



Reducing the Cost of Operating Public Buildings in Homer

Implementation of Energy Conservation Measures

What motivated us to reduce energy consumption?

- **Budgetary Constraints** (increasing energy prices – flat City revenue growth)
- First **Climate Action Plan** developed by an Alaskan Community (2006)

The Plan provided Mitigation Measure ideas regarding:

Energy Management

Transportation

Purchasing and Waste reduction

Land Use/Planning & Zoning

Out Reach and Advocacy

(all focused on community CO2 emission reductions)

The first thing we realized was we **could not easily determine where and how much** energy was being used at individual City facilities.

So we started tracking energy costs for each facility (creating baseline data).

2010 Energy Expenditures

Total spent on energy = **\$1,218,636**

Total electric use = **5,629,132 kwh**

Total spent on electricity = **\$844,387**

Total gallons of heating fuel = **71,424**

Total spent on heating fuel = **\$202,065**



We started by contracting for the completion of an Energy Audit of all city buildings/facilities

Through the RFP process, Siemens Industry, Inc. was selected to:

- 1) Inspect facilities and identify potential energy conservation measures (Phase I), and
- 2) Implement measures with the best ROI (Phase II)

Energy Audit - City of Homer Facilities

Recommended Facility Improvement Measures

Revised - January 17, 2011

			1	2	3	
		est. annual savings	FIM Grant Eligible	FIM Revolving Loan	FIM Enterprise funds	simple payback (yrs)
Non-Lighting Facility Improvement Measure (FIM)	Description					
SEWER TREATMENT PLANT - PUMP MOTOR REPLACEMENTS	Replace existing motors w with higher efficiency motors	\$12,429	\$58,679			4.7
RAW WATER PUMP STA. - PUMP MOTOR REPLACEMENTS/VFD	Replace existing motors w with higher efficiency motors and install VFDs	\$12,405	\$10,000	\$156,089		13.4
AIRPORT - HVAC IMPROVEMENTS	New Fan Motor and VFD controlled by Building Pressure & CO2	\$6,615	\$8,982			1.4
PUBLIC WORKS - MISC INSULATE PIPING	Insulate approximately 400' of exposed heating w ater piping	\$1,693	\$13,748			8.1
POLICE STATION - HVAC IMPROVEMENTS	Police station electric heat zones w with new programmable control	\$1,420	\$8,856			6.2
SEWER TREATMENT PLANT - SOLAR AERATION	Solar Aeration System	\$12,506			\$108,850	8.7
Lighting Facility Improvement Measure (FIM)	Subtotal	\$47,068	\$100,265	\$156,089	\$108,850	
LIGHTING - HOMER AIRPORT	Lighting Upgrade and Occ Controls	\$10,362		\$84,009		8.1
LIGHTING - HOMER HARBOR	Lighting Upgrade and Occ Controls	\$25,867	\$50,000	\$50,000	\$131,335	8.9
LIGHTING - POLICE STATION	Lighting Upgrade and Occ Controls	\$8,454	\$50,561			6.0
LIGHTING - SEWER TREATMENT PLANT	Lighting Upgrade and Occ Controls	\$7,428			\$64,082	8.6
	Subtotal	\$52,111	\$100,561	\$134,009	\$195,417	
	Energy Audit Report Preparation		\$26,295			
		\$99,179	\$227,121	\$290,098	\$304,267	8.0

How do you pay for it?

Private firms will complete an energy audit, recommend improvements, implement conservation measures, finance all costs, and guarantee promises made.

Homer elected to:

- 1) Seek grants (Alaska Energy Authority)
- 2) Create an internal Energy Revolving Loan fund
- 3) Use Reserve Account Funds





Public Works Maintenance

Hot Water Piping to shop heaters insulated



Sewer Treatment Plant

New LED lighting
installed over
treatment facilities
through out plant



Sewer Treatment Plant Office

The City installed Energy efficient interior lighting (many LED's) at the Sewer Treatment Plant, Harbor Maintenance, the Police Department and the Ice Plant buildings



Sewer Treatment Plant

Energy efficient (full cut-off) exterior lighting was installed at the Sewer Treatment Plant, Harbor Maintenance Shop, Ice Plant, and the Police Department



Solar Assisted Lagoon Aerator

This “Solar Bee” replace 6 traditional aerators, in the lagoon reducing electricity usage by 30% at the Sewer Treatment Plant

Results?

The City reduced electricity usage by almost 8% during the two years following conservation measure implementation.

Annual Reduction

CO2e Reductions

Electricity	1,097,463
#2 Fuel Oil	54,281
Total	1,151,744

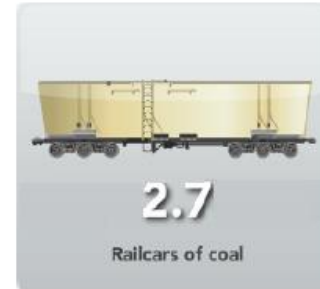
in pounds

Other Pollutants

NOx	2,335
SO2	2,061

in pounds

Equivalencies



From the Energy Audit of all City Buildings

Estimated greenhouse gas emission reductions from
implemented energy conservation measures.

2011 Great Alaska Energy Challenge Winner



The Great Alaska Energy Challenge (Oct 2011 – Mar 2012) was organized by the Renewable Energy Alaska Project – sponsored by the **Alaska Housing Finance Corporation** – with the goal of raising awareness about energy efficiency and conservation.



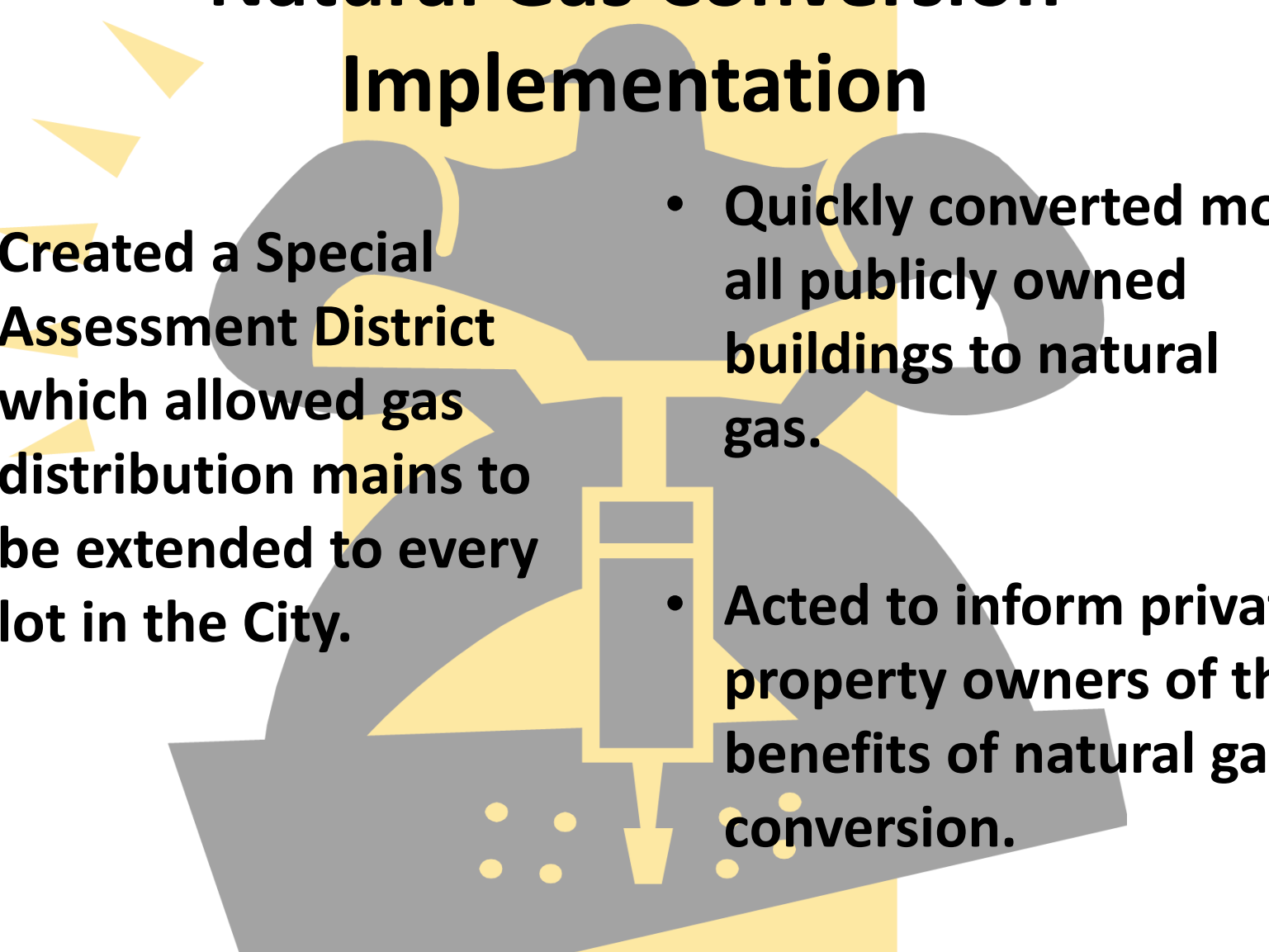
Challenge Winner!

Plaque awarded by the Alaska Energy Authority to the City of Homer for leadership in energy efficiency and conservation practices

What happens when natural gas comes to Town?

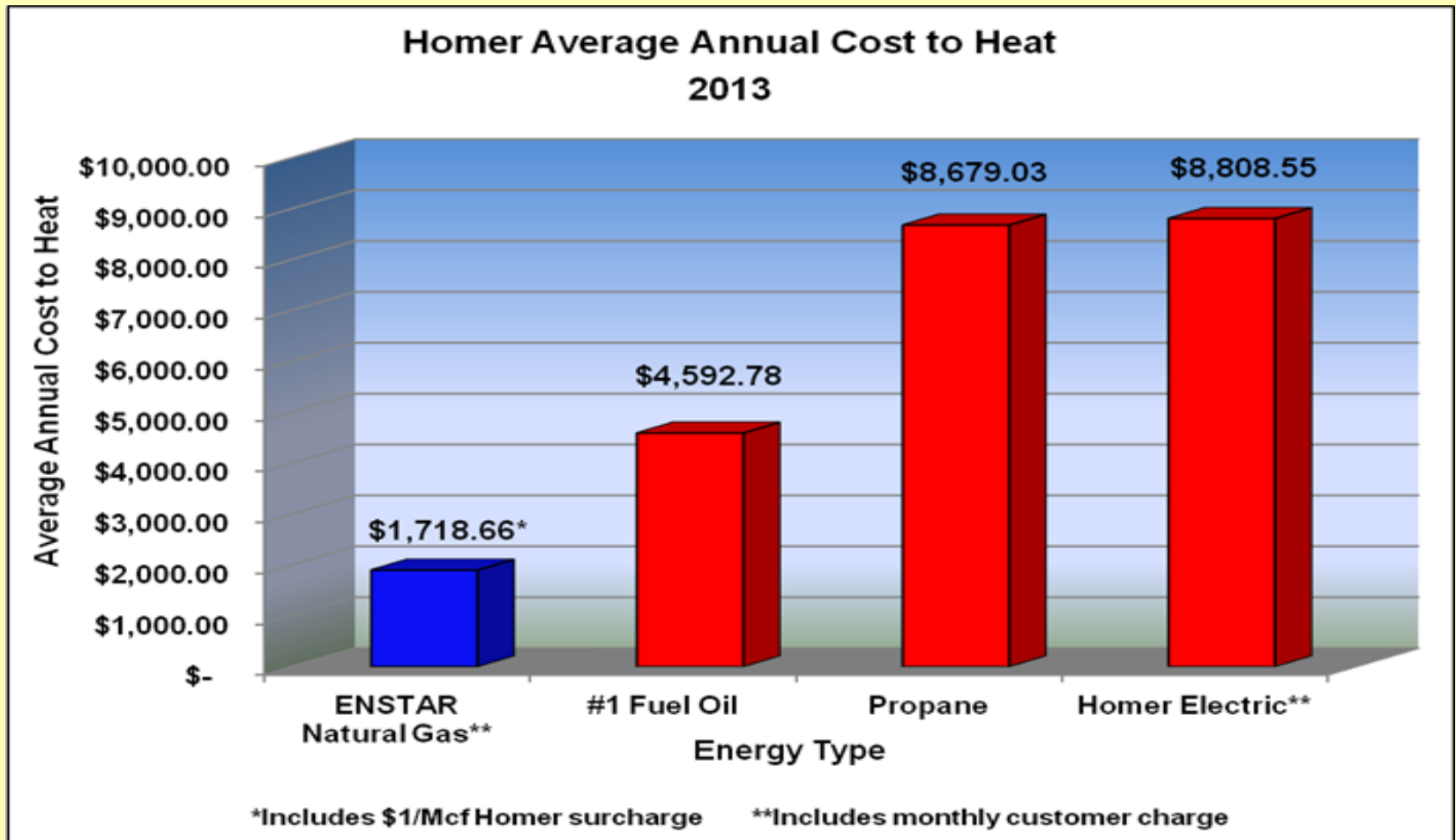
- Homer recognized for many years that natural gas would bring a **lower cost of living** to “the end of the road”, and lobbied for a transmission main.
- The City’s Climate Action Plan stated that converting to natural gas would significantly reduce the City’s carbon footprint. The combustion of natural gas **emits almost 30 percent less carbon dioxide** than oil.
- Natural gas had gotten as far south as Anchor Point. Through a State Legislative grant and surcharge on gas users, the City and Enstar partnered to **extended a natural gas pipeline to Homer**.
- It was **time to implement** a second wave of energy conservation measures.

Natural Gas Conversion Implementation



- Created a Special Assessment District which allowed gas distribution mains to be extended to every lot in the City.
- Quickly converted most all publicly owned buildings to natural gas.
- Acted to inform private property owners of the benefits of natural gas conversion.

Benefits of Heating with Natural Gas



Savings Expected from City Facilities Converted First

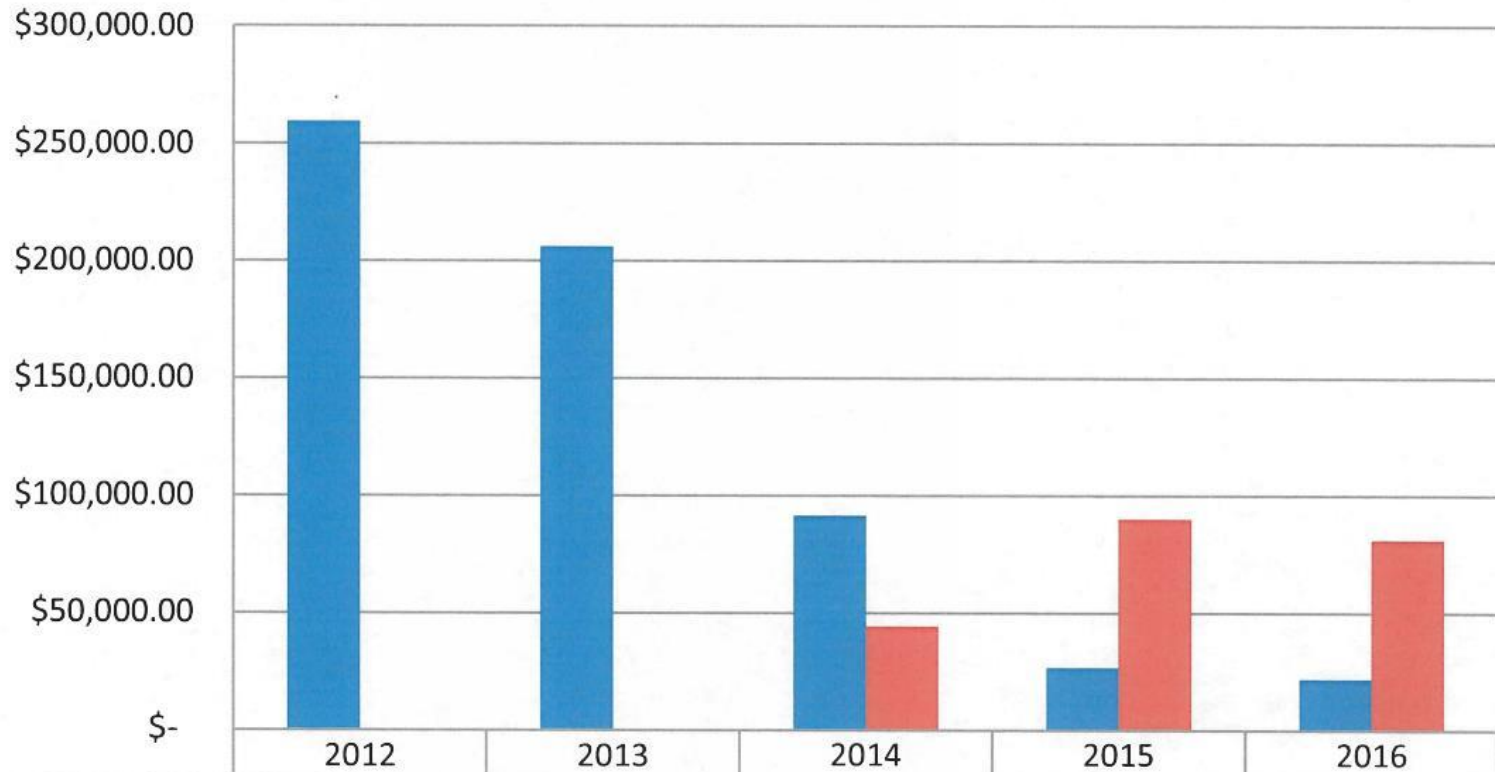
Building	Total Cost to Convert	Annual Current Heating Fuel Usage (\$)	Expected Annual Future Gas Usage (\$)	Annual Savings (\$)	Payback Period (Yrs)
Public Works	\$35,971	\$12,407	\$4,590.59	\$7,816	4.6
Animal Shelter	\$25,764	\$18,707	\$6,921.59	\$11,785	2.2
Sewer Treatment Plant	\$38,742	\$31,494	\$11,652.78	\$19,841	2.0
Sewer Treatment Plant Office (Propane)	\$17,638	\$5,673	\$1,134.60	\$4,538	3.9
Library	\$26,612	\$34,064	\$12,603.68	\$21,460	1.2
City Hall	\$19,482	\$13,051	\$4,828.87	\$8,222	2.4
Fire Dept	\$194,582	\$32,000	11840	20160	9.7
Police Dept	\$41,377	\$4,746	\$1,756.02	\$2,990	13.8
Water Treatment Plant	\$40,406	\$23,879	\$8,835.23	\$15,044	2.7
Airport	\$20,084	\$35,399	\$13,097.63	\$22,301	0.9
Restroom - Ramp 4	\$15,692	\$2,173	\$804.01	\$1,369	11.5
Restroom - Ramp 6	\$15,692	\$3,953	\$1,462.61	\$2,490	6.3
Restroom - Load and Launch	\$14,192	\$2,697	\$997.89	\$1,699	8.4
Restroom - Ramp 2	\$11,859	\$1,313	\$485.81	\$827	14.3
Port Maintenance Facility	\$39,073	\$14,642	\$5,417.54	\$9,224	4.2
	\$557,166			\$149,769	3.7

Actual Savings from Natural Gas Conversions

Heating Fuel Costs vs. Natural Gas Costs
Five City Buildings

	Heating Fuel Cost	Natural Gas Cost	% Reduction
Public Works	\$7,297.58	\$2,954.50	40.5
Library	\$25,545.03	\$12,797.12	50.1
City Hall	\$12,663.54	\$4,274.28	33.8
Animal Shelter	\$25,381.23	\$8,025.36	31.6
Airport Terminal	\$21,878.56	\$7,850.30	35.9

Heating Costs (All) City Buildings



Fuel Oil (No. 1)	\$259,180.17	\$205,932.90	\$91,464.62	\$26,807.61	\$21,823.19
Natural Gas		\$85.85	\$44,357.18	\$90,005.42	\$81,157.51

Current Energy Conservation projects

(no rest for the weary)

- Harbor High Mast Lights LED upgrade
- Fire Station Upgrades - conversion from electricity to natural gas
- Installation of Solar Panels on and LED lighting upgrade at the Library

Lessons Learned

- Don't assume that a LEED certified building will be energy efficient.
- Might have focused more on the building envelope.
- We don't have to implement energy efficiency measures all at one time. Focus on "low hanging fruit".
- Track your energy costs – how is your energy \$ spent?
- Don't ignore other positive implications of energy conservation.
 - 1) reduced maintenance costs
 - 2) elimination of fuel tanks and associated liability/regulatory compliance
 - 3) Reduced carbon footprint
 - 4) Reduced light pollution