Alaska Affordable Energy Strategy and Alaska Affordable Energy Model:

Policy and tools for improving energy efficiency in Alaska communities

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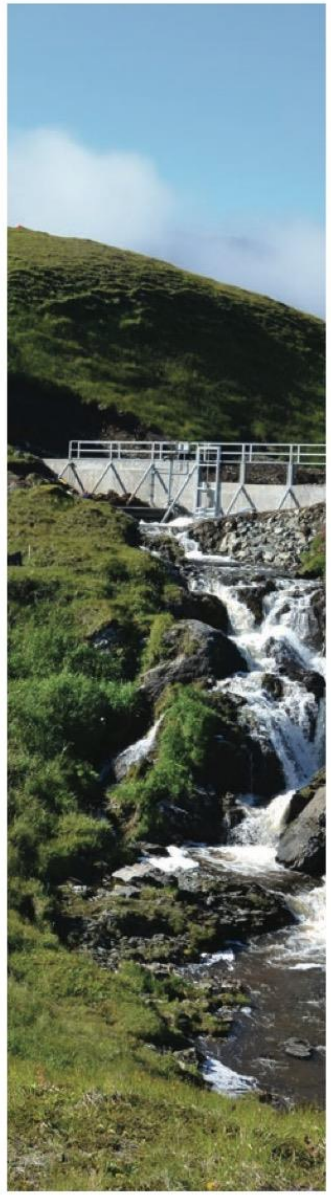
Energy Efficiency NOW Conference

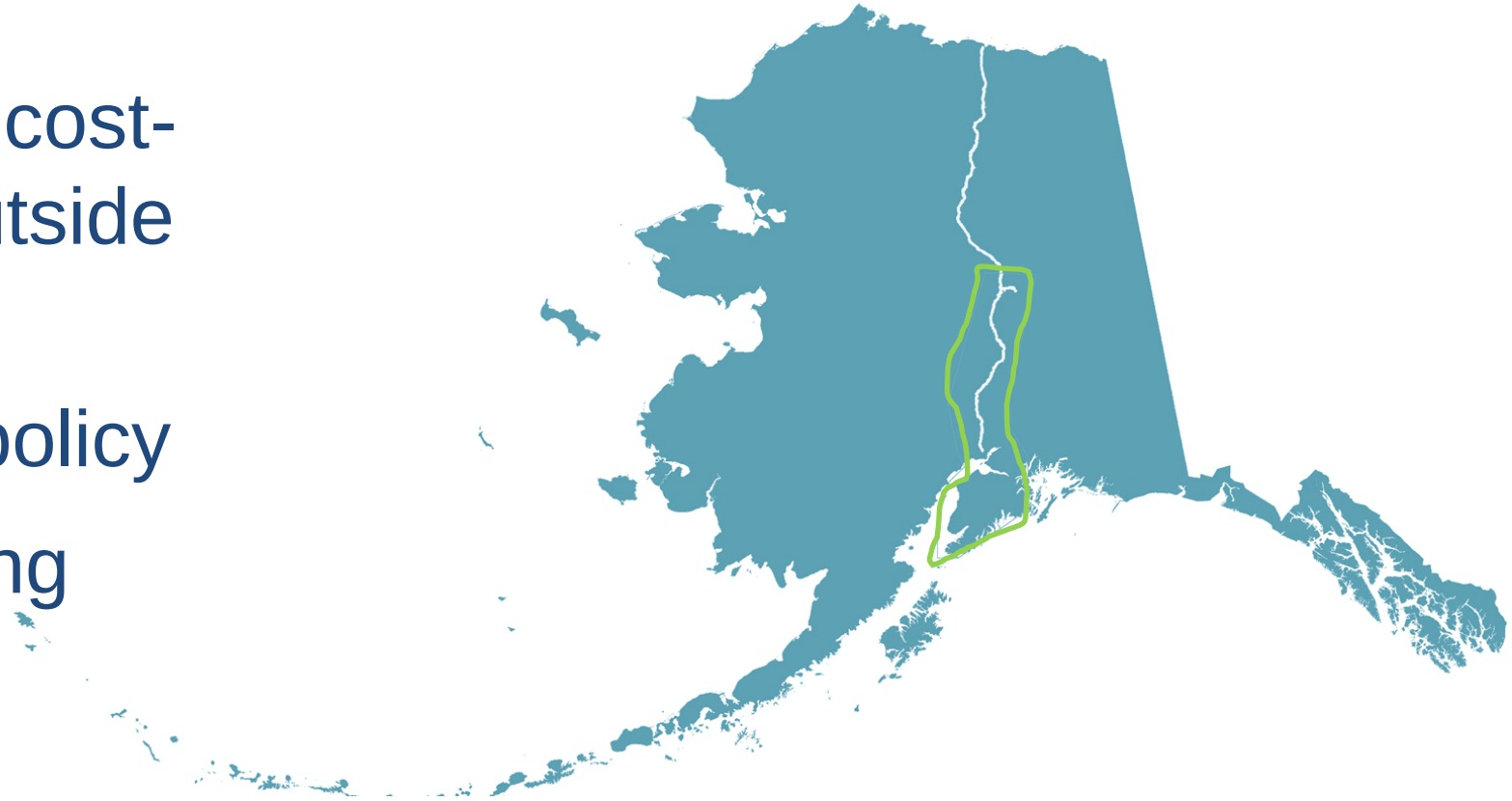
March 29, 2017






In 2014, Senate Bill 138 tasked AEA to

- Develop a plan for cost-effective energy outside the Railbelt
- Consider existing policy
- Recommend funding mechanisms



The Alaska Affordable Energy Strategy (AkAES)

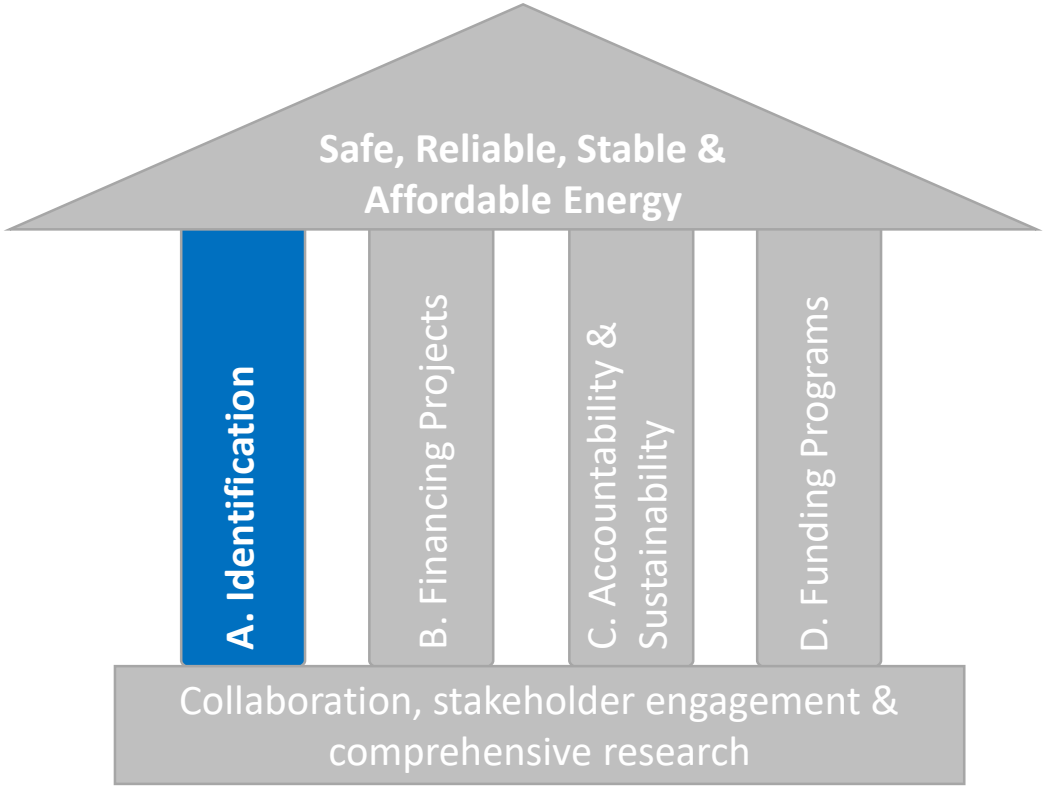
is a strategic plan to improve the methods by which the State works with **non-Railbelt communities and utilities** to identify, evaluate, develop, and maintain **cost-effective energy solutions**.

The AkAES is a framework to build safe, stable, reliable, and affordable energy systems

Policy, statutory, and regulatory changes can help transition Alaska to a more effective way of supporting critical energy services and programs despite limited public dollars.

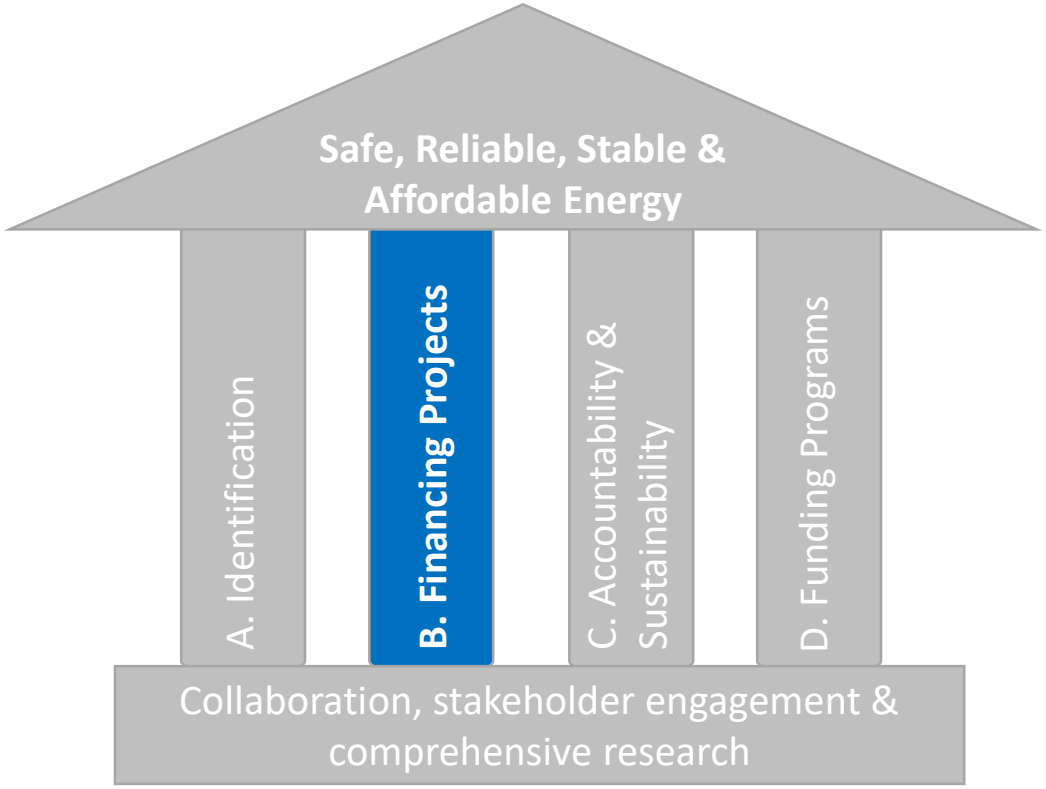
Recommendation A-3:

Establish residential and non-residential building energy codes



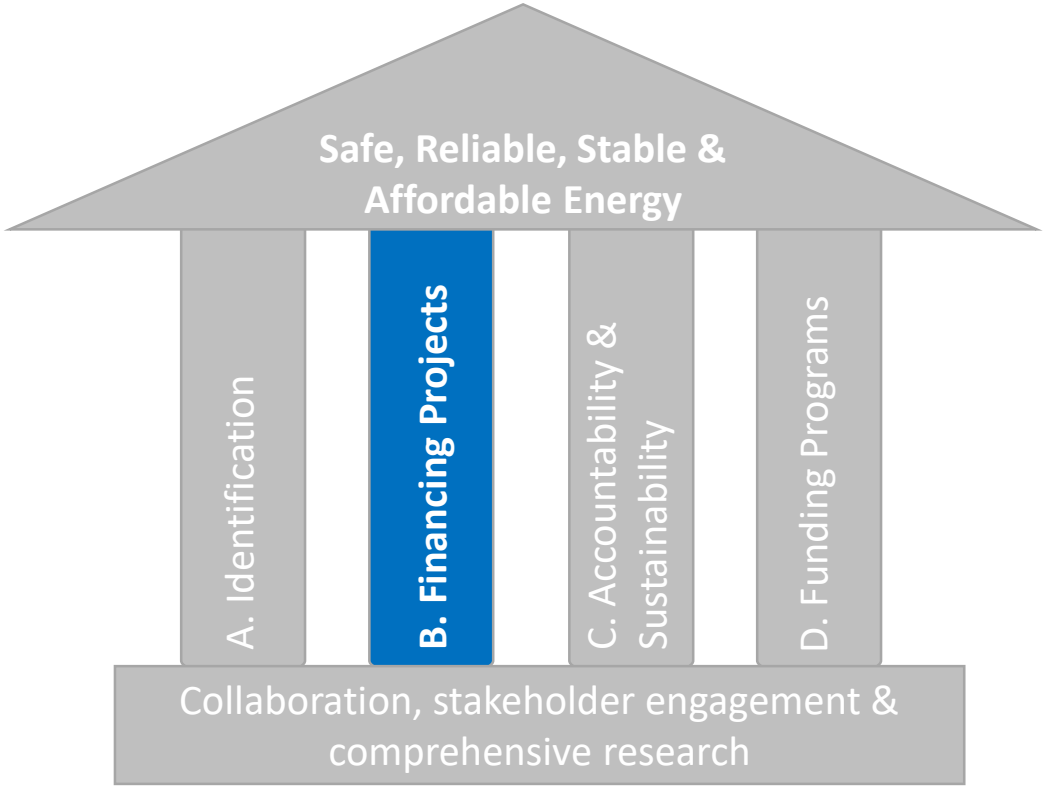
Recommendation B-2:

Create a one-stop-shop fund for communities that allows for segregated state, federal, and private grants and loans that could be blended to develop energy projects



Recommendation B-4:

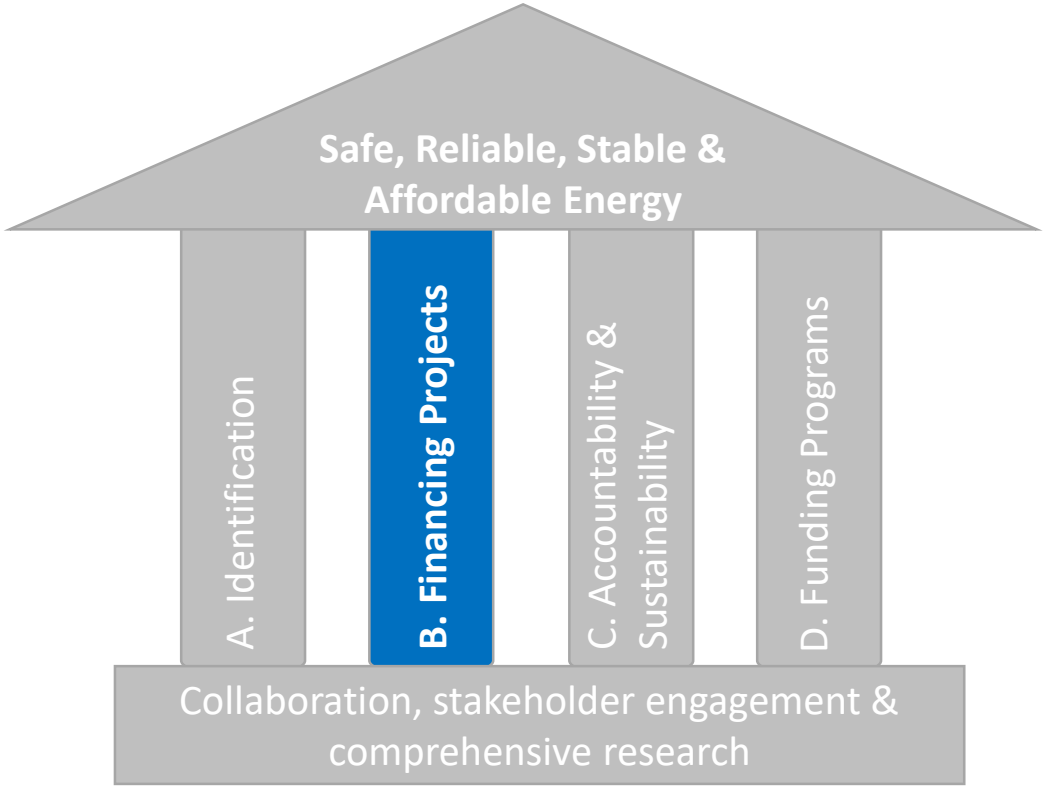
Statutorily allow voluntary on-bill financing and C-PACE



Recommendation B-5:

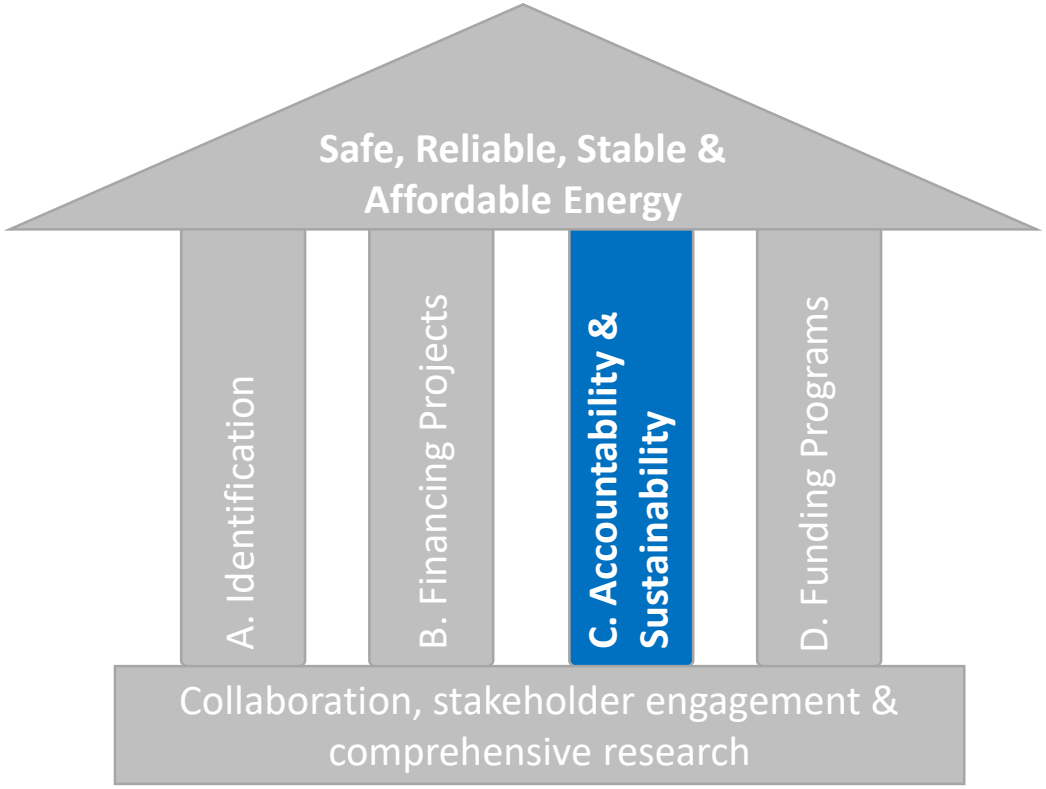
Stabilize State funding for residential Weatherization

Modify Home Energy Rebate rules to expand access to residential efficiency services



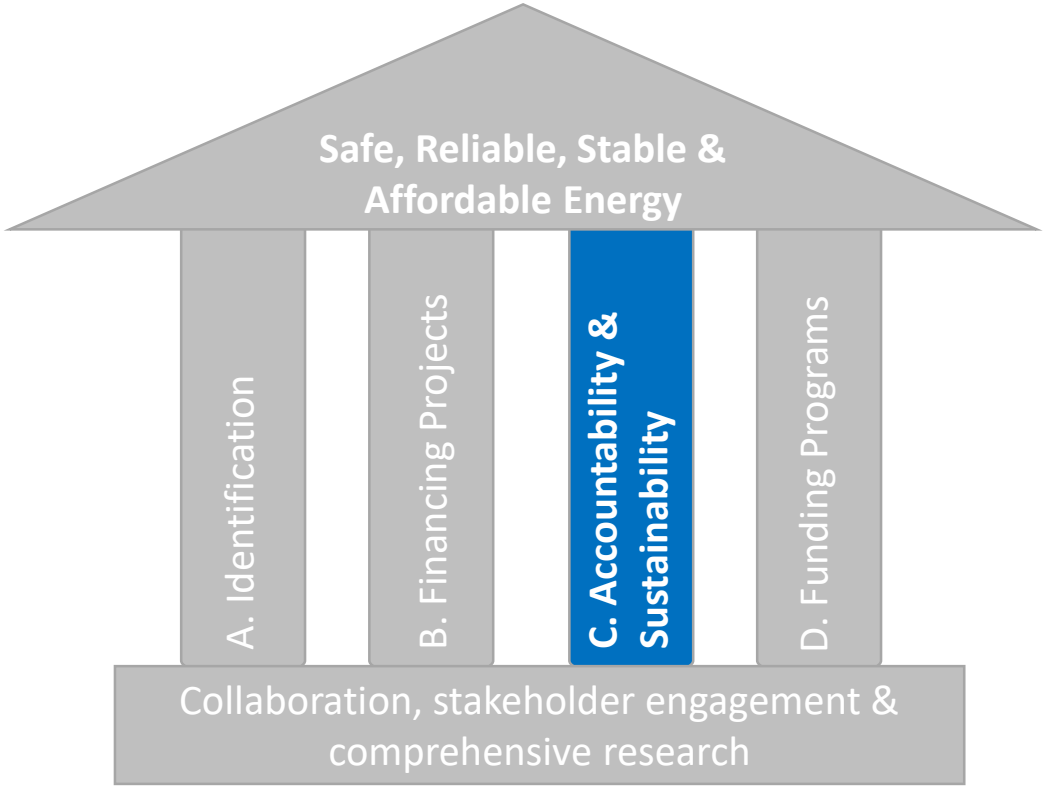
Recommendation C-2:

Draw on the State's partnerships with regional and statewide entities to more cost effectively provide needed assistance



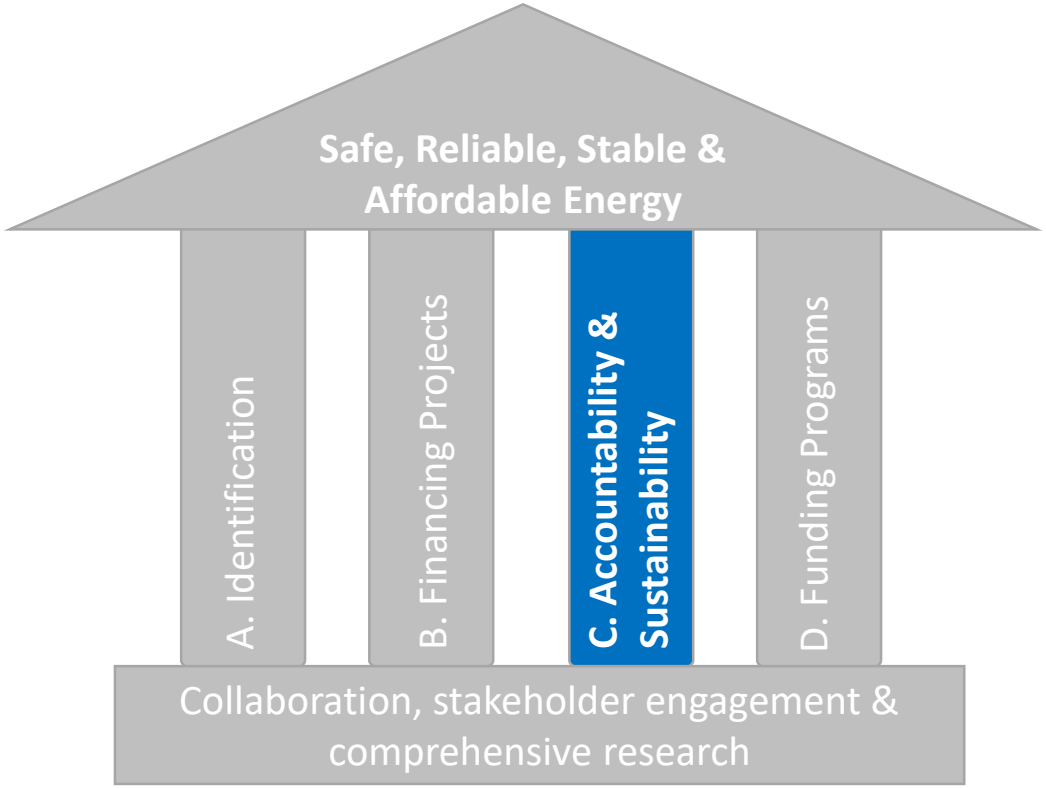
Recommendation C-4:

Require large non-residential buildings that receive PCE to have an energy audit and perform cost-effective retrofits



Recommendation C-6:

Enact a 1% per year fuel reduction target for electric utilities until cost effective gains have been realized



Alaska Affordable Energy Model

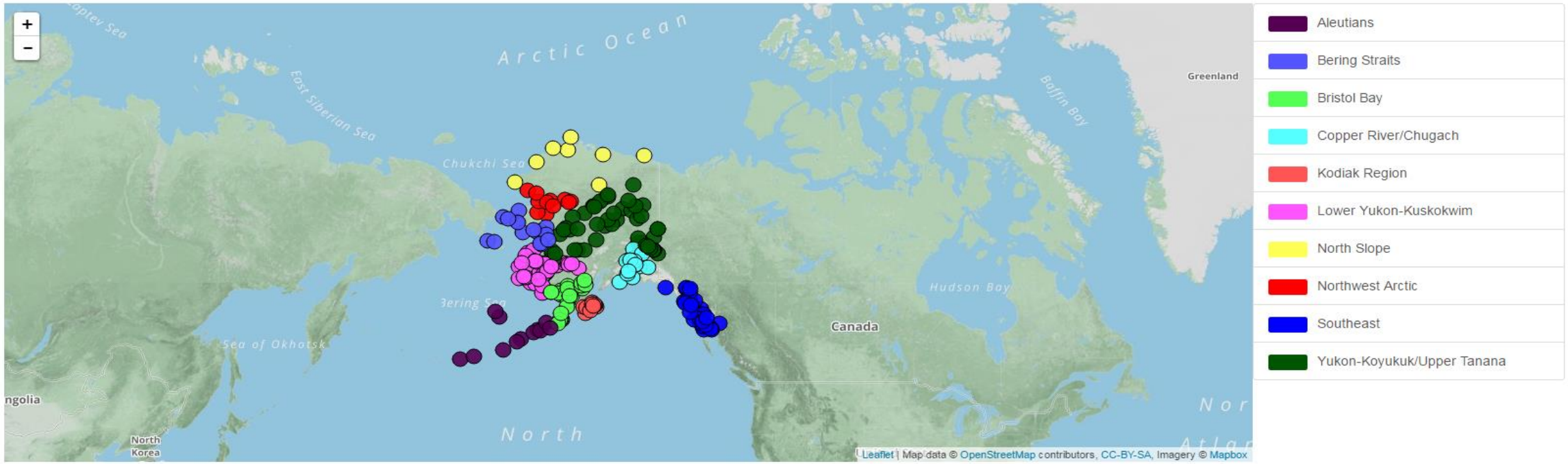
A tool for comparing potential project types in non-Railbelt communities

Alaska Affordable Energy Model | Communities | Regions | State Senate Districts | State House Districts

Alaska Affordable Energy Model

Message about data used for the model

The results presented here a generated from available data on population, consumption, generation, and information on a technologies analyzed. For some communities this information may be incomplete. If you have, or know of a source of data that could help improve the model please contact The Alaska Energy Authority .



Generated from Model Version 0.22.2 and Data Version 0.22.2 on 2016-11-29

Community overview

Demographics	
Population (2010)	246
Households (2010)	100
Financial	
Forecasted diesel fuel cost (2016)	$2.40/gallon
Forecasted heating fuel cost (2016)	$3.95/gallon
Forecasted electricity cost (2016)	$0.57/kWh
Consumption	
Total electricity consumption (2013)	1,029,853 kWh
Estimated residential heating fuel (2017)	52,455 gallons
Estimated non-residential heating fuel (2017)	64,160 gallons
Estimated utility diesel (2017)	100,177 gallons
Generation	
Total generation(2013)	1,142,603 kWh
Average load(2013)	unknown
Generation from diesel(2013)	1,142,603 kWh
Generation from hydropower(2013)	0 kWh
Generation from wind(2013)	0 kWh
Diesel generator efficiency (2013)	13.09 kWh/gallons
Line losses estimated (2013)	9.87%

Heating degree days

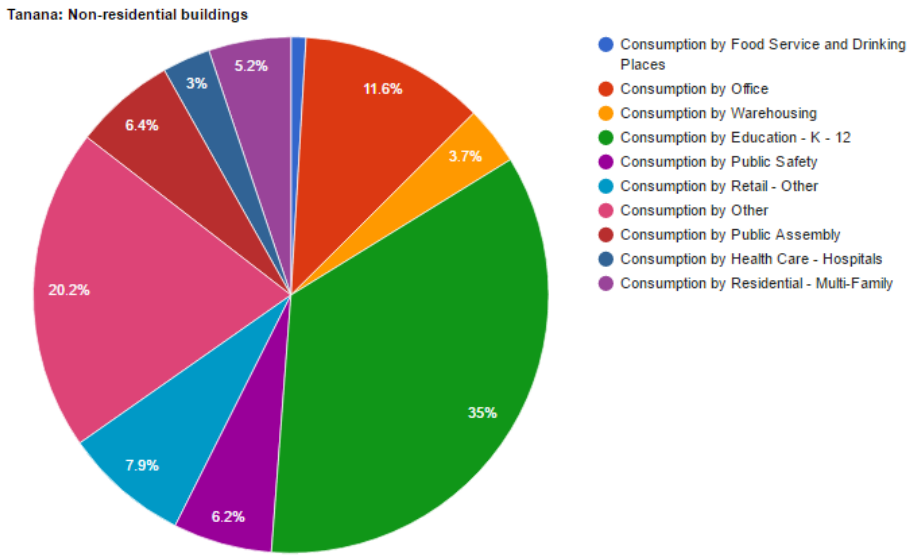
Heating Degree Days per year	1

Residential buildings

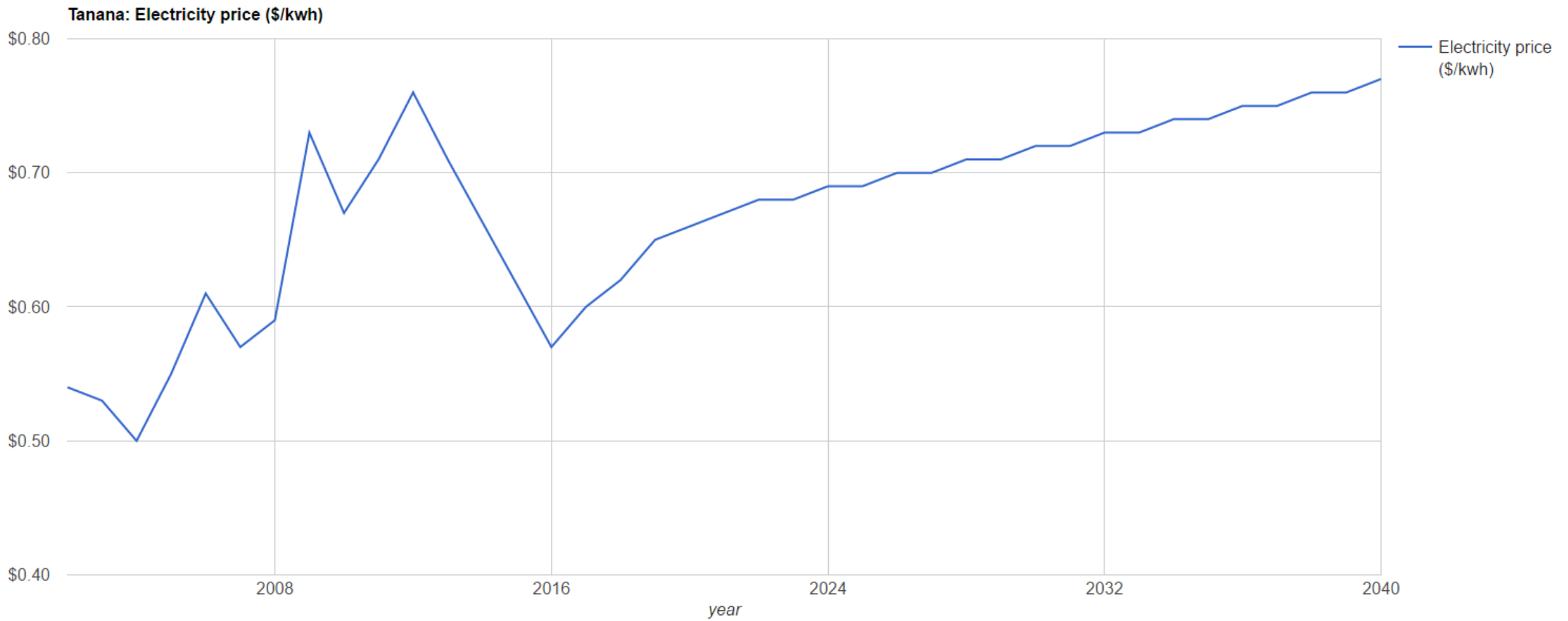
	Number Houses	Houshold Avg. Square Feet	Avg. EUI
BEES	4	1,767	0.22
Post-Retrofit	57	815	0.13
Pre-Retrofit	39	809	0.27

Non-residential buildings

There is a estimated total of 66,118 square feet for the 28 non-residential buildings in this community. 100.0% of the buildings have been identified. The others are assumed to exist. 81.4% of the assumed square footage is from measured sources. The break down of heating fuel consumption by building type is pesented in the pie chart



Electricity price ($/kwh)



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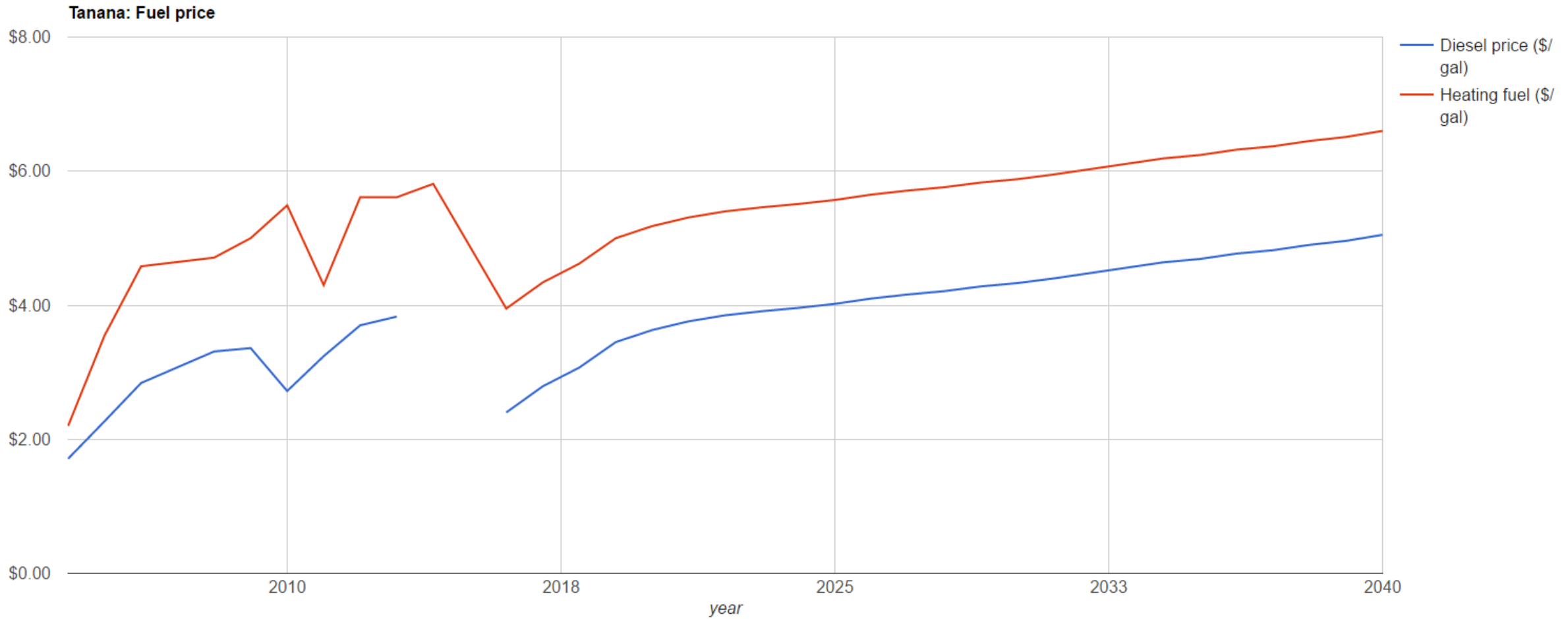
Fuel price



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Technology/Project	NPV benefits	NPV cost	NPV net benefit	Benefit cost ratio	Levelized cost of energy: electricity ($/kwh)	Levelized cost of energy: heating oil ($/gal)	gallons fuel saved per year
Residential Energy Efficiency	$1,129,554	$547,324	$582,230	2.1	N/A	$1.88	20,189
Non-residential Energy Efficiency	$1,266,733	$595,196	$671,537	2.1	$0.13	$2.17	14,220
Water and Wastewater Efficiency	$457,306	$123,075	$334,231	3.7	$0.17	$1.59	3,330
Wind Power	$709,560	$2,254,559	$-1,544,998	0.3	$0.61	N/A	20,401
Solar Power	$43,416	$98,884	$-55,469	0.4	$0.78	N/A	1,044
Hydropower	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Transmission and Interties	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Diesel Efficiency	$456,601	$2,189,227	$-1,732,625	0.2	$145.15	N/A	8,028
Biomass for Heat (Cordwood)	$505,640	$533,108	$-27,467	0.9	N/A	$5.65	14,240
Biomass for Heat (Pellet)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Residential ASHP	$-2,023,620	$3,225,578	$-5,249,198	-0.6	N/A	$17.81	44,377
Non-Residential ASHP	$-671,705	$557,601	$-1,229,306	-1.2	N/A	$14.67	13,869
Heat Recovery	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Cost effective projects have a benefit cost ratio greater than 1.0.

Alaska Affordable Energy Model Beta | Communities | Regions | State Senate Districts | State House Districts | Technologies

Tanana Residential Energy Efficiency

Summary | Efficiency Projects | Electricity Projects | Heating Projects

- Residential Energy Efficiency
- Non-residential Energy Efficiency
- Water and Wastewater Efficiency

This component calculates the potential reduction heating oil by improving the efficiency re

Current system

Households 2010: 100

Estimated Total Households 2017: 100

Estimated Households to be retofit 2017: 39

Modeled efficiency project

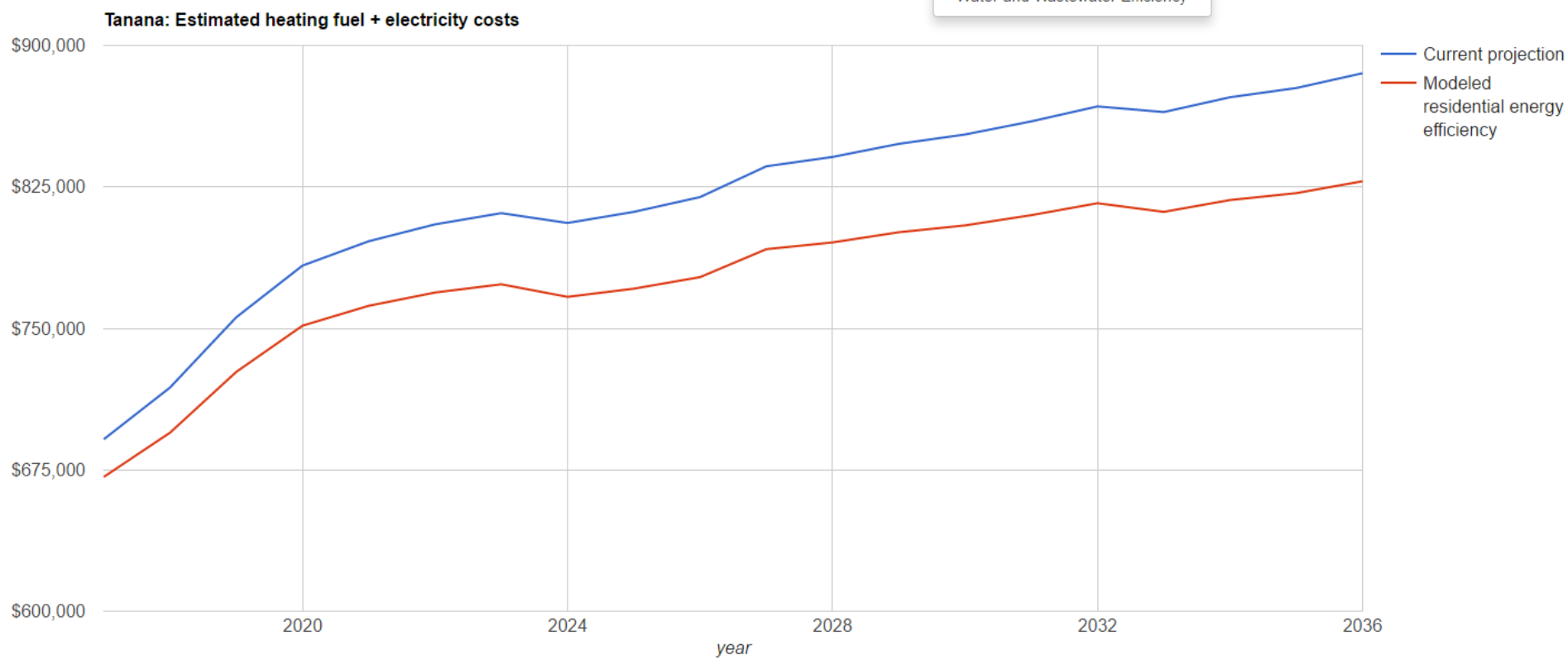
Capital cost: $547,324

Lifetime savings: $1,129,554

Net lifetime savings: $582,230

Benefit-cost ratio: 2.1

Estimated cost to refit household: $15,400.00/home



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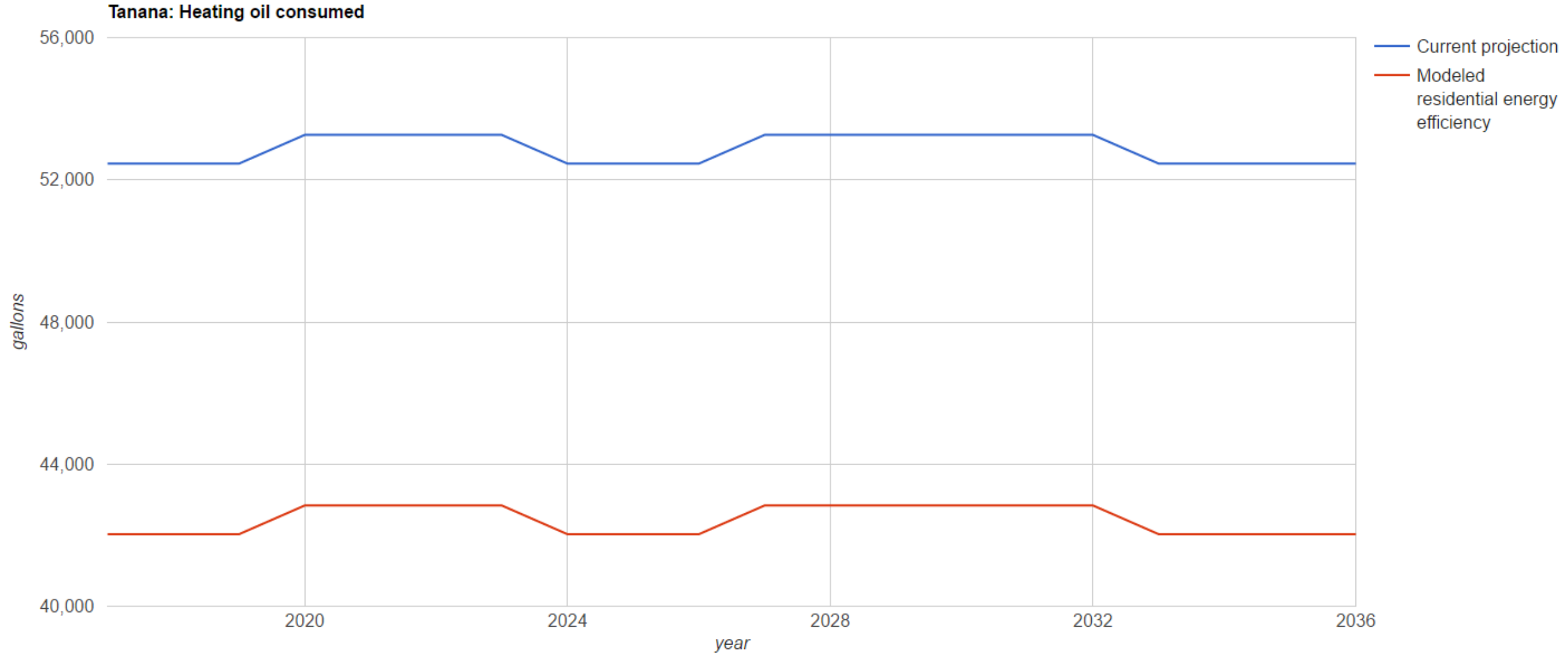


Plot/Table | Printable Plot | Table as csv

Tanana Non-residential Energy Efficiency

Summary | Efficiency Projects | Electricity Projects | Heating Projects

Current system

Esitmated Square Feet: 66,118

Modeled efficiency project

Capital cost: $595,196

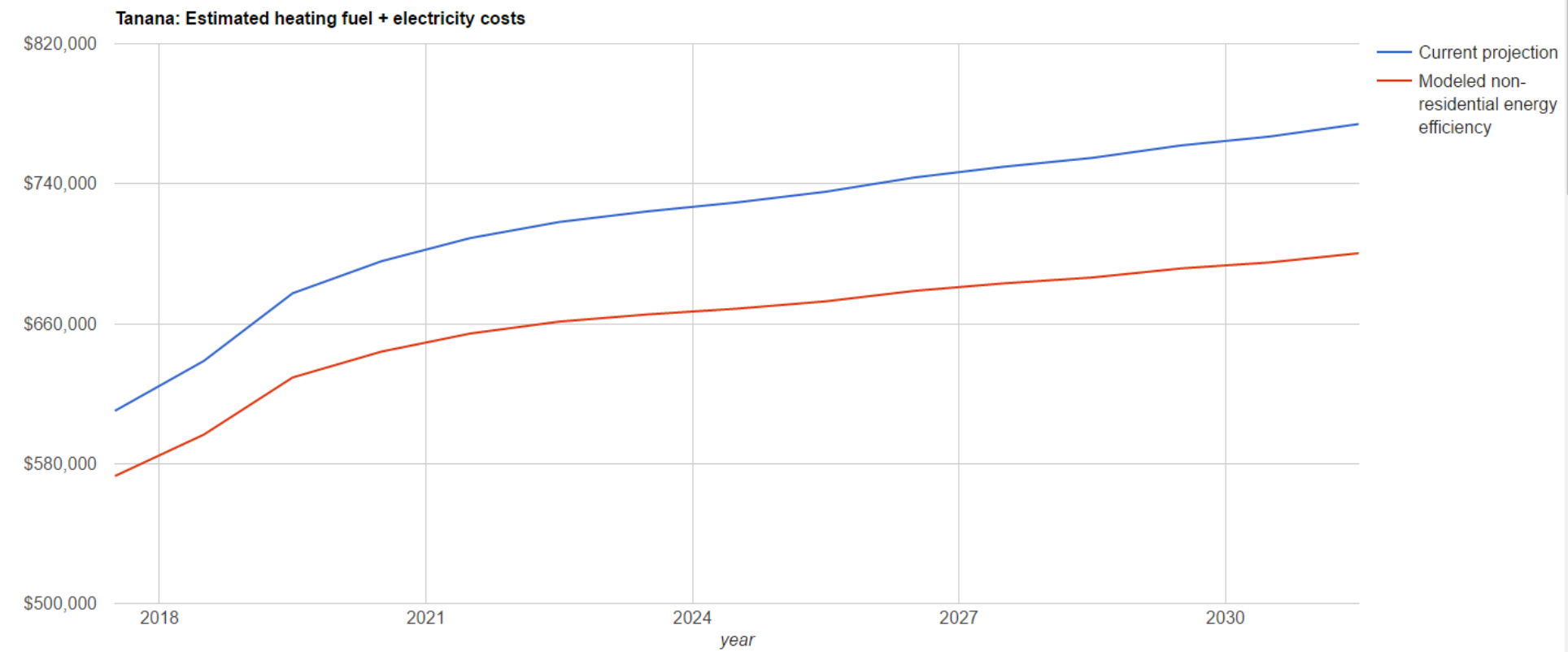
Lifetime savings: $1,266,733

Net lifetime savings: $671,537

Benefit-cost ratio: 2.1

Refit cost rate: $9.80/sqft

This component calculates the potential reduction in electricty and heating oil by improving the efficiency of Non-residential buildings



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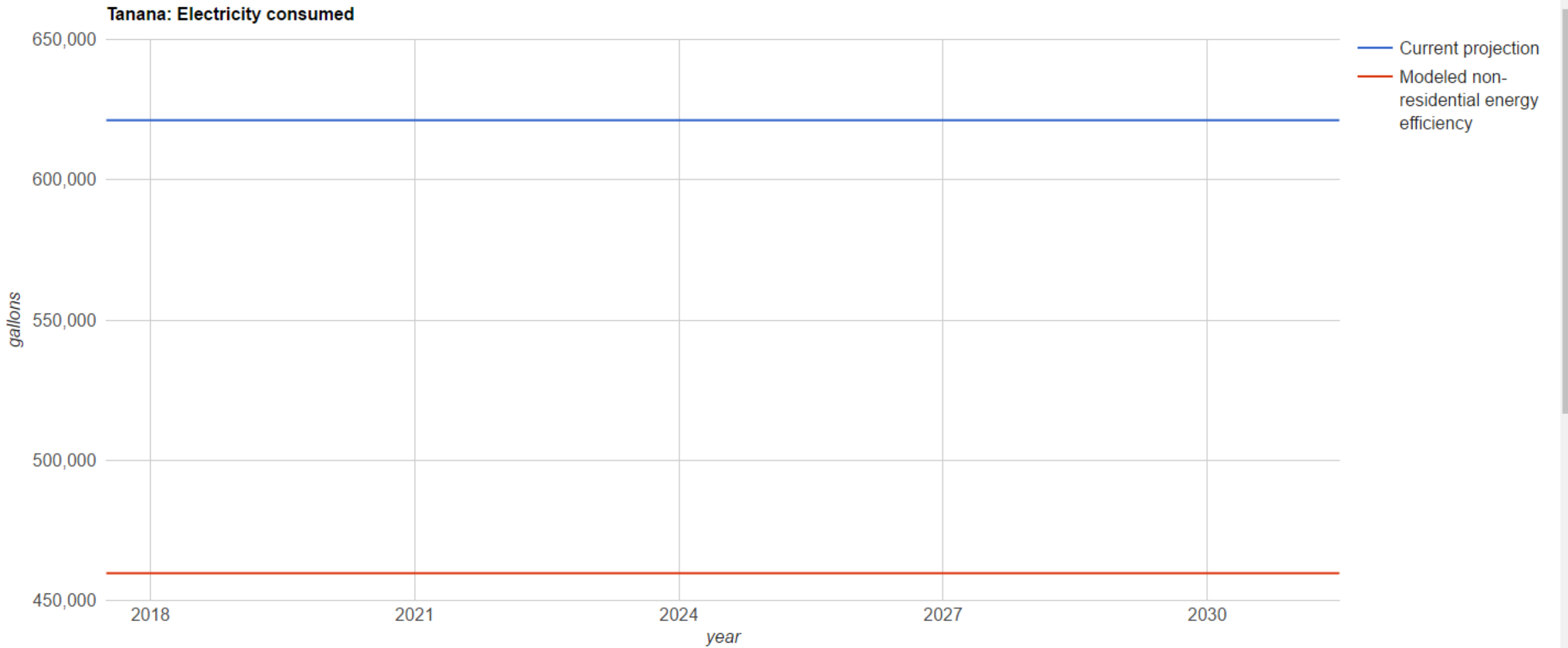
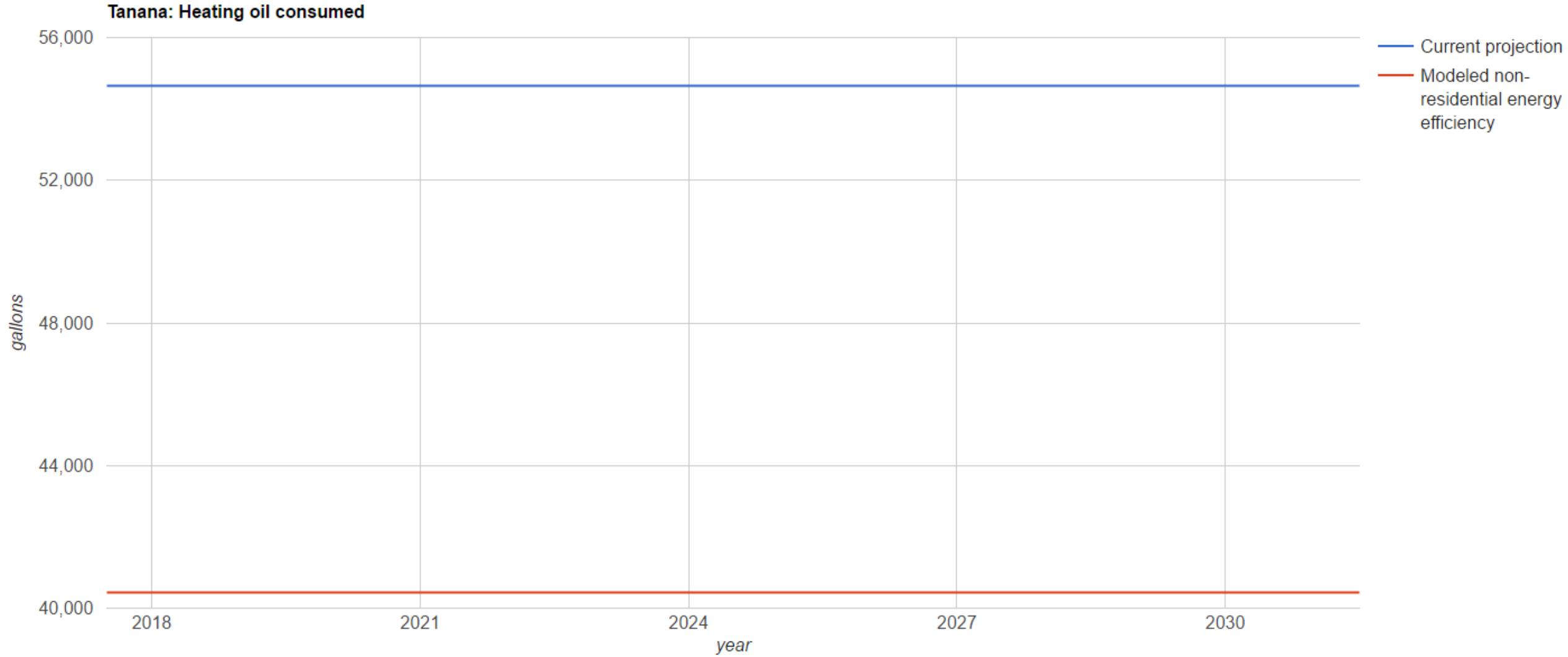

Tanana: Electricity consumed
650,000
600,000
550,000
500,000
450,000
gallons
2018
2021
2024
2027
2030
year
Current projection
Modeled non-residential energy efficiency
Plot/Table
Printable Plot
Table as csv


Tanana: Heating oil consumed
56,000
52,000
48,000
44,000
40,000
gallons
2018
2021
2024
2027
2030
year
Current projection
Modeled non-residential energy efficiency
Plot/Table
Printable Plot
Table as csv

Type	Number of communities with cost-effective projects	Investment needed for cost-effective projects	Lifetime net benefit of cost-effective projects	Annual diesel offset by generation &/or efficiency (gallons)	Annual heating oil displaced (gallons)	Extra capacity needed/offset (kW)
Non-residential efficiency	151	$412,503,000	$363,602,000	5,440,000	11,087,000	-17,000
Residential ASHP	18	$461,364,000	$240,417,000		17,879,000	30,000
Residential efficiency	192	$470,715,000	$298,852,000		9,436,000	
Hydro	16	$362,432,000	$191,459,000	5,900,000		
Non-residential ASHP	25	$95,072,000	$86,801,000		5,562,000	9,000
Wind	11	$127,961,000	$52,779,000	4,440,000		
Biomass--cordwood	34	$32,341,000	$13,165,000		1,204,000	
Water/wastewater efficiency	119	$12,106,000	$32,583,000	214,000	377,000	
Heat recovery	17	$15,654,000	$18,073,000		370,000	
Biomass--pellets	14	$4,372,000	$2,131,000		304,000	
Powerhouse replacement	1	$17,528,000	$1,919,000	288,000		
Solar	6	$127,000	$37,000	1,800		
Interties	1	$614,000	$588,000			

For more information about the Alaska Affordable Energy Strategy and the full texts of the reports, please see:
http://www.akenergyauthority.org/Policy-planning/AlaskaAffordableEnergyStrategy

For more information about the Alaska Affordable Energy Model and supporting documentation, please see:
http://www.akenergyinventory.org/energymodel

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AEA's mission: Reduce the cost of energy in Alaska.