

DATE	August 2012
NUMBER	20121740

www.eapc.net
EAPC
Architecture | Engineering | Industrial | Wind Energy | Interior Design
3100 Demers Avenue, Grand Forks ND 58201 | TELE 701.775.3000 | FAX 701.772.3605

August 7, 2012

City of EGF
600 Demers Ave
East Grand Forks, MN 56721

Attn: Scott M. Huizenga, City Administrator.

SUBJ: EGF Blue Line Arena, 804 4th St. SE.

RE: Energy Savings and Cost Study for EGF CIVIC.

FILE: 20121740

Dear Mr. Huizenga:

Pursuant to your request, the undersigned staff of EAPC visited the building and reviewed the existing building systems.

After reviewing the available existing information, and reviewing the energy use records for the building, a description of possible energy cost saving measures and associated costs and payback periods were produced to provide the proposed building system improvements, see below.

I. BACKGROUND

A. The East Grand Forks Blue Line arena was visited to observe the existing conditions of the building components, the refrigeration and ice making system, and the Heating, Ventilation, and Air Conditioning systems and discuss the operation of the facility. This information was then used to perform a study and identify significant energy saving opportunities. The costs and simple payback analysis were then estimated for the implementation of those items.

B. The past utility bills were reviewed and the following values were determined to show the seasonal change in energy consumption related to the refrigeration, heating, and lighting. The utility is the City of East Grand Forks.

EGF Blue Line Energy use for 2011':

Season	Electrical Use	Electrical Cost	Natural Gas Use	Natural Gas Cost
Winter: Oct. – Mar.	101,316 kWh	$8,580	3898 Therms	$3,895
Summer: April – Sept.	12,888 kWh	$702	932 Therms	$858
Totals:	114,204 kWh	$9,982	4830 Therms	$4,831

Note: Demand charges are not applied to this service.

C. Significant energy cost saving measures have been identified in the results of this study and are listed as follows:

East Grand Forks Blue Line Arena						
Priority Based On Savings Potential	Project Description	Reduction in Refrigeration Tons	Reduction Therms Nat. Gas	Annual Savings $	Installed Cost$	Simple Payback In Years.
1	Infiltration		540	$400	$2,148	5.4
2	Water Treatment	5		$3,000	$1,500	.5
3	Insulate exposed piping areas.			$300	$1,000	3.3
4	Exterior Lighting			$707	$3,803	5.4
Totals:		**5**	**540**	**$4,407**	**$8,451**	**1.9**
5	Reclaim Heat-Domestic Water Heating		2,452	$1,815	$25,000	13.8
Note: Item 5 Reclaim Heat-Domestic Water Heating simple payback is over 10 years.						

II. DISCUSSION:

A. Building Description: The East Grand Forks Blue Line Club Arena is a pre-engineered steel framed structure with insulated steel wall panels and roofing. The size of the ice sheet is 85'x185=15,725 s.f. The ceiling is painted steel panels. The operation of the facility is October through March 30.

B. Refrigeration system description: The ice sheet is maintained by a R-22 refrigerant system with two 40 hp, 20 Ton compressors. The age of the system is 3-4 years old. The ice sheet is cooled by a 30 hp glycol circulating pump. One compressor handles most loads experienced at the arena. Heat is rejected through air cooled condensing units with fan-cycling. The system uses slab IR temperature sensing to control compressor operation. Operation-One compressor operates, normally. The refrigeration control set-points are automatically controlled.

C. Heating and ventilation system description: The arena space is unheated. Space ventilation through exhaust fan and fresh air intakes louver.

D. Perimeter spaces including the lobby, concessions, and locker rooms are heated by natural gas fired furnaces.

E. Humidity: Space humidity is uncontrolled, no dehumidification system is present.

F. Ice melting: Ice melting and floor heating are not used in this facility.

G. Water heating: Domestic hot water is provided by one high efficiency natural gas fired water heater, and storage tank.

H. Ice resurfacing occurs approximately four times per game, both domestic water heaters are emptied each time the rink is resurfaced.

I. Lighting: Rink lighting was recently converted to (10) lamp T-5 HO high bay fluorescent fixtures. The rink perimeter is illuminated with (8) lamp T-5 HO high bay fluorescent fixtures. The locker rooms, mechanical areas, store rooms, office and restrooms are fitted with fluorescent fixtures with T-8 lamps.

   Exterior parking lot lighting is provided by city owned and maintained cobra head high pressure sodium road way type fixtures on 30 foot poles.

   Exterior building perimeter and entrance lighting is by (5) 250 watt high pressure sodium building mounted fixtures with individual photo controls.

J. Existing Operating Conditions:

   Rink air temperature is maintained at about 35 degrees F.

   One compressor operates 24/7 and can handle most loads experienced at the arena. Winter operation is open in October and close at the end of March.

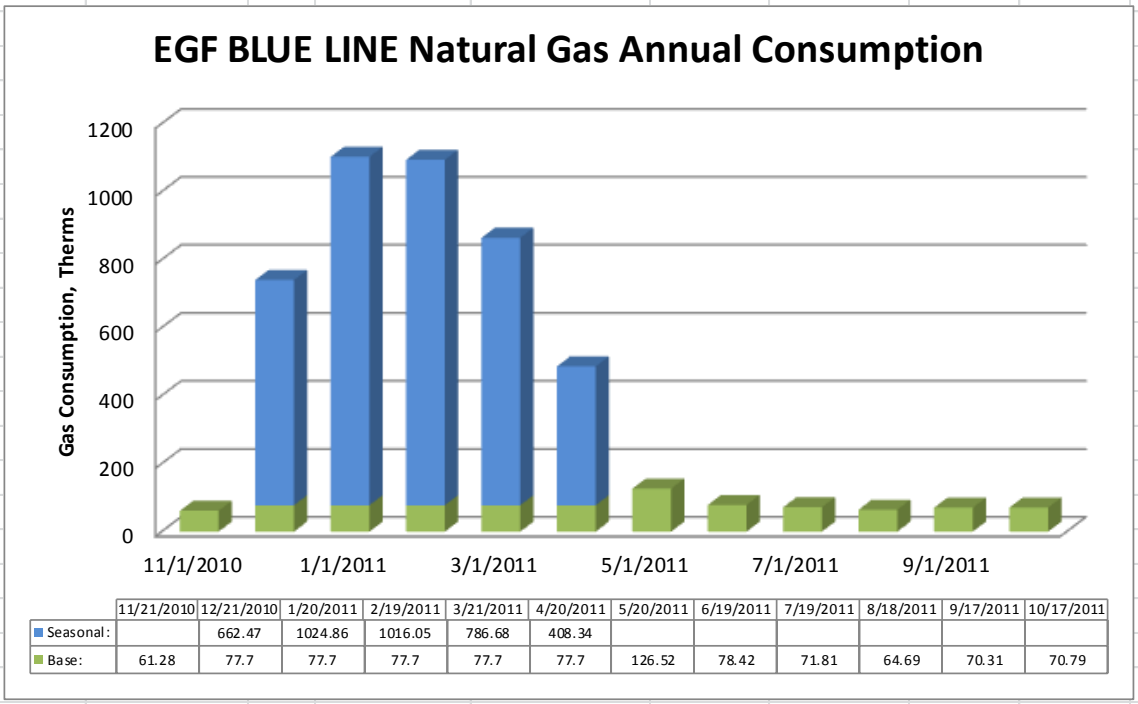
   Glycol mix supplied to the ice was at 10 degrees F, return temperature was 14 degrees F.

   Exterior doors and mechanical penetrations in the building envelope such as exhaust fan locations were observed leaking cold outside air into the building at various locations using thermal imaging. Exhaust dampers were observed to be leaking cold outside air into the building using thermal imaging. Refer to attachments for images.

   Many holes were observed in the exterior wall insulation vapor barrier. Moisture can pass through these holes and condense within the wall insulation cavity and cause damage to the insulation and wall materials.

   Rink lighting is two level manual switches. Lighting in other areas is controlled by manual switching.

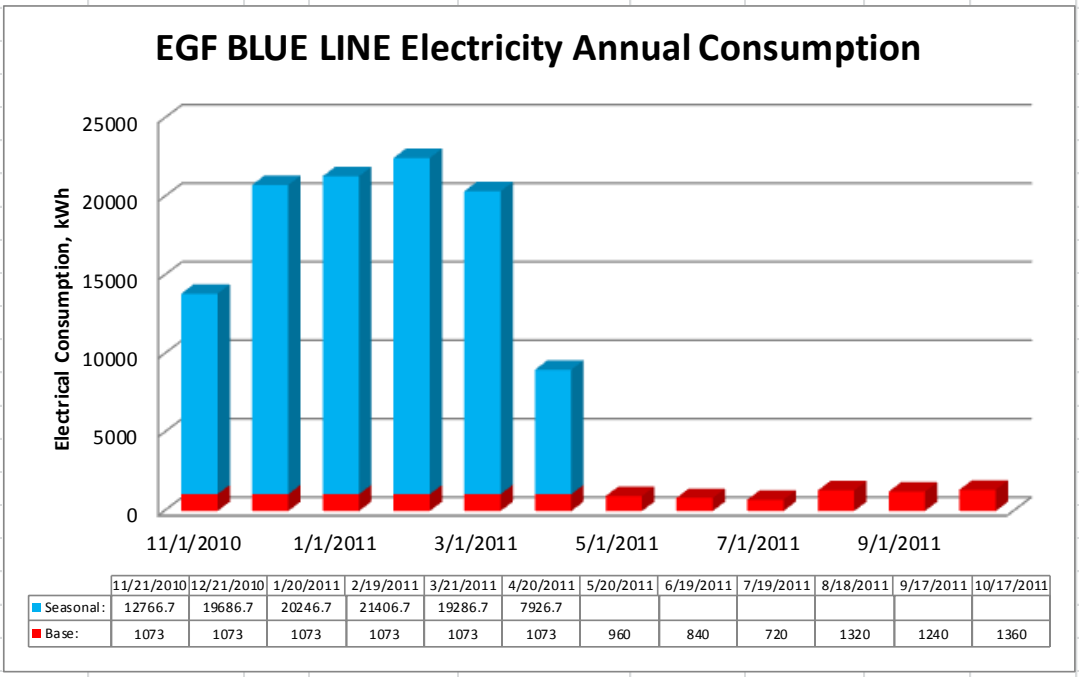
K. Utility Costs: The utility costs for one year showing seasonal differences are shown below.



	11/21/2010	12/21/2010	1/20/2011	2/19/2011	3/21/2011	4/20/2011	5/20/2011	6/19/2011	7/19/2011	8/18/2011	9/17/2011	10/17/2011
Seasonal:		662.47	1024.86	1016.05	786.68	408.34						
Base:	61.28	77.7	77.7	77.7	77.7	77.7	126.52	78.42	71.81	64.69	70.31	70.79

EGF Blue Line:

	Therms/year:		Nat. Gas Charge ($):
Date:	Seasonal:	Base:	
11/21/2010		61.28	$61
12/21/2010	662.47	77.7	$740
1/20/2011	1024.86	77.7	$1,103
2/19/2011	1016.05	77.7	$1,094
3/21/2011	786.68	77.7	$864
4/20/2011	408.34	77.7	$486
5/20/2011		126.52	$127
6/19/2011		78.42	$78
7/19/2011		71.81	$72
8/18/2011		64.69	$65
9/17/2011		70.31	$70
10/17/2011		70.79	$71
Totals:	**1195**	**932**	**$4,831**



	11/21/2010	12/21/2010	1/20/2011	2/19/2011	3/21/2011	4/20/2011	5/20/2011	6/19/2011	7/19/2011	8/18/2011	9/17/2011	10/17/2011
Seasonal:	12766.7	19686.7	20246.7	21406.7	19286.7	7926.7						
Base:	1073	1073	1073	1073	1073	1073	960	840	720	1320	1240	1360

EGF Blue Line:

	Elec. Usage (kWh):		Elec. Charge ($):
Date:	Seasonal:	Base:	
11/21/2010	12766.7	1073	$1,218
12/21/2010	19686.7	1073	$1,767
1/20/2011	20246.7	1073	$1,813
2/19/2011	21406.7	1073	$1,931
3/21/2011	19286.7	1073	$1,758
4/20/2011	7926.7	1073	$796
5/20/2011		960	$106
6/19/2011		840	$94
7/19/2011		720	$82
8/18/2011		1320	$139
9/17/2011		1240	$135
10/17/2011		1360	$143
Totals:	**101320**	**12880**	**$9,982**

L. Energy savings measures: Estimated Cost and Payback for energy saving options based on an current utility rates of $0.087 per kWh for electricity and an average of $0.74 per Therm natural gas:

1. Infiltration can create additional load to the refrigeration system by allowing warmer air and humidity into the rink which is absorbed mostly by the ice surface and this load must be removed by the refrigeration system. Potentially 10-15% or 10-15 tons of the system capacity is used for this process and can be minimized by weatherization of the building envelope.

Annual Savings:	$ 400.
Installation Estimated Cost of the upgrade:	$ 2,148.
Simple Payback Period:	5.4 years.

2. Water treatment for ice making: Using an ice enhancement additive to increase the freezing temperature to lower the refrigeration load by approximately 12% and reduce domestic hot water heating natural gas consumption by approximately 10%.

Annual Savings:	$ 3,000.
Installation Estimated Cost:	$ 1,500.
Simple Payback Period:	.5 years.

3. Exposed refrigeration piping absorbs heat for the space around it and this heat becomes a load on the refrigeration system. It should be noted that when the pipes frost over, they become somewhat self- insulated.

Annual Savings:	$ 300.
Installation Estimated Cost of the upgrade:	$ 1,000.
Simple Payback Period:	3.3 years.

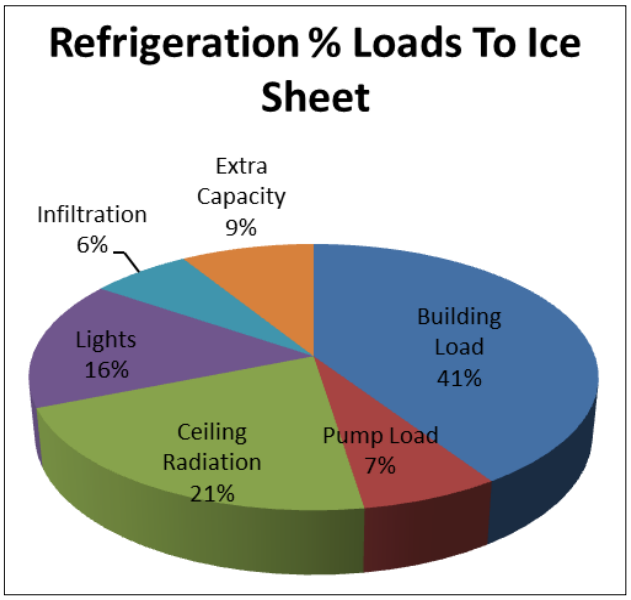
4. Lighting: Replace the (5) 250 watt high pressure sodium building mounted perimieter/entrance fixtures with new LED fixtures drawing 60 watts.

Annual Savings:	$ 707.
Installation Estimated Cost of the upgrade:	$ 3,803.
Simple Payback Period:	5.4 years.

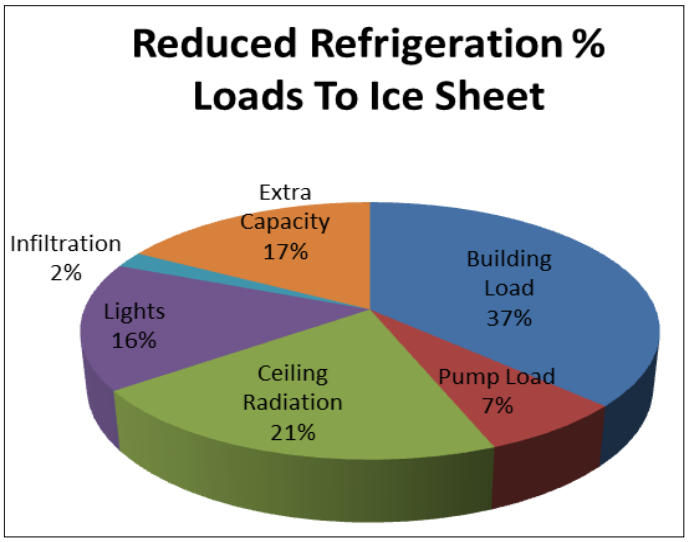
5. Domestic water heating: recovered heat from the refrigeration equipment can provide 75% to 100% of the facility's space and domestic water heating energy.

Annual Savings:	$ 1,815.
Installation Estimated Cost of the upgrade:	$ 25,000.
Simple Payback Period:	13.8 years.

M. The following charts show the estimated distribution of existing heat loads on the ice making refrigeration system (Figure-1) and the reduced heat load as a result of proposed modifications (Figure-2).



Current Refrigeration Load, Figure 1



Reduced Refrigeration Load, Figure 2

III. RECOMMENDATIONS

A. This study provides a description of the cost saving measures for further consideration for becoming actual energy saving projects in the future. The energy savings measures in the table above have a combined annual savings of $4,407 and are estimated to cost $8,451 for installation, with a total overall simple payback period of 1.9 years. These values are best estimates based on current available construction and energy cost information, electric rate of $0.087 per kWh, and natural gas rate of $0.74 per Therm.

B. Other potential energy saving items exist, however, the estimated savings is small compared to the cost and therefore, the simple payback periods are as long or longer than the life expectancy of the equipment used in those items.

Moisture can pass through holes in the exposed exterior wall vapor barrier and condense within the wall insulation cavity and cause damage to the insulation and wall materials. Proper repair of the vapor barrier should be performed and the cost of such repairs is minimal.

Controlling the thickness of the ice sheet to the normal 1 inch thickness can save significant refrigeration costs. Every additional 1 inch of ice thickness is estimated to increase the refrigeration energy use from 8% to 15%. Careful monitoring and Zamboni operations can minimize overly thick ice build-up and save energy. Cost: None. Estimated Savings: $300 to $600 per year.

Controlling the temperature of the ice to as high of a temperature as possible can reportedly save as much as 6% of the refrigeration energy. Cost: None. Estimated Savings: $250/year.

The cost associated with this work is based on the available architectural, mechanical, and electrical information at the time of this study.

DISCLAIMER

The conclusions and opinions contained in this report are based on information directly observed by EAPC, reported to EAPC, or otherwise made known to EAPC, and are held to a reasonable degree of engineering certainty. Any new or subsequent information may void all or part of this report.

Please contact us if you have any questions concerning this report.

Respectfully submitted,

Brion Mahin, P.E.
for
EAPC Architects Engineers

Enc.

ATTACHMENTS:

Appendix A – Pictures

Appendix B – Thermal Images

Appendix C – EGF Arenas Comparison

Appendix A – Pictures

Blue Line Arena.

Condensors.

Compressors

Brine tank.

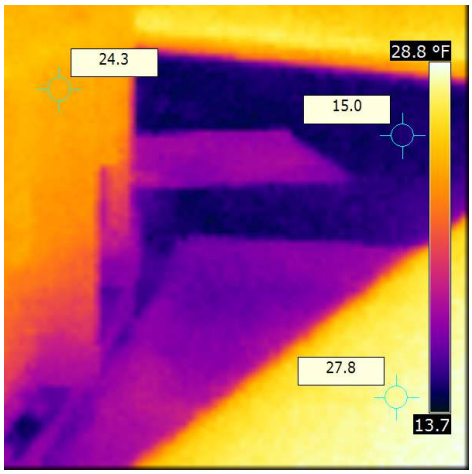
Brine pump.

Appendix B – Thermal Images

Inspection Report

Report Date 7/18/2012

Company	EAPC	**Customer**	EGF Blue Line Club
Address	3100 Demers Ave., Grand Forks, ND 58201	**Site Address**	EGF, MN.
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



Camera Model	FLIR Z-Camera
Image Date	2012:04:16 11:58:56
Image Name	Cold floor at corner.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Cold floor at corner.

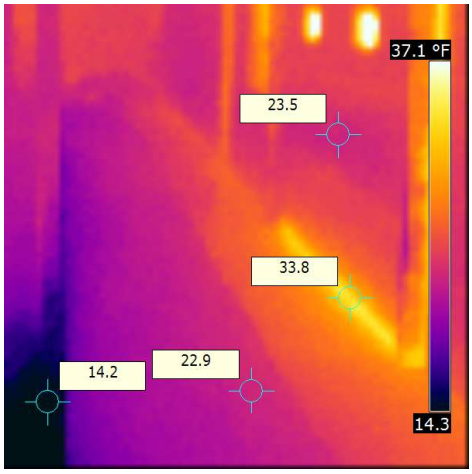


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Image Date	2012:04:16 11:58:03
Image Name	IR_1723.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Temperatures at south end of rink.

Inspection Report

Report Date 7/18/2012

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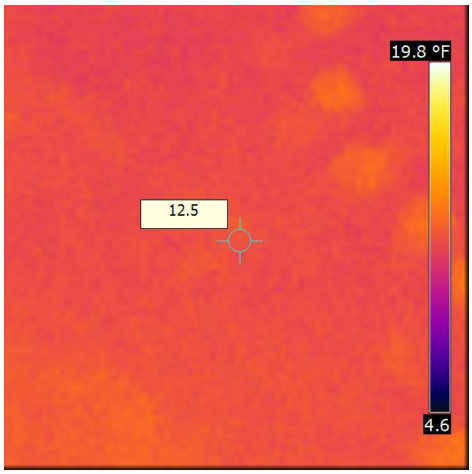
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



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Object Distance	3.3 ft

Description

Surface temperature.

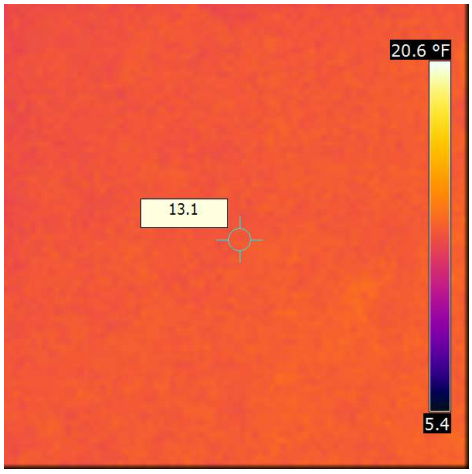

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Image Name	IR_1725.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

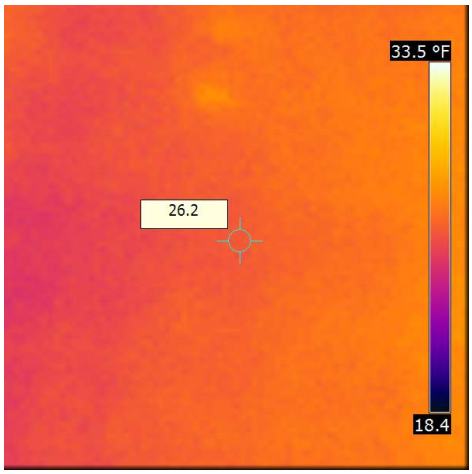
Description

Surface temperature.

Inspection Report

Report Date 7/18/2012

Company	EAPC	**Customer**	EGF Blue Line Club
Address	3100 Demers Ave., Grand Forks, ND 58201	**Site Address**	EGF, MN.
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



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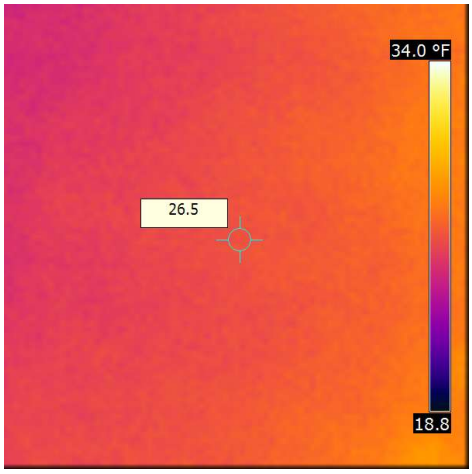
Object Distance	3.3 ft

Description

Surface temperature.



Camera Model	FLIR Z-Camera
Image Date	2012:04:16 11:58:51
Image Name	IR_1727.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

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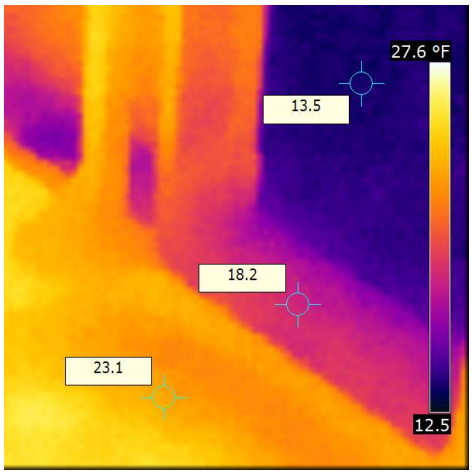

Camera Model	FLIR Z-Camera
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Image Name	IR_1729.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Surface temperatures.

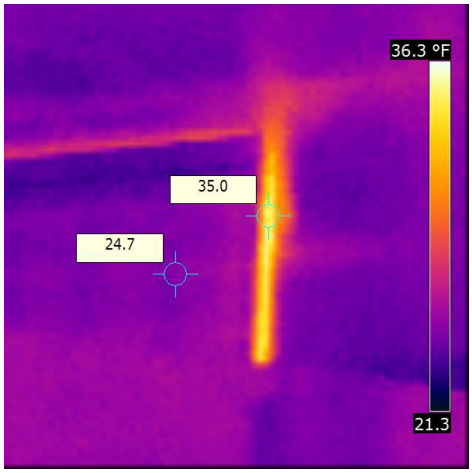

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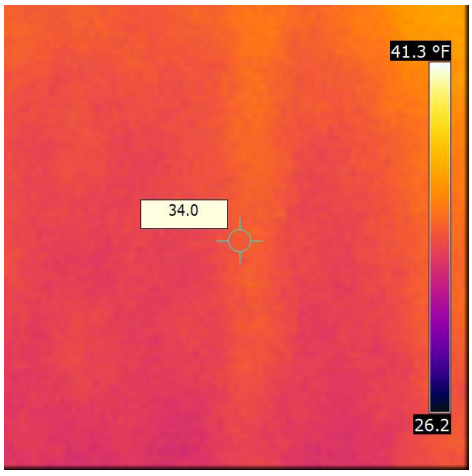
Image Date	2012:04:16 11:59:14
Image Name	IR_1730.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Inspection Report

Report Date 7/18/2012

Company	EAPC	**Customer**	EGF Blue Line Club
Address	3100 Demers Ave., Grand Forks, ND 58201	**Site Address**	EGF, MN.
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



Camera Model	FLIR Z-Camera
Image Date	2012:04:16 11:59:26
Image Name	IR_1731.jpg
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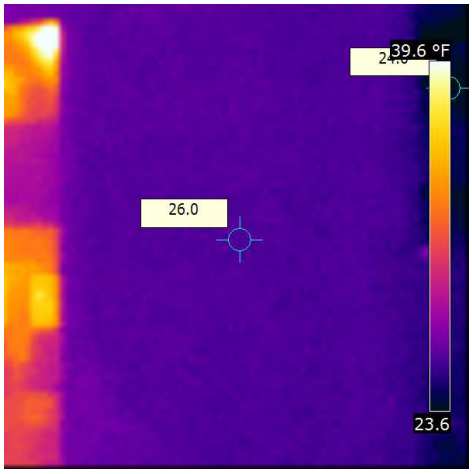
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Wall surface temperature.

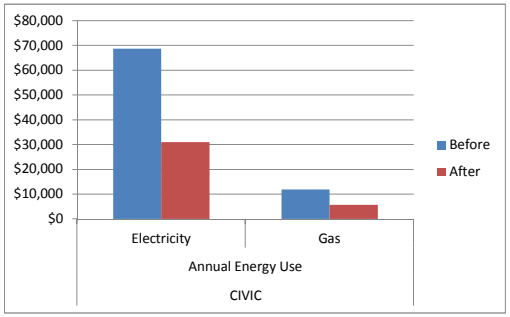


Camera Model	FLIR Z-Camera
Image Date	2012:04:16 11:59:39
Image Name	IR_1732.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

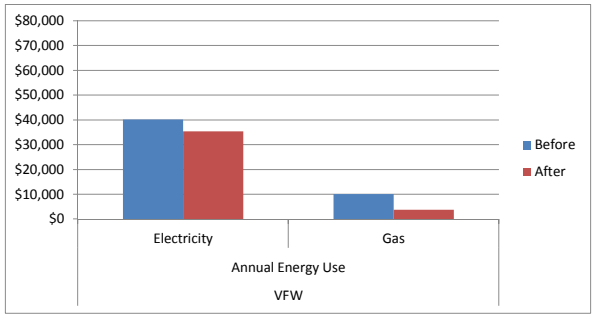
Description

Appendix C – EGF Arenas Comparison

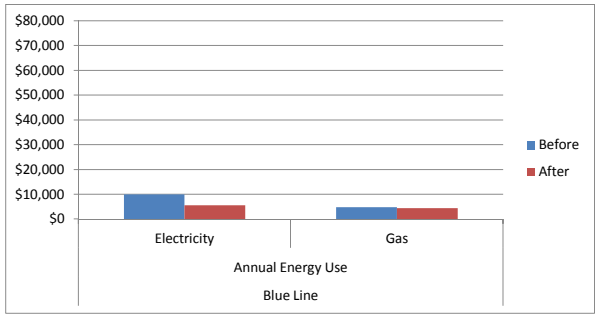
Comparison of the East Grand Forks CIVIC, VFW, and Blue Line Arenas Before and After Energy Saving Modifications.
Based on $0.74/ Therm, $0.087/kWh.



CIVIC		
	Annual Energy Use	
	Electricity	Gas
Before	$68,780	$11,988
After	$30,982	$5,705



VFW		
	Annual Energy Use	
	Electricity	Gas
Before	$40,187	$10,111
After	$35,472	$3,831



Blue Line		
	Annual Energy Use	
	Electricity	Gas
Before	$9,982	$4,831
After	$5,575	$4,431

Comparisons:	**CIVIC**	**VFW**	**Blue Line**
Low-e ceiling	none	yes	none
lighting	basic	better	better
Refrigeration	Reciprocating Compressors	Reciprocating Compressors	Reciprocating Compressors
brine dry cooler	new	new	new
brine cooling tower	none	none	none
dx dry cooler	none	none	none
dx to ice sheet	none	yes	none
brine to ice sheet	pumped	none	pumped
brine pump	20hp	none	30hp
reclaim heat	to ventilation units	to ventilation unit	
ice melt	none	none	none
ventilation	minimal	minimal	minimal
domestic water heatin	high eff. Nat. gas.	high eff. Nat. gas.	high eff. Nat. gas.
updated controls	none	Yes	Yes

EGF CIVIC Arena

EGF VFW Arena

EGF Blue Line Arena

EAPC
ARCHITECTS ENGINEERS

East Grand Forks CIVIC Arena
Energy Savings Study

DATE	August 2012
NUMBER	20121740

www.eapc.net
EAPC
Architecture | Engineering | Industrial | Wind Energy | Interior Design
3100 Demers Avenue, Grand Forks ND 58201 | TELE 701.775.3000 | FAX 701.772.3605

August 7, 2012

City of EGF
600 Demers Ave
East Grand Forks, MN 56721

Attn: Scott M. Huizenga, City Administrator.

SUBJ: EGF CIVIC Arena, 300 15th St. NE.

RE: Energy Savings and Cost Study for EGF CIVIC.

FILE: 20121740

Dear Mr. Huizenga:

Pursuant to your request, the undersigned staff of EAPC visited the building and reviewed the existing building systems.

After reviewing the available existing information, and reviewing the energy use records for the building, a description of possible energy cost saving measures and associated costs and payback periods were produced to provide the proposed building system improvements, see below.

I. BACKGROUND

A. The East Grand Forks CIVIC arena was visited to observe the existing conditions of the building components, the refrigeration and ice making system, and the Heating, Ventilation, and Air Conditioning systems and discuss the operation of the facility with the facility operator. This information was then used to perform a study and identify significant energy saving opportunities. The costs and simple payback analysis were then estimated for the implementation of those items.

B. The past utility bills were reviewed and the following values were determined to show the seasonal change in energy consumption related to the refrigeration, heating, and lighting. The utility is the City of East Grand Forks.

EGF CIVIC Energy use for 2011':

Season	Electrical Use	Electrical Cost	Natural Gas Use	Natural Gas Cost
Winter: Oct. – Mar.	624,720 kWh	$52,842	14,252 Therms	$10,353
Summer: April – Sept.	175,812 kWh	$15,828	1,620 Therms	$1,632
Totals:	800,532 kWh	$68,780	15,872 Therms	$11,985

Note: Demand charges are not applied to this service.

C. Significant energy cost saving measures have been identified in the results of this study and are listed as follows:

East Grand Forks CIVIC Arena						
Priority Based On Savings Potential	**Project Description**	**Reduction in Refrigeration Tons**	**Reduction In Therms Nat. Gas**	**Annual Savings $**	**Installed Cost$**	**Simple Payback In Years.**
1	Install low emissivity Ceiling-Fabric	20.3	-	$14,239	$70,000	4.9
2	Brine Pumping Flow Control	3.9	-	$7,500	$4,150	1.8
3	Infiltration	-	8,486	$6,280	$10,000	1.6
4	Water Treatment	5	-	$3,000	$1,500	.5
5	Lighting: Exterior Entrance	-	-	$1,052	$3,064	2.9
6	Lighting: Exterior Security	-	-	$4,034	$17,494	4.4
7	Lighting: Exterior Drive	-	-	$3,677	$28,016	7.7
8	Insulate exposed piping.	-	-	$300	$1,000	3.3
9	Improve Controls	-	-	$4,000	$20,000	5
Totals:		**29.2 Tons**	**8,486**	**$44,082**	**$155,224**	**3.5**
10	Reclaim Heat-Domestic Water Heating	-	3,344	$2,475	$25,000	10.1
11	Compressors Replacement	-	-	$7,500	$52,000	7
12	Refrigeration System Replacement: Retrofit from R-22 to CO2 System.	-	-	$10,875	$950,000 ($100,000 over conventional system.)	5-9, based on added cost over conventional system.
Notes:	1. Replacement of the condensers is a current project in progress. 2. Replacement of existing lighting is in progress. 3. Items 10, 11, and 12 are considered future replacement options and not included in the totals.					

II. DISCUSSION:

A. Building Description: The East Grand Forks CIVIC Arena is a steel framed structure with block and brick exterior walls. The exterior of the block is covered with 2" of rigid insulation and clad with prefinished steel siding. The size of the ice sheet is 85'x200'=17,000 s.f. The total size of the building is approximately 34,000 square feet. The ceiling is standard painted ceiling and structure. The operation of the facility is October 30 through March 30.

B. Refrigeration system description: The ice sheet is maintained by an R-22 refrigeration system with two 100 hp, 50 Ton reciprocating compressors and a heat reclaim system. The compressors are 20 years old. A continuously operating, 800 gpm, 20 hp pump delivers 50% glycol mix to the ice rink slab through floor tubing. Heat is rejected from the compressors to two 39 year old air cooled condensers with fan cycling which are currently being replaced with new units and a new 5hp circulating pump. The 5hp pump also circulates reclaimed heat to several rink air handlers.

The refrigeration control set-points are manually adjusted as conditions change. There are no slab temperature sensors. Compressor unloading control is present and appears to be operating. Both compressors operate together to maintain load. It is reported that one compressor can maintain the proper ice conditions only when very cold weather conditions occur.

C. Heating and ventilation system description: The arena heating and ventilation is provided through several 6000 cfm air handlers, which provide ventilation air mixed with recirculated air to the rink, and several exhaust fans. The air handlers have electric heating coils and hot water coils using reclaimed heat from the refrigeration compressors provided by the 5hp pump mentioned in the previous paragraph. The electric heating coils are meant to stage on as needed, however, the staging controls are reportedly not functioning properly and the coils come on 100%. The air handlers bring in fresh air through louvers for ventilation mixed with recirculated air. The amount of outside air is manually controlled. The automatic controls are pneumatic and electronic. The rink operator controls rink temperature using manual thermostat control and makes adjustments as needed.

Perimeter spaces including the lobby, concessions, and locker rooms are heated by natural gas fired furnaces. Ventilation for the locker areas is handled through heat recovery ventilators. Also, several existing exhaust fans exist and are no longer used. The main lobby entrance and lobby stair wells have 5kW electric cabinet unit heaters with self-contained thermostats for supple-mental heat. The main public restrooms have 12 foot electric cove heaters with self-contained thermostats for supplemental heat.

D. Humidity: Space humidity is uncontrolled, and no dehumidification system is present.

E. Ice melting: Ice melting and sub floor slab heating are not used in this facility.

F. Water heating: Domestic hot water is provided by two high efficiency natural gas fired 120 gallon, 400 mbh water heaters.

G. Ice resurfacing: Ice resurfacing occurs approximately four times per game. The hot water stored in the domestic water heaters is completely consumed each time the rink is resurfaced.

H. Lighting: Rink lighting currently consists of (36) 400 watt to 100 watt dual level metal halide light fixtures. A Musco dimming system is in place but it appears that the system is permanently set on high (1000 watts) and lighting is controlled by rows using contactors and (2) toggle switches.

A contract is in place to replace these fixtures, on a one for one basis, with 10 lamp high efficiency fluorescent high bay fixtures with T5 HO lamps with electronic ballasts. This should provide a significant energy savings. Energy cost savings would have been determined by the contractor providing the new system and not reflected in this report.

The remainder of the interior lighting is currently served by fluorescent fixtures with 4'-0" T8 lamps. These fixtures are a combination of surface ceiling and wall mount fixtures. The lobby, concession area and restrooms utilize 2'x4' lay in troofers with T8 lamps.

Exterior lighting is by building mounted (6) 50 watt and (23) 250 watt metal halide wall packs. The main entry drive is illuminated with (8) 150 watt incandescent post top globes with photo control on/off.

Eight decorative drive-through post-top 150 watt luminaires on 14' poles provide pedestrian lighting at the front of the facility.

Parking lot lighting is provided by city owned and maintained cobra-head high pressure sodium roadway type fixtures on 30 foot poles.

I. Existing Operating Conditions:

Rink air temperature is maintained at about 45 degrees F.

Glycol mix supplied to the ice was at 10 degrees F, return temperature was 14 degrees F. The refrigeration load delivered to the ice sheet was estimated to be approximately 72.5 tons at these conditions.

Ceiling temperature was measured with an infrared thermometer to be at 37 degrees F while the outside temperature was 30F and overcast and windy, 20-30 mph gusts.

Warm air was observed migrating over an open wall from a heated office to the arena perimeter spaces and is wasting energy.

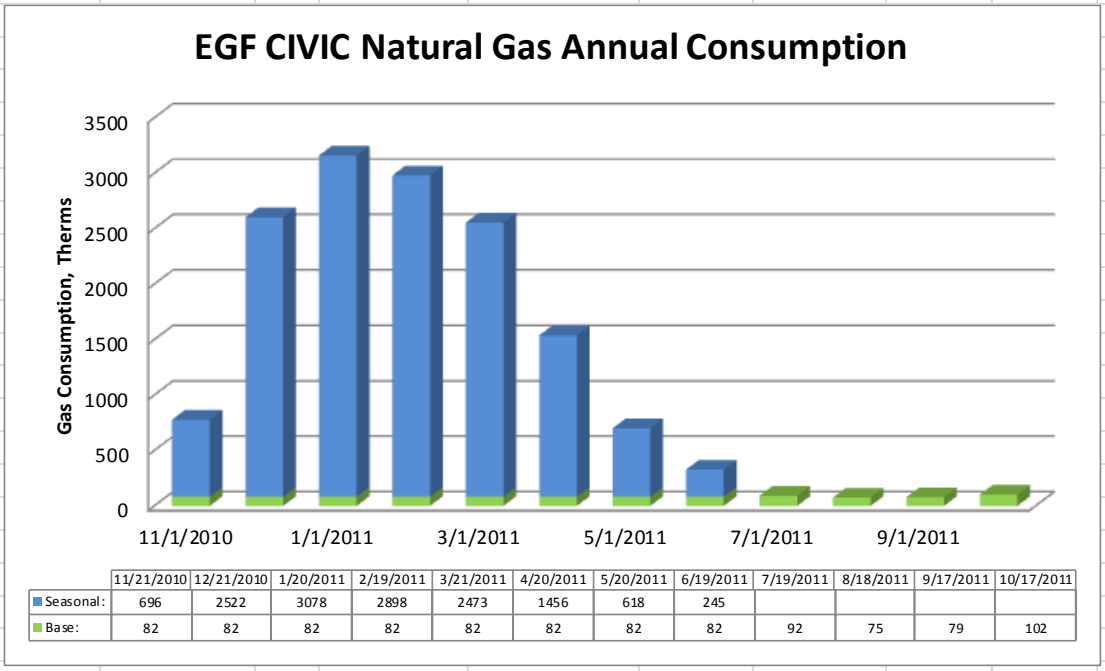
Existing cracks and seams, exterior doors, and mechanical penetrations in the building envelope such as exhaust fan damper locations were observed leaking cold outside air into the building at various locations using thermal imaging. Refer to attachments for images. A gas furnace heats this area and the heat migrates to the rink

The lobby area is heated by a natural gas furnace with flexible supply ducts above the ceiling of the ticket booth- office. Using thermal imaging, several supply ducts were found to be disconnected allowing heated supply air to flow into the space above the ceiling and not to the occupied areas in the lobby where the heat is needed, and where the thermostat is located, potentially wasting nearly 2/3 of the gas consumption of that furnace all season long.

The main lobby currently has two (2) ceiling fans for redistribution of the head at the ceiling. These fans are currently not in use due to burned out motors. These fans should be replaced.

Control of the exterior light fixtures is by self-contained photo controls in the building mounted luminaries. Control of the post top fixtures at the drive is by an individual wall mounted photo control. Control of the interior lighting is by manual switches. The main public restroom luminaries are controlled with occupancy sensors.

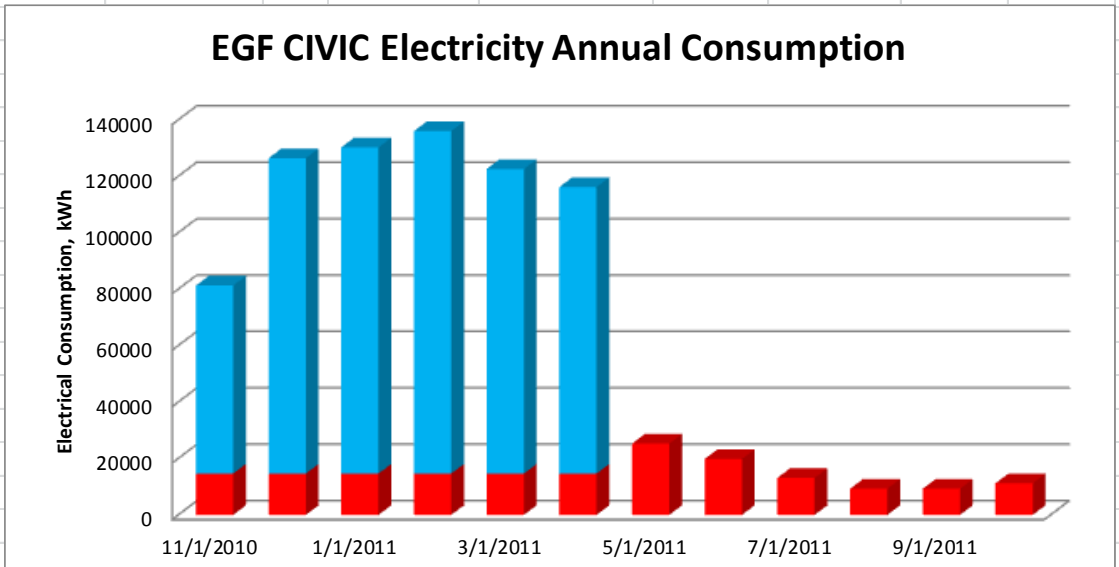
J. Utility Costs: The utility costs for one year showing seasonal differences are shown below.



	11/21/2010	12/21/2010	1/20/2011	2/19/2011	3/21/2011	4/20/2011	5/20/2011	6/19/2011	7/19/2011	8/18/2011	9/17/2011	10/17/2011
Seasonal:	696	2522	3078	2898	2473	1456	618	245				
Base:	82	82	82	82	82	82	82	82	92	75	79	102

EGF Civic:

	Therms/year:		Nat. Gas Charge ($):
Date:	Seasonal:	Base:	
11/21/2010	696	82	$614
12/21/2010	2522	82	$2,009
1/20/2011	3078	82	$2,525
2/19/2011	2898	82	$2,365
3/21/2011	2473	82	$2,042
4/20/2011	1456	82	$1,250
5/20/2011	618	82	$507
6/19/2011	245	82	$259
7/19/2011		92	$110
8/18/2011		75	$99
9/17/2011		79	$98
10/17/2011		102	$112
Totals:	**4792**	**1004**	**$11,988**



	11/21/2010	12/21/2010	1/20/2011	2/19/2011	3/21/2011	4/20/2011	5/20/2011	6/19/2011	7/19/2011	8/18/2011	9/17/2011	10/17/2011
Seasonal:	66618	111747	115579	121338	107928	101508						
Base:	14652	14652	14652	14652	14652	14652	25260	19824	13107	9264	9260	11195

EGF Civic:

	Elec. Usage (kWh):		Elec. Charge ($):
Date:	Seasonal:	Base:	
11/21/2010	66618	14652	$6,983
12/21/2010	111747	14652	$10,670
1/20/2011	115579	14652	$10,985
2/19/2011	121338	14652	$11,595
3/21/2011	107928	14652	$10,498
4/20/2011	101508	14652	$10,023
5/20/2011		25260	$2,292
6/19/2011		19824	$1,767
7/19/2011		13107	$1,160
8/18/2011		9264	$872
9/17/2011		9260	$891
10/17/2011		11195	$1,043
Totals:	**624720**	**175820**	**$68,779**

K. Energy Saving Measures: Estimated Cost and Payback for energy saving options are based on current utility rates of $0.087 per kWh for electricity and an average of $0.74 per Therm of natural gas:

1. Ceiling – The ceiling in an ice arena has a naturally warmer surface temperature than the ice due to warm air stratification, heat from the lighting, people, and heat from outside the building such as solar heating of the roof. The ice sheet absorbs radiant heat from the warmer ceiling and this absorbed heat must be removed by the refrigeration system to maintain the proper ice conditions. The installation of a low emissivity ceiling over the rink will change the radiant emissivity from about .9 to .05 and reduce the refrigeration load by an estimated 20.3 tons.

   Annual Savings: $14,239

   Installation Estimated Cost: $70,000

   Simple Payback Period: 4.9 years.

2. 20 hp Brine pump – by adding a variable frequency drive and flow controls, an estimated refrigeration load reduction of about 3.9 tons is possible as well as reduce electrical consumption through lower speeds and scheduling setback operation.

   Annual Savings: $7,500

   Installation Estimated Cost: $4,150

   Simple Payback Period: 1.8 years

3. Heating: Infiltration can create additional load to the refrigeration system by allowing warmer air and humidity into the rink which is absorbed mostly by the ice surface and this load must be removed by the refrigeration system. Potentially 10-15% or 10-15 tons of the system capacity may be used for this process and can be minimized by weatherization of the building envelope. Infiltration can account for 41.6% of the heating load of an ice rink according to Manitoba Hydro article “Energy Efficiency Guide for Ice Arenas and Curling Rinks” page 20. An estimate assuming the infiltration of the building is improved from “average” to “neutral-tight” results in reduction in natural gas consumption and an estimated payback of 1.6 years.

   Annual Savings: $6,280.

   Installation Estimated Cost of the upgrade: $10,000.

   Simple Payback Period: 1.6 years.

4. Water treatment for ice making: Using an ice enhancement additive to increase the freezing temperature to lower the refrigeration load by approximately 12% and reduce domestic hot water heating natural gas consumption by approximately 10%.

   Annual Savings: $ 3,000.

   Installation Estimated Cost of the upgrade: $ 1,500.

   Simple Payback Period: .5 years.

5. Lighting-

   Exterior lighting: Replace the existing building mounted metal halide fixtures and the incandescent post top drive through light fixtures with new fixtures utilizing an LED light source. LED light sources provide the same amount of lighting with considerably fewer watts but also become lighter in cold weather. Metal halide lamps lose approximately 34 percent efficiency over their life which is about 20,000 hours. LED fixtures lose about 10 percent of efficiency over the life of 50,000 hours. The longer lamp life will minimize maintenance man hours and lamp replacement costs by better than half.

   Replace the (6) 150 watt metal halide building mounted fixtures at entries with LED fixtures drawing 54 watts.

Annual Savings:	$ 1,052.04
Installation Estimated Cost of the upgrade:	$ 3,064.00
Simple Payback Period:	2.9 years.

6. Lighting-

   Replace the (23) 250 watt metal halide building mounted perimeter security fixtures with LED fixtures drawing 60 watts.

Annual Savings:	$ 4,033.88
Installation Estimated Cost of the upgrade:	$ 17,493.75
Simple Payback Period:	4.4 years.

7. Lighting-

   Replace the (11) 150 watt incandescent post top main entrance drive fixtures with LED fixtures drawing 28 watts. (assume 6 month use)

Annual Savings:	$ 3,676.66
Installation Estimated Cost of the upgrade:	$ 28,015.68
Simple Payback Period:	7.7 years.

8. Piping insulation: Exposed refrigeration piping absorbs heat for the space around it and this heat becomes a load on the refrigeration system. It should be noted that when the pipes frost over, they become somewhat self- insulated.

Annual Savings:	$ 300.
Installation Estimated Cost of the upgrade:	$ 1,000.
Simple Payback Period:	3.3 years.

9. Refrigeration controls: Replacement of the refrigeration controls with digital controls and slab or brine temperature sensing may reduce energy use by approximately 5%-10%.

Annual Savings:	$ 8,000.
Installation Estimated Cost of the upgrade:	$ 20,000.
Simple Payback Period:	5 years

10. Domestic water heating: Reclaimed heat from the refrigeration equipment can provide 75% to 100% of the hot water energy for ice resurfacing and domestic hot water heating by adding a domestic water heating storage tank, and controls.

Annual Savings:	$ 2,475.
Installation Estimated Cost of the upgrade:	$ 25,000.
Simple Payback Period:	10.1 years.

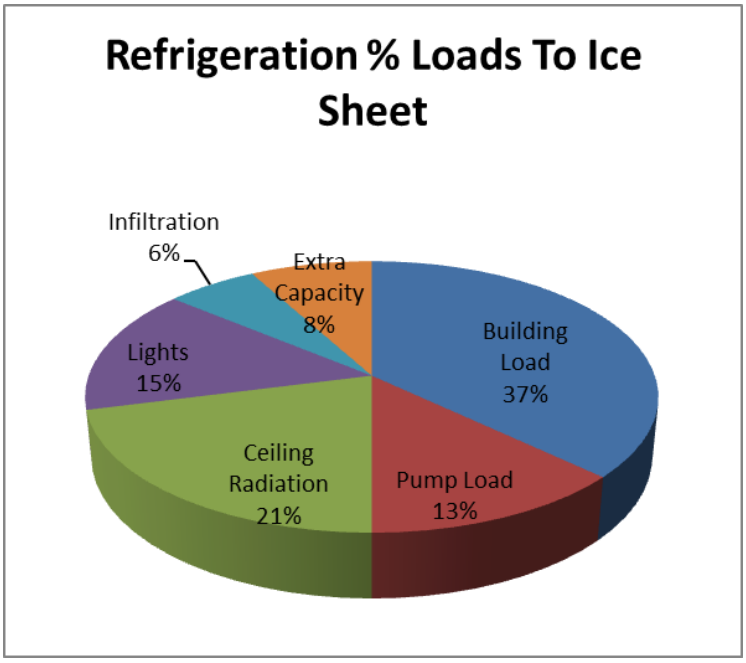
11. Replacement of the compressors: Replacement of the compressors due to age, wear, damage may allow for improved efficiency supported by improved controls of the system. There is one new compressor ready for installation. Replacement of some controls may be needed to operate the compressors at peak performance and staging.

Annual Savings:	$ 7,500
Installation Estimated Cost:	$ 52,000
Simple Payback Period:	7 years

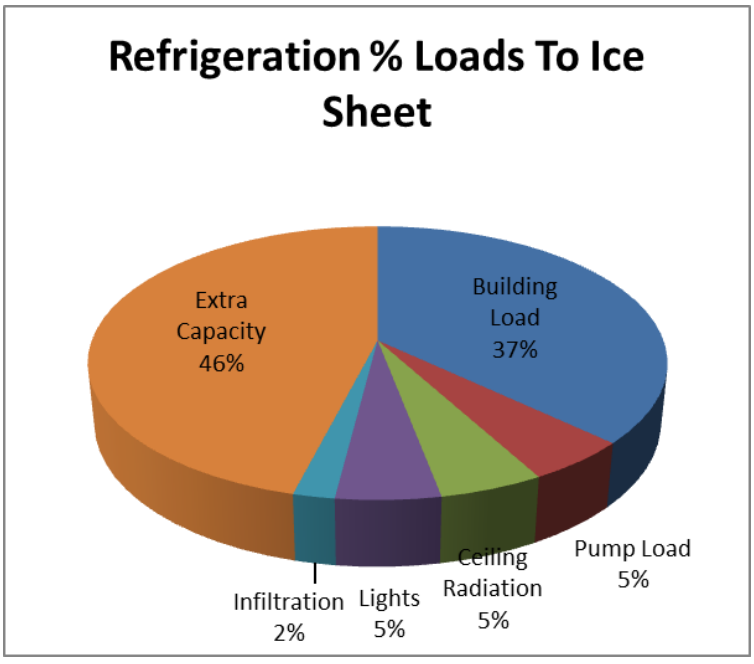
12. Refrigeration system and ice sheet replacement: A new refrigeration system using CO2 as the refrigerant and a new, direct refrigerant in slab ice floor is a possible future option for replacement of the aged system and is more energy efficient than the existing system and more safe and environmentally friendly. Estimates based on information in the ASHRAE Journal March 2012 article “Ice Rink CO2 System”. The estimated installed cost above the cost of a new conventional system was used for the simple payback estimate. The System is not widely used yet and energy savings data to support it is limited.

Annual Savings:	$ 10,875.
Installation Estimated Cost of the upgrade:	$ 100,000.
Simple Payback Period:	5-9 years.

L. The following charts show the estimated distribution of existing heat loads on the ice making refrigeration system (Figure-1) and the reduced heat load as a result of proposed modifications (Figure-2). The results are a reduction of approximately 28.2 tons of refrigeration.



Current Refrigeration Load, Figure 1



Estimated Reduced Refrigeration Load, Figure 2

III. RECOMMENDATIONS

A. This study provides a description of the cost saving measures for further consideration before becoming actual energy saving projects. The energy savings measures in the table above have a combined annual savings of $44,082 and are estimated to cost $155,224 for installation, with a total overall simple payback period of 3.5 years. These values are best estimates based on current available construction and energy cost information, electric rate of $0.087 per kWh, and natural gas rate of $0.74 per Therm.

Of the options listed above, the installation of a low emissivity ceiling will produce the greatest annual savings and reduce the load on the refrigeration systems.

Controlling the thickness of the ice sheet to the normal 1 inch thickness can save significant refrigeration costs. Every additional 1 inch of ice thickness is estimated to increase the refrigeration energy use from 8% to 15%. Careful monitoring and Zamboni operations can minimize overly thick ice build-up and save energy. Cost: None. Estimated Savings: $ 1,900 to $3,600 per year.

This system uses R-22 refrigerant and as the phase-out of R-22 refrigerant drives up the cost of replacement refrigerant and equipment, a replacement refrigerant should be planned for in the future to reduce maintenance costs.

Controlling the temperature of the ice to as high of a temperature as possible can reportedly save as much as 6% of the refrigeration energy. Cost: None. Estimated Savings: $1,450/year.

Other potential energy saving items exist, however, the estimated savings is small compared to the cost and therefore, the simple payback periods are as long or longer than the life expectancy of the equipment used in those items.

Minimal kW savings may be accomplished at no new cost by reducing the light levels in the concession's area by removing 1/3 of the lamps in the 3 lamp lay-in troffers as this area is currently over lit.

B. The cost associated with this work is based on the available architectural, mechanical, and electrical information at the time of this study.

DISCLAIMER

The conclusions and opinions contained in this report are based on information directly observed by EAPC, reported to EAPC, or otherwise made known to EAPC, and are held to a reasonable degree of engineering certainty. Any new or subsequent information may void all or part of this report.

Please contact us if you have any questions concerning this report.

Respectfully submitted,

Brion Mahin, P.E.
for
EAPC Architects Engineers

Enc.

ATTACHMENTS:

Appendix A – Pictures

Appendix B – Thermal Images

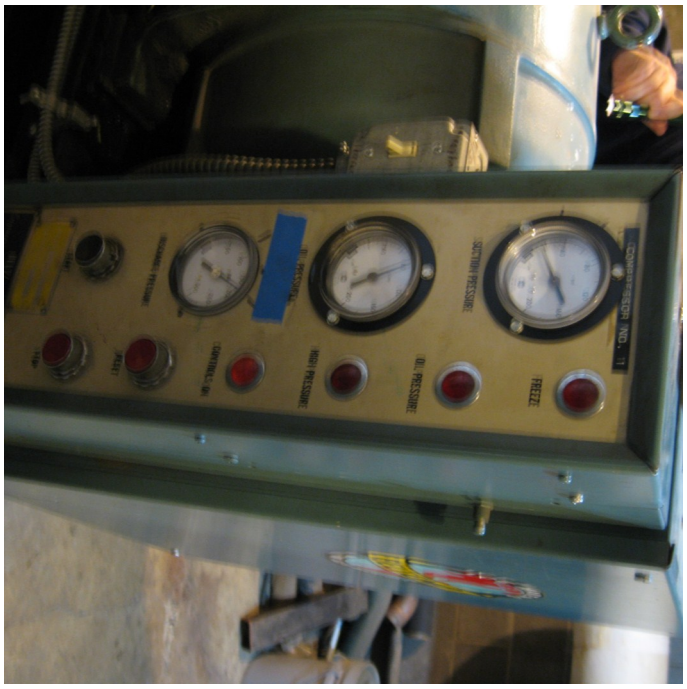
Appendix C – EGF Arenas Comparison

Appendix A – Pictures

Civic Arena.

Compressors.

Refrigeration Unit controls.



Gauge panel.

Heat reclaim circulating pump.

Equipment switches.

Compressor.

Compressor panels.

Spare compressor.

Air handling unit.

Lower level.

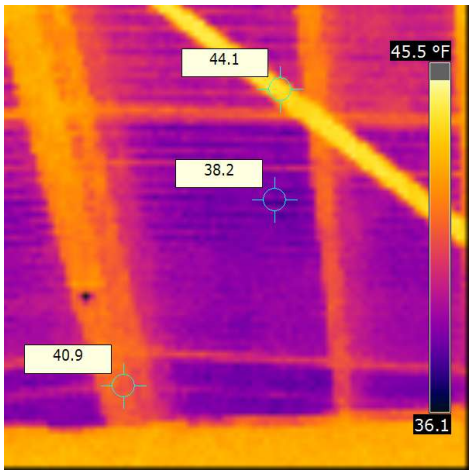
Exterior door seal.

Appendix B – Thermal Images

Inspection Report

Report Date 7/18/2012

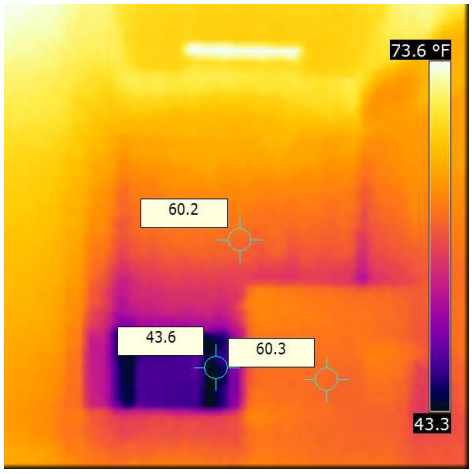
Company	EAPC	**Customer**	EGF CIVIC Arena
Address	3100 Demers Ave., Grand Forks, ND 58201	**Site Address**	EGF, MN.
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



Camera Model	FLIR Z-Camera
Image Date	2012:02:09 11:57:35
Image Name	Ceiling.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Ceiling.



Camera Model	FLIR Z-Camera
Image Date	2012:02:09 13:30:24
Image Name	Cold entry infiltration.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

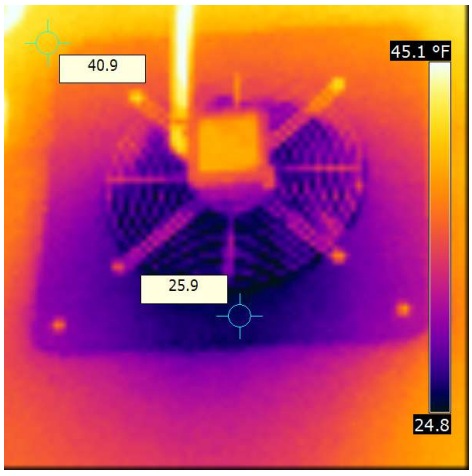
Description

Infiltration, cold entry area.

Inspection Report

Report Date 7/18/2012

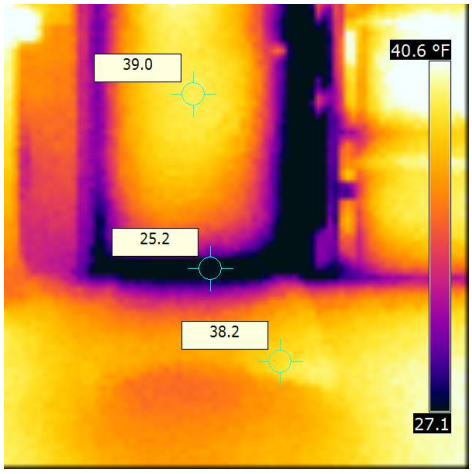
Company	EAPC	**Customer**	EGF CIVIC Arena
Address	3100 Demers Ave., Grand Forks, ND 58201	**Site Address**	EGF, MN.
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



Camera Model	FLIR Z-Camera
Image Date	2012:02:09 12:00:14
Image Name	Exhaust fan.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Infiltration through wall exhaust fan.



Camera Model	FLIR Z-Camera
Image Date	2012:02:09 12:10:43
Image Name	Infiltration at door..jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

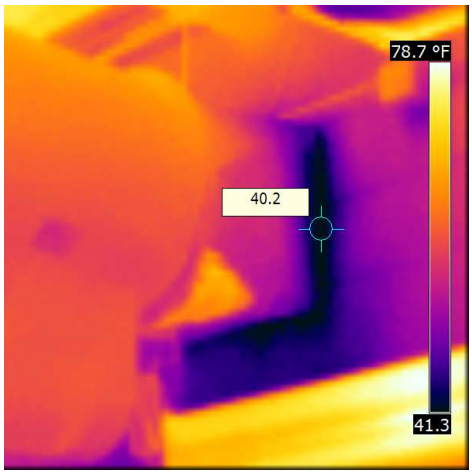
Description

Infiltration at door.

Inspection Report

Report Date 7/18/2012

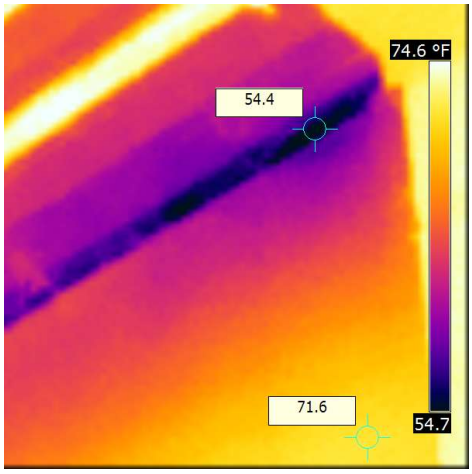
Company	EAPC	**Customer**	EGF CIVIC Arena
Address	3100 Demers Ave., Grand Forks, ND 58201	**Site Address**	EGF, MN.
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



Camera Model	FLIR Z-Camera
Image Date	2012:02:09 12:53:37
Image Name	Infiltration at exhaust fan lower level IR_1616.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

Infiltration of outside air at wall mounted exhaust fan.



Camera Model	FLIR Z-Camera
Image Date	2012:02:09 11:51:35
Image Name	Infiltration exterior wall..jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

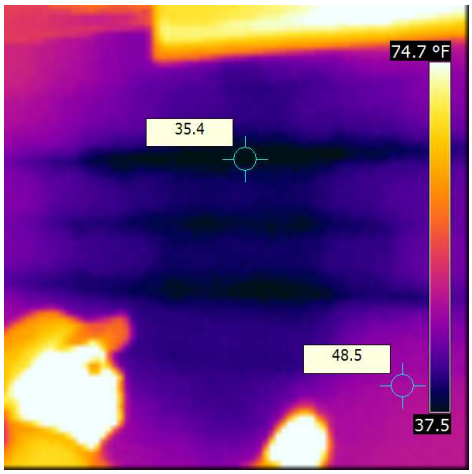
Description

Infiltration along top of exterior wall.

Inspection Report

Report Date 7/18/2012

Company	EAPC	**Customer**	EGF CIVIC Arena
Address	3100 Demers Ave., Grand Forks, ND 58201	**Site Address**	EGF, MN.
Thermographer	Brion D. Mahin, PE.	**Contact Person**	



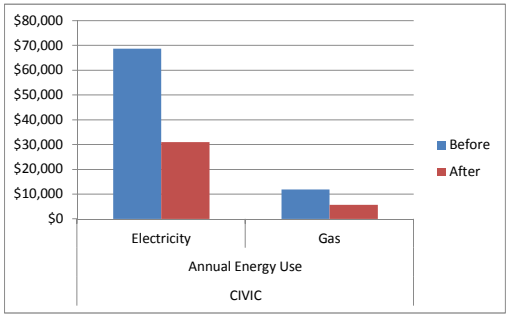
Camera Model	FLIR Z-Camera
Image Date	2012:02:09 12:54:22
Image Name	Infiltration West side lower level exterior IR_1617.jpg
Emissivity	0.90
Reflected Temperature	68.0 °F
Object Distance	3.3 ft

Description

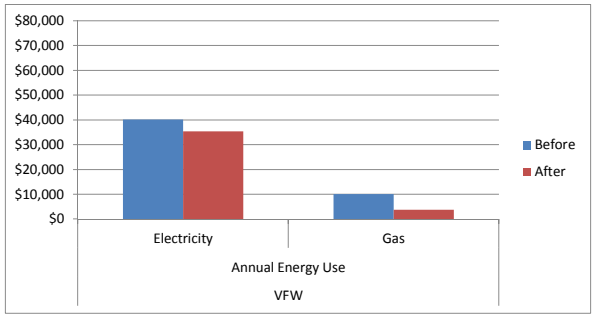
Infiltration of outside air at lower level exterior wall.

Appendix C – EGF Arenas Comparison

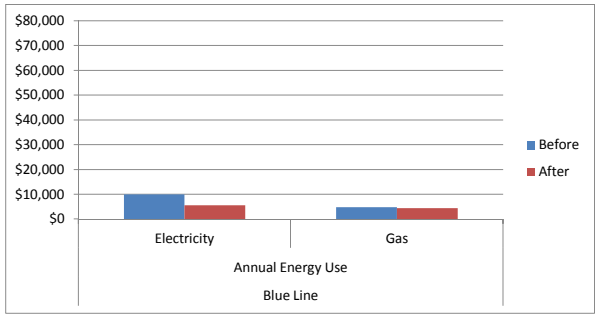
Comparison of the East Grand Forks CIVIC, VFW, and Blue Line Arenas Before and After Energy Saving Modifications.
Based on $0.74/ Therm, $0.087/kWh.



CIVIC		
	Annual Energy Use	
	Electricity	Gas
Before	$68,780	$11,988
After	$30,982	$5,705



VFW		
	Annual Energy Use	
	Electricity	Gas
Before	$40,187	$10,111
After	$35,472	$3,831



Blue Line		
	Annual Energy Use	
	Electricity	Gas
Before	$9,982	$4,831
After	$5,575	$4,431

Comparisons:	**CIVIC**	**VFW**	**Blue Line**
Low-e ceiling	none	yes	none
lighting	basic	better	better
Refrigeration	Reciprocating Compressors	Reciprocating Compressors	Reciprocating Compressors
brine dry cooler	new	new	new
brine cooling tower	none	none	none
dx dry cooler	none	none	none
dx to ice sheet	none	yes	none
brine to ice sheet	pumped	none	pumped
brine pump	20hp	none	30hp
reclaim heat	to ventilation units	to ventilation unit	
ice melt	none	none	none
ventilation	minimal	minimal	minimal
domestic water heatin	high eff. Nat. gas.	high eff. Nat. gas.	high eff. Nat. gas.
updated controls	none	Yes	Yes

EGF CIVIC Arena

EGF VFW Arena

EGF Blue Line Arena

2012 Capital Project Grant Program (Total of 90 Applications)

Applicant	Project Detail	Request Amount
Albany, City of	8th Street Corridor	$740,500.00
Babbitt, City of	Infrastructure Replacement & Street Reconstruction	$882,000.00
Becker, County of	Solid Waste Facility & Recycling Program	$1,153,025.00
Beltrami, County of	Geriatric Nursing Facility for Veterans	$500,000.00
Big Lake, City of	Industrial Park Infrastructure	$5,350,000.00
Biwabik, City of	Redevelopment & Parking	$700,000.00
Bloomington, City of	Bloomington Central Station Public Improvements	$1,350,000.00
Braham, City of	Sewer & Water Infrastructure	$221,000.00
Brooten, City of	Industrial Park Infrastructure	$780,500.00
Canby, City of	Soil Correction, Utility and Street Improvements	$585,000.00
Carver County CDA	Infrastructure for Apartments in Waconia	$2,000,000.00
Carver County CDA	Infrastructure for Housing in the City of Carver	$1,302,837.00
Chatfield, City of	Redevelop School & Auditorium into Performance/Exhibit Space	$7,096,000.00
Chisholm, City of	Infrastructure for Housing & Industrial Park	$1,300,000.00
Chisholm-Hibbing Airport Authority	Terminal Enhancement	$2,500,000.00
Clara City, City of	Expand Industrial Park	$774,574.00
Corcoran, City of	Construct a new Public Works Facility	$750,000.00
Corcoran, City of	Water Tower Construction	$1,100,000.00
Cosmos, City of	Replacement of Public Library & City Facilities	$600,000.00
Cottonwood, City of	Fire Hall/Ambulance Garage	$600,000.00
Dakota, County of	Trails & Visitor Centers	$3,000,000.00
Deer River, City of	Wastewater Treatment Pond	$731,000.00
Detroit Lakes, City of	Renovation of Pavilion & Construction of a Trail	$1,625,000.00
Duluth, City of	Downtown Development & Parking Ramp	$10,000,000.00
Duluth, City of	Wade Stadium Repair and Upgrades	$5,800,000.00
East Grand Forks, City of	Wastewater Treatment Improvements	$4,500,000.00
Edina, City of	Edina Promenade Greenway Expansion	$1,500,000.00
Fosston, City of	Second Street South Improvements	$400,000.00
Hampton, City of	Downtown Improvement	$450,000.00
Hector, City of	Wastewater System Improvements	$1,250,000.00
Hibbing, City of	Curling Club Upgrades	$1,190,000.00
Hoyt Lakes, City of	Renovate Police, Fire, & Ambulance Services Building	$750,000.00
Hutchinson, City of	Small Business Incubator	$850,000.00
Iron Range Resources	Giants Ridge Events Center	$4,995,000.00
Isle, City of	Malone Island Bridge & Sewer Replacement	$500,000.00

Kasson, City of	Incubator Building/Industrial Park	$2,370,500.00
Kasson, City of	Wastewater Treatment Improvements	$1,100,000.00
Koochiching, County of	Sanitary Sewer Collection System along Rainy Lake	$7,500,000.00
Lake City, City of	Expand Public Library	$650,000.00
La Prairie, City of	Extending Municipal Infrastructure along La Prairie Ave.	$1,500,000.00
Litchfield, City of	Wastewater Infrastructure Improvements	$2,550,000.00
Lonsdale, City of	Street & Utilities Improvements for New Business Park	$2,121,800.00
Mankato, City of	Renovate & Expand Mankato Civic Center	$14,500,000.00
Maple Grove, City of	Rebuild Law Enforcement Training Facility	$473,387.50
Maple Plain, City of	Streets, Sewer & Water Line Improvements	$930,500.00
Maplewood, City of	East Metro Public Safety Training Center	$1,280,000.00
Marshall, City of	Public Safety Training Center Expansion	$2,500,000.00
Marshall, City of	Regional Amateur Sports Center	$4,000,000.00
Maynard, City of	Public Infrastructure	$535,635.00
Metropolitan Council	Southwest Light Rail Transit Line	$14,000,000.00
Minneapolis, City of	Redesign Nicollet Mall	$25,000,000.00
Minneapolis Park & Rec. Board	Minneapolis Sculpture Garden	$750,000.00
Minneapolis Special School District No. 1	Update Athletic Facilities	$2,783,250.00
Moorhead, City of	New 115kV Electric Transmission Line	$1,800,000.00
Moose Lake, City of	Redevelop Riverside Center	$435,000.00
Morton, City of	Gneiss River Valley Development Project	$2,496,000.00
Mountain Iron, City of	Infrastructure along proposed County Highway	$300,000.00
Mountain Lake, City of	Infrastructure Improvements	$4,127,364.00
Oak Park Heights, City of	STH 36 & Osgood Ave. - Redevelopment Area	$1,425,000.00
Osseo, City of	Construct Police Building	$750,000.00
Park Rapids, City of	Drinking Water Improvements	$1,284,500.00
Pelican Rapids, City of	Wastewater Treatment Facility Improvements	$3,190,000.00
Perham, City of	Community Center Improvements	$630,960.00
Pine Technical College	Business Incubator Construction	$300,000.00
Prior Lake, City of	Welcome Avenue Industrial Park Improvements	$1,080,500.00
Ramsey, County of	Twin Cities Army Ammunition Plant Site Acquisition & Remediation	$5,900,000.00
Red Wing, City of	Levee Road Area and Riverfront Improvements	$1,583,400.00
Red Wing, City of	TB Sheldon Theater Renovations	$685,500.00
Red Wing, City of	Design & Construct West Fire Station Training Facility	$2,621,500.00
Redwood/Renville Regional Solid Waste Bd	Material Recovery Facility	$2,256,050.00
Rice, County of	Road Reconstruction for Industrial Park Expansion	$452,500.00
Rochester, City of	Mayo Civic Center - Convention Center Addition	$25,000,000.00
Rushford-Peterson Schools	New Grade School	$7,500,000.00

Sartell, City of	Construct Public Safety Facility	$3,361,849.00
Sartell, City of	Street Improvements	$2,200,000.00
Sibley Renville Fiber Joint Powers Board	Fiber Optics Installation	$5,071,998.00
Silver Bay, City of	Watermain Improvements	$851,403.50
St. Cloud, City of	River's Edge Convention Center Expansion	$9,600,000.00
St. Paul, City of	Saint Paul Regional Ballpark	$27,000,000.00
Stewartville, City of	Fire Hall Renovation	$550,000.00
Thief River Falls, City of	Greenwood Street Underpass & Construction	$1,213,794.00
Three Rivers Park District	Cross-Country Trail Improvements in Bloomington	$3,658,228.00
Todd, County of	Senior Citizens Healthy Living Center in Long Prairie	$500,000.00
Tower, City of	Improvements for Mixed-Use Development	$1,000,000.00
Truman, City of	Flood Mitigation-Storm Sewer Improvement	$1,357,500.00
Virginia, City of	Infrastructure Development for Industrial Park	$1,500,000.00
Wadena, City of	Public Health & Wellness Facility	$4,625,000.00
West Saint Paul, City of	Sports Dome Construction	$3,450,000.00
Winona, City of	Street Improvements	$4,729,500.00
Woodbury	Expand Sports Center	$1,500,000.00

Total: $288,359,055.00