

# **Greenhouse Gas Emissions in the Fairbanks North Star Borough**

**Presented by: Gwen Holdmann, Organizational Director  
Alaska Center for Energy and Power  
AMA Breakfast December 5<sup>th</sup>, 2008**





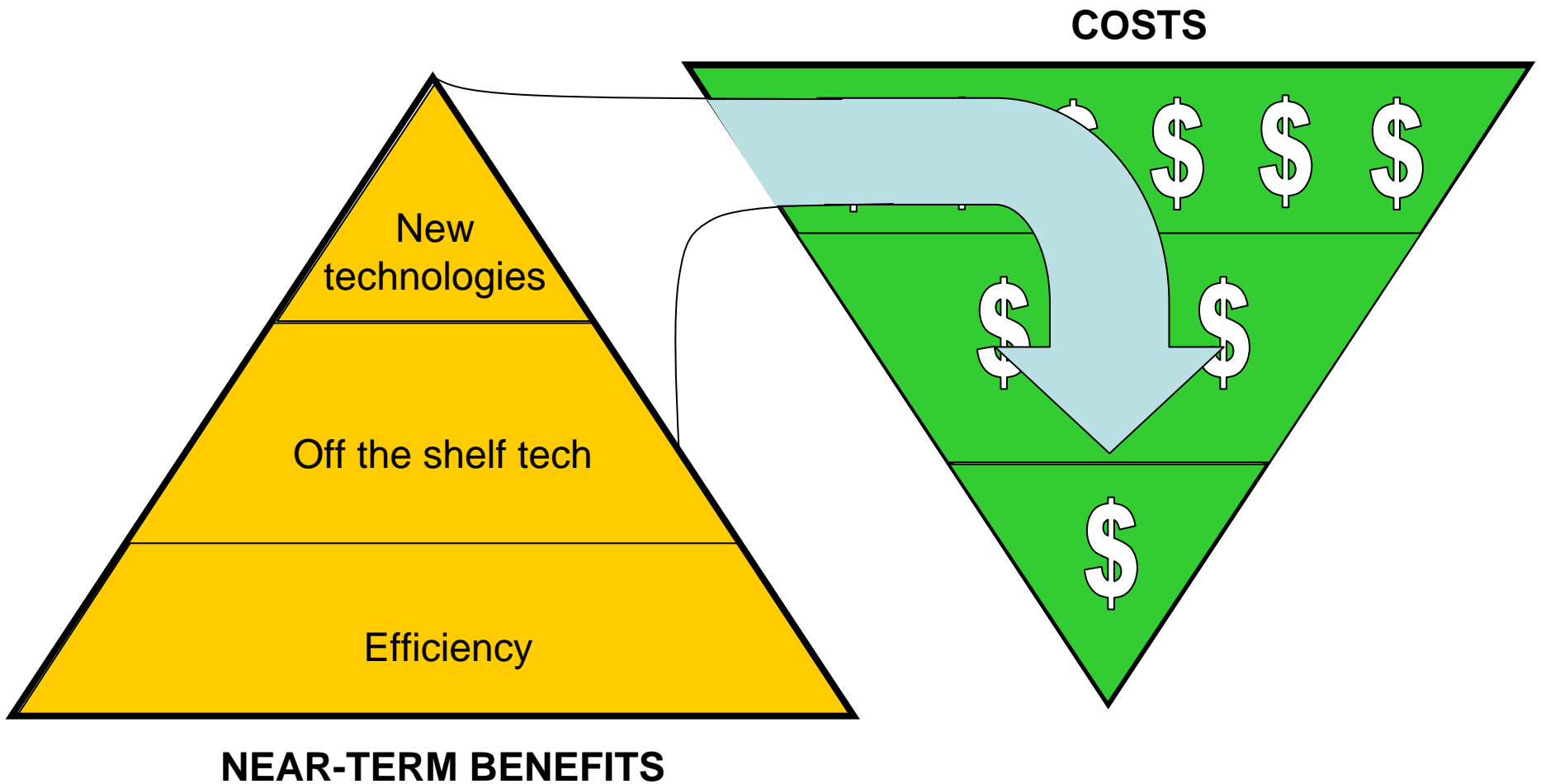
**ACEP**  
Alaska Center for Energy and Power

**ACEP MISSION:** To meet state and local need for applied energy research by working towards developing, refining, demonstrating, and testing marketable technologies that provide practical solutions to Alaska's problems.



**ACEP**  
Alaska Center for Energy and Power

# How do we get there?



# ACEP Focus Areas



**Community  
Energy Solutions**



**Powering the  
Economy**



**The EnergyField  
of the Future**

# Diesel Engine Efficiency & Fuels Testing

Waste heat capture, hydrogen and propane diesel augmentation, fish oil and synthetic fuels



# Alaska Wind-Diesel Test Center

Addressing issues to improve penetration of wind-diesel systems through improvements in control, energy storage, low-load diesel.



# Nenana Hydrokinetic Test Center



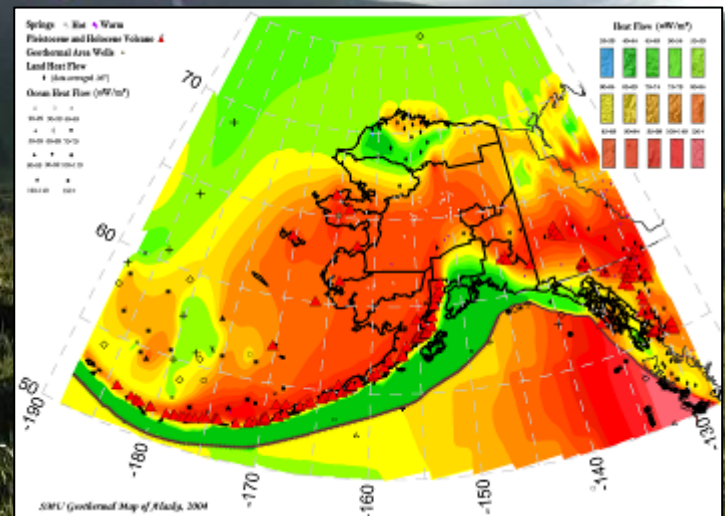
**Assessing opportunities for deploying tidal and in-river hydro in Alaska**



# Geothermal Resource Assessment



Working with the private sector to foster development of geothermal resources

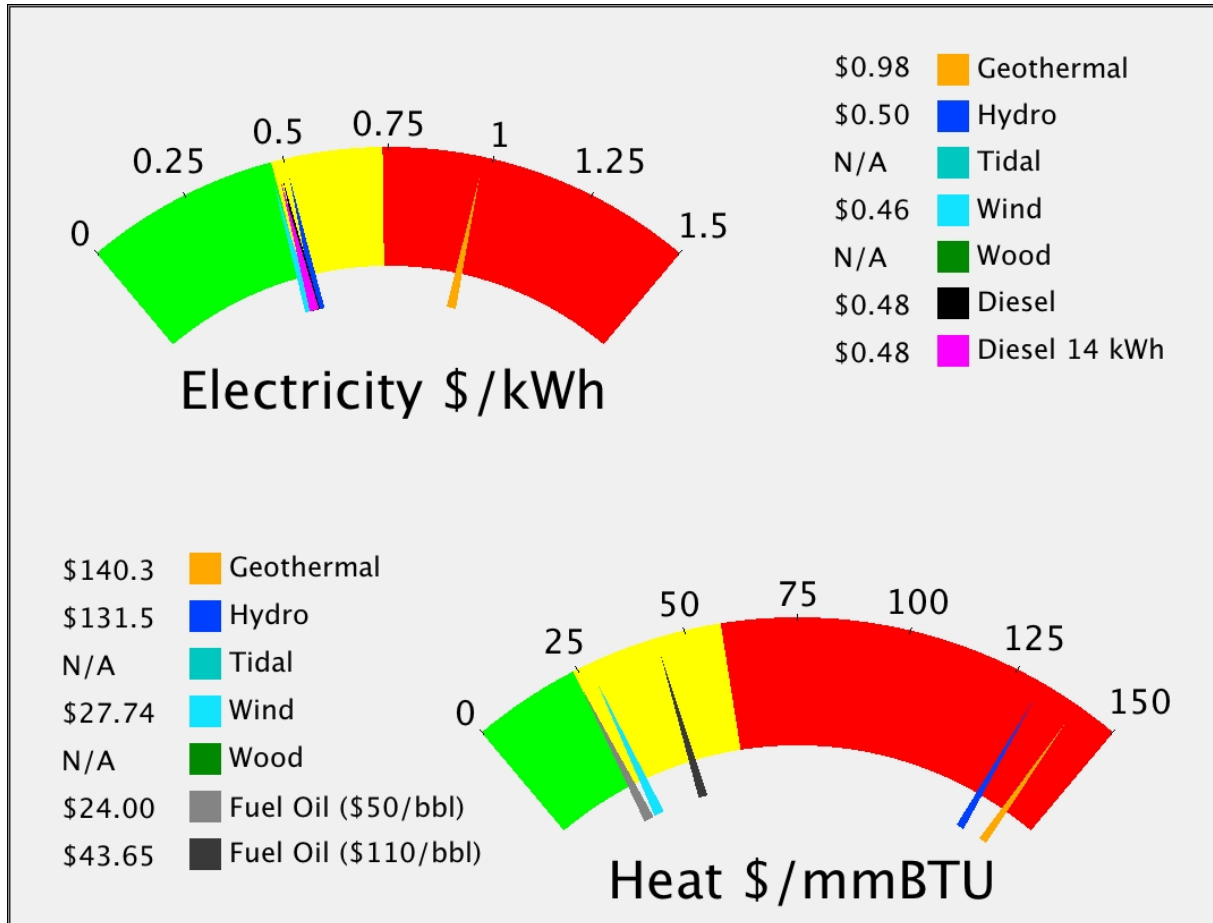


# ACEP Projects

- Waste heat capture (INE)
- Energy storage (INE, working with SNL)
- Geothermal (GI, INE, ISER)
- Tidal and In-stream hydro (SFOS, INE)
- Wind/diesel (working with NREL and AEA)
- Climate change impacts on hydro projects (GI, IARC, INE)
- Hydrogen Fuels (INE, ISER)
- Biogenic methane as an energy source (IARC, INE)
- Short-rotation woody biomass crops (AFES)
- Education and outreach (Coop. Ext)



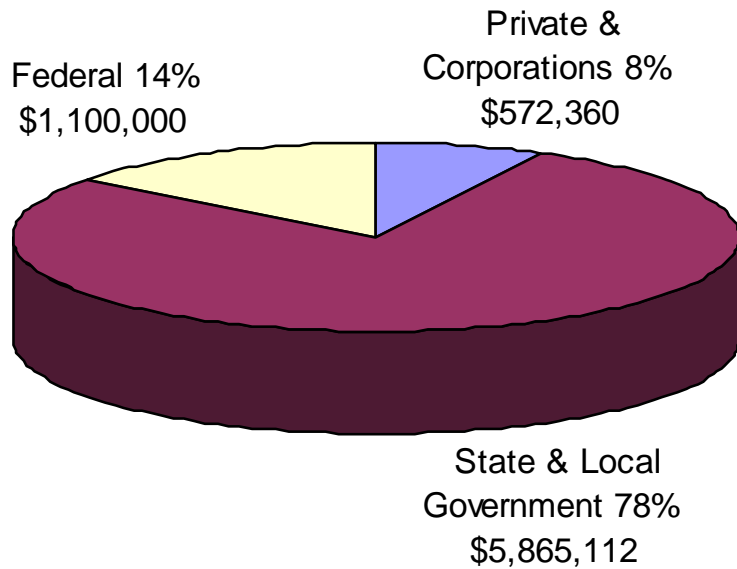
# Alaska State Energy Plan



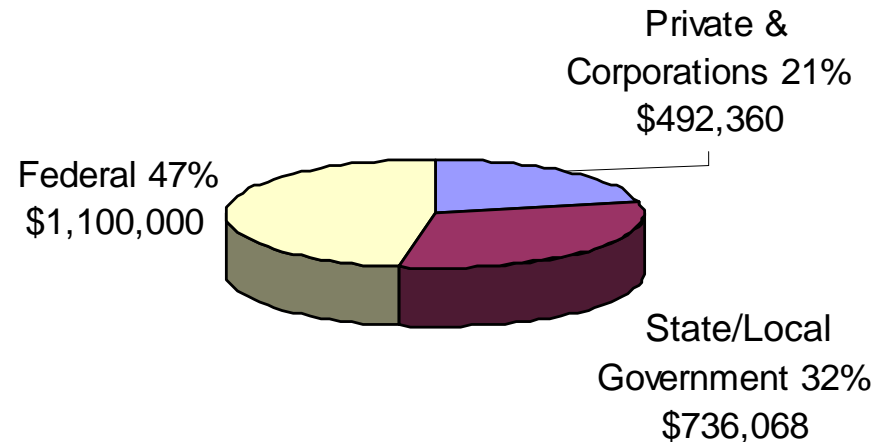
# ACEP Funding to Date

## Funding Requested

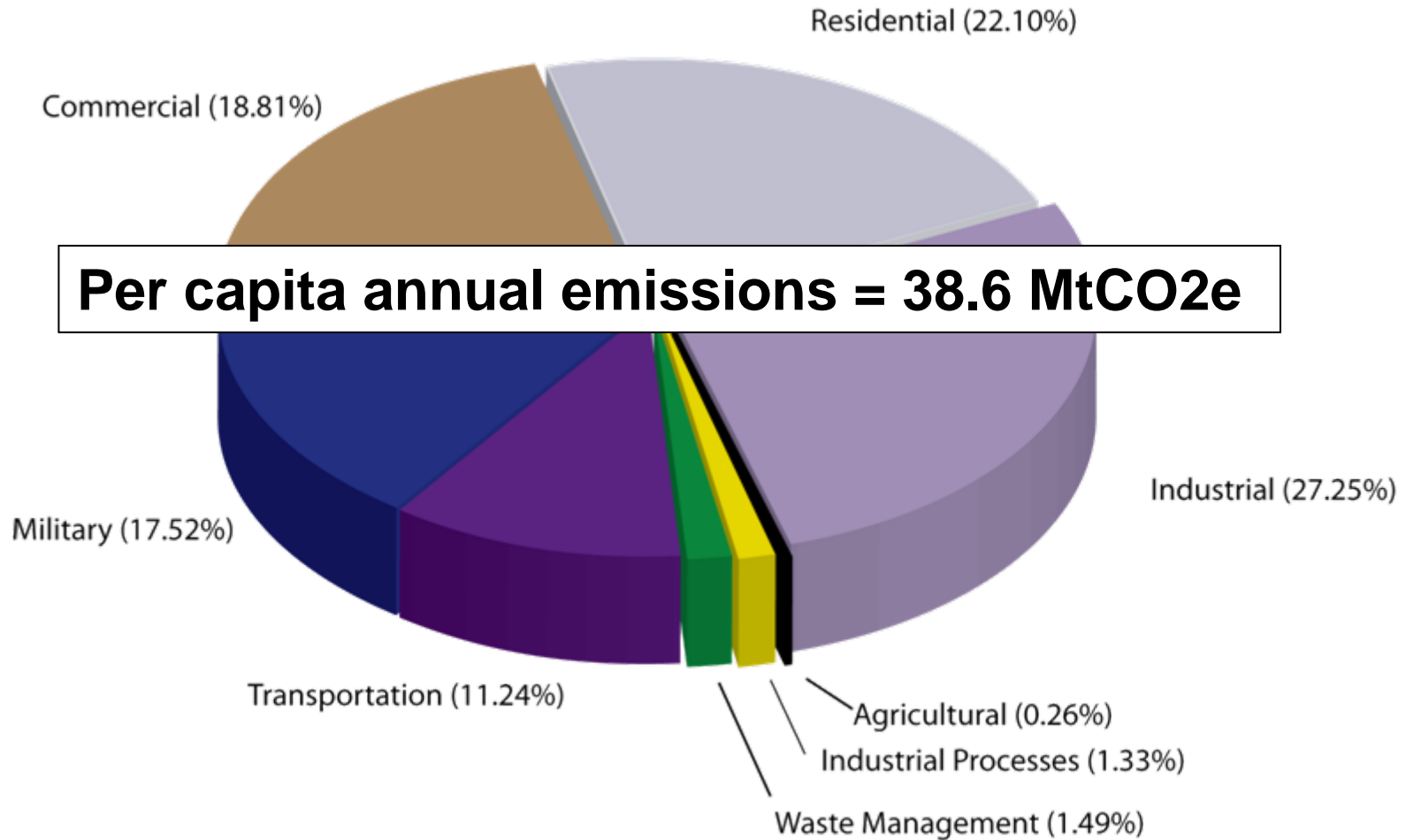
(via competitive proposals submitted)



## Funding Awarded to Date



# GHG Emissions in the FNSB



# What are Greenhouse Gases?

*'Greenhouse Gases are gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the earth's surface, the atmosphere itself, and by clouds'*

*Carbon Dioxide (CO<sub>2</sub>)*

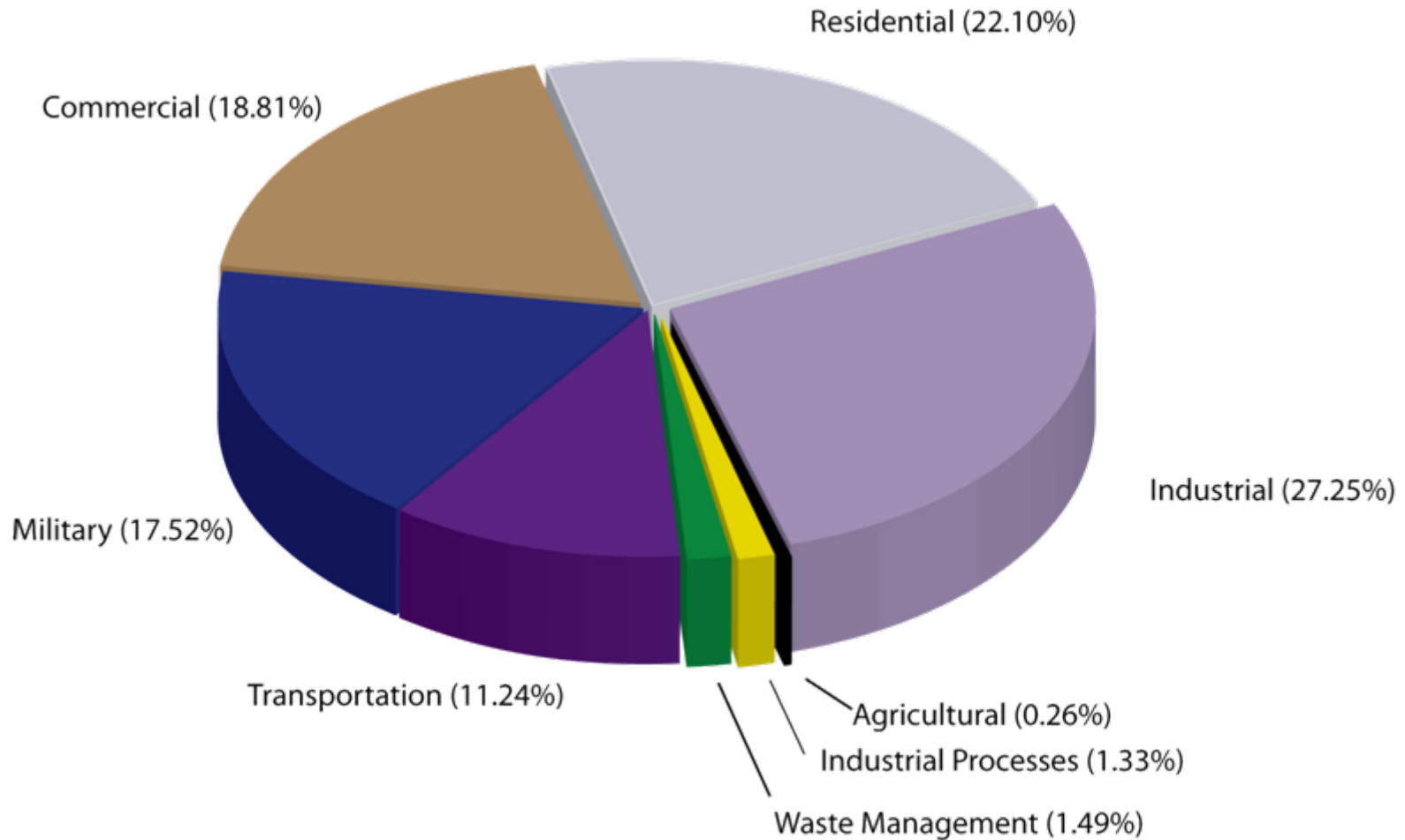
*Methane (CH<sub>4</sub>)*

*Nitrous Oxide (NO<sub>2</sub>)*

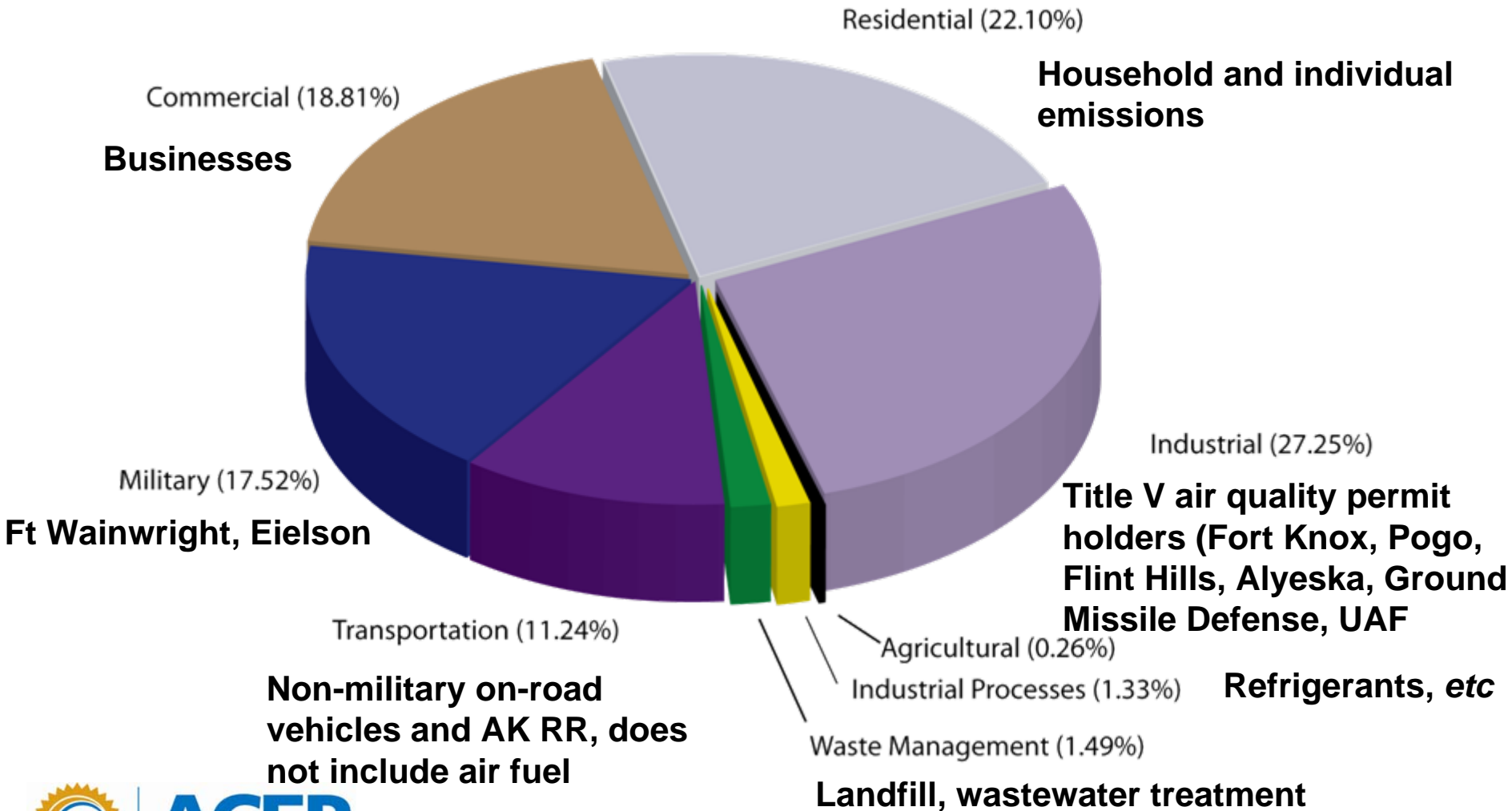
*hydrofluorocarbons, perfluorocarbons,  
sulfur hexafluoride*



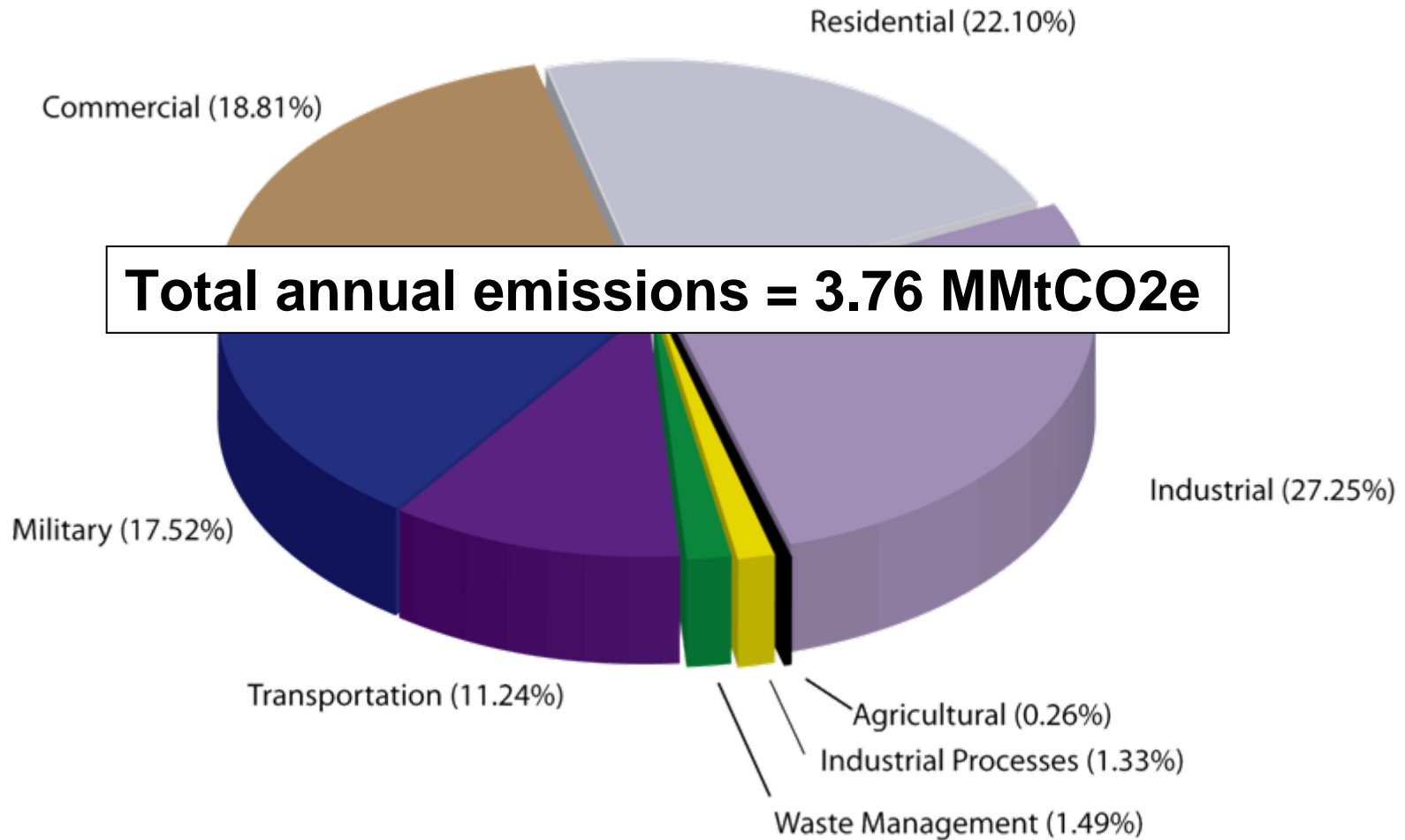
# GHG Emissions in the FNSB



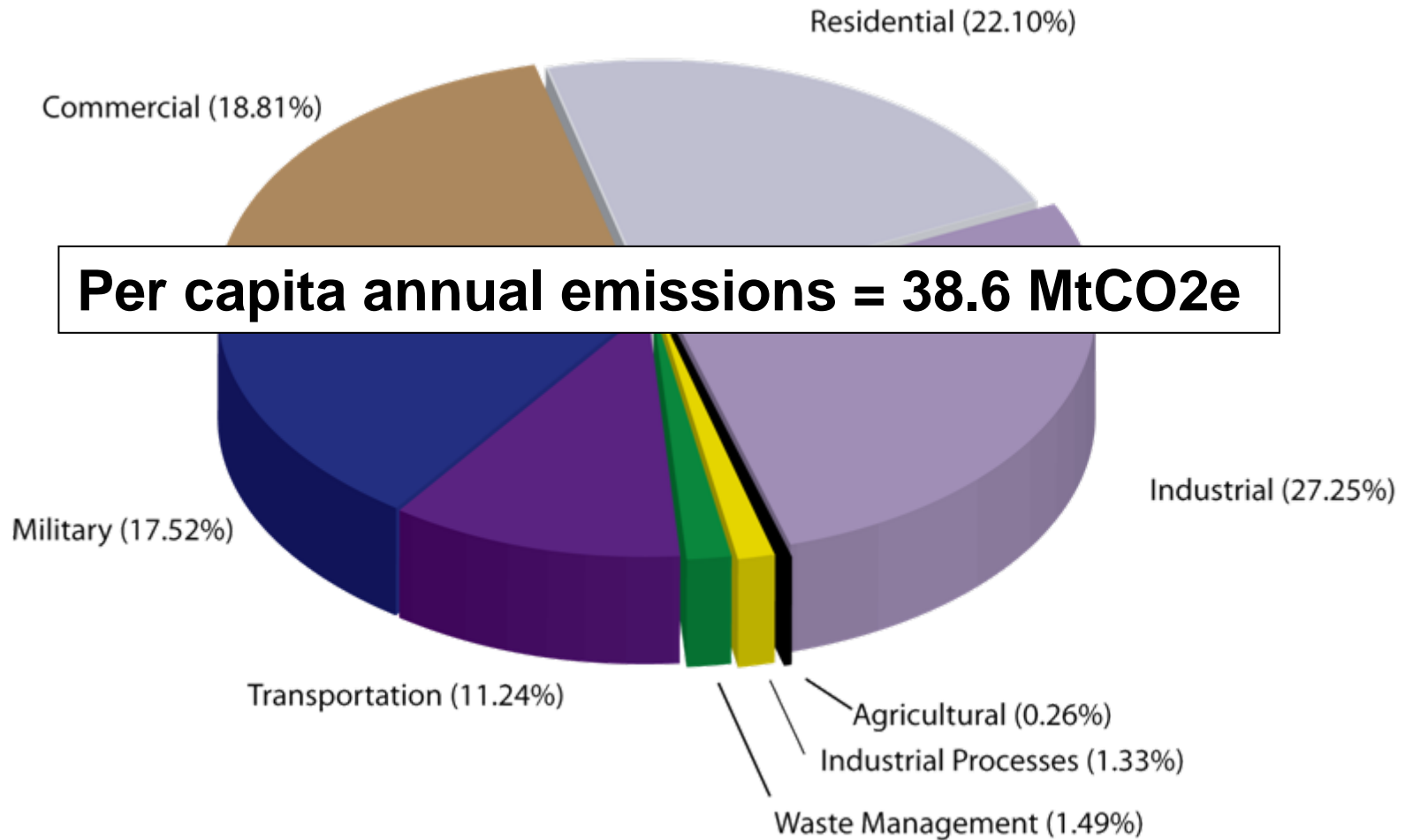
# GHG Emissions in the FNSB



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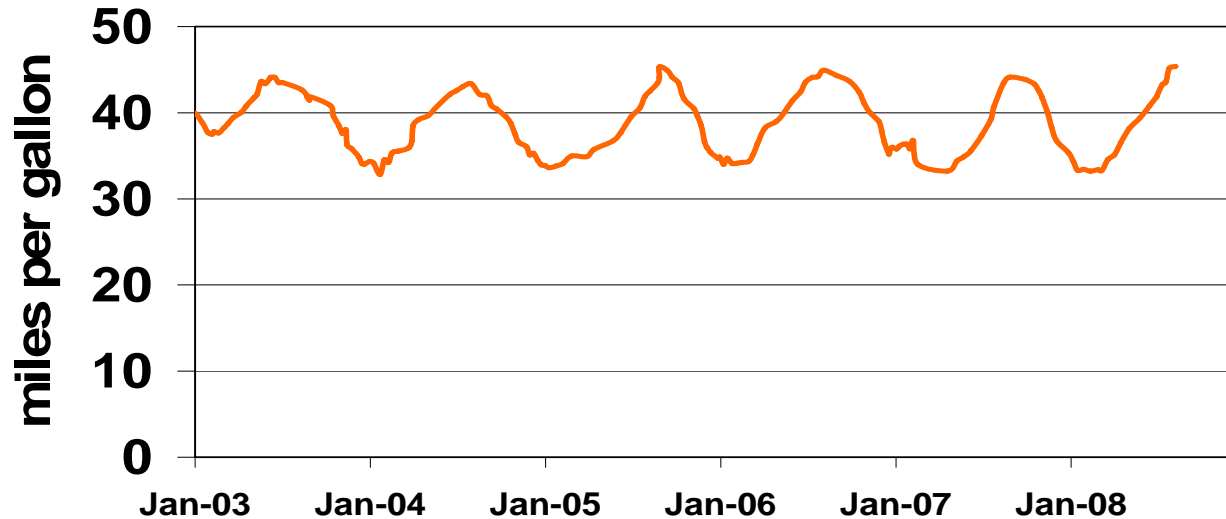
# Nation and Statewide Comparison

- FNSB per capita emissions is 64% higher than national average
- Heating Loads

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**fuel economy  
1998 Chevy Metro  
(running average of 8 fill-ups)**



# Nation and Statewide Comparison

- FNSB per capita emissions is 64% higher than national average

Heating Loads

Temperature effects on engine operation

Higher rolling resistance

- Lubricant viscosity
- Snow on roads
- Winter tires

Increased idling times

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# Nation and Statewide Comparison

- FNSB per capita emissions is 64% higher than national average
- FNSB emissions 50% lower than average for Alaska

Does not include bulk industrial emissions from oil & gas industry, Agrium, etc

# Industrial Fuel Sources in FNSB

Source	Fuel Type	Amount	Units	Emissions (MMt CO <sub>2</sub> e)
Aurora Energy Coal	Coal (sub-bituminous)	220,531	Tons	0.368
Flint Hills Resources Diesel	Distillate Fuel	32,361	Gallons	<0.001
Flint Hills Resources Fuel Gas	Natural Gas	519,000	Mscf	0.028
Flint Hills Resources LSR	LSR/Gasoline	33,800,000	Gallons	0.295
Flint Hills Naphtha	Naphtha	1200	Gallons	<.001
Golden Valley Coal	Coal (sub-bituminous)	193,553	Tons	0.323
Golden Valley Distillate (Diesel + HAGO)	Distillate Fuel	18409986	Gallons	0.185
Golden Valley Jet A	Jet Fuel	234360	Gallons	0.002
Golden Valley Naphtha	Naphtha	26203380	Gallons	0.253
Petro Star Fuel Gas	Natural Gas	37261.554	Mscf	0.002
Petro Star Fuel Oil #1	Residual Fuel	410	Gallons	<.001
Petro Star LAGO (Diesel)	Distillate Fuel	149016	Gallons	0.001
Petro Star LSR	LSR/Gasoline	1509732	Gallons	0.013
UAF Coal	Coal (sub-bituminous)	69795	Tons	0.117
UAF Diesel	Diesel	1222813	Gallons	0.0123
UAF Natural Gas	Natural Gas	11975	Mscf	0.001
<b>Total</b>				<b>1.600</b>

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# What does this mean?

- FNSB per capita emissions in line with national emissions when taking into account climate factors
- Report provides a baseline for energy flow and emissions in FNSB
- Relevant to future projects
- Opportunity to seek ways to reduce emissions in the future
- Shows how future policies may impact the FNSB

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For more information visit:

[www.uaf.edu/acep](http://www.uaf.edu/acep)