



Alaskan

## Diesel Retrofit Projects

Alaska Department of Environmental Conservation

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(Delivered by Wayne Elson)

West Coast Collaborative Partners Meeting, Seattle WA,  
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# Alaska Diesel Retrofit Projects

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## Retrofit History

- Anchorage School District Bus project - 2004
- National Park Service biodiesel and retrofit - 2006
- ADEC brokered SEP funding for American Lung Association of Alaska project - 2007
- North Slope Oil Producers project – 2008 and ongoing
- DERA

# Anchorage School District Retrofit



Old Mufflers

# Alaska Diesel Retrofit Projects

## Anchorage School District Retrofit

- Learned the importance of a project “champion”
- Funded with EPA school bus and State SEP funds
- Mistake by contractor allowed negotiation of 10 more retrofits over number paid for

Number	BUS MAKE	YEAR
20	IC CORP	2003
15	AM TRAN	1999
9	GENESIS	1993
10	AM TRAN	2001
3	THOMAS	2001
12	THOMAS	1999
3	THOMAS	1998
2	THOMAS	1997
<b>74</b>	<b>TOTAL</b>	

# Alaska Diesel Retrofit Projects

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## Denali National Park Retrofit

- Summer of 2006, DEC contractor retrofitted diesel sources at park
- First Alaska retrofit of stationary diesel source
- Part of overall effort to introduce field use of fish oil biodiesel

# Alaska Diesel Retrofit Projects

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## Denali National Park Retrofit

“One generator torn apart due to injector pump replacement” – Contractor report

Fish oil (B100) basically destroyed generator fuel pumps  
– not recommended

Fish oil blend (<B20) worked in gen-sets and mobile sources

# Alaska Diesel Retrofit Projects

## Denali National Park Retrofit

Diesel oxidatives catalysts placed on:

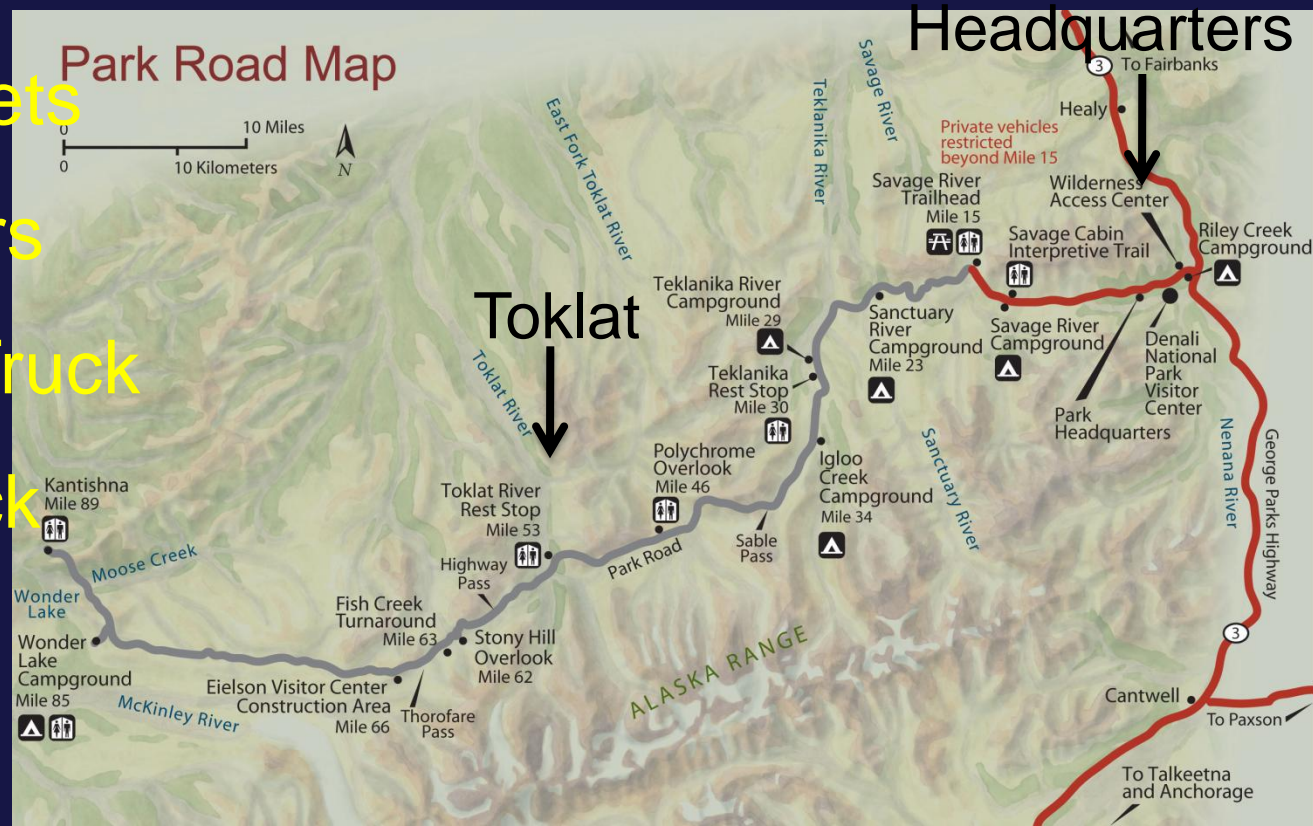
Toklat camp

- Two Onan Gensets

Park Headquarters

- Sterling Dump Truck

- Ford Dump Truck



# Sterling Dump Truck



# American Lung Fairbanks Retrofit



# Alaska Diesel Retrofit Projects

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## American Lung Association of Alaska (ALAA) Fairbanks Retrofit

Through a State Supplemental Environmental Project funds brokered by DEC, ALA received \$75,000 to manage retrofit projects in Fairbanks

- Plan A – retrofit school buses
  - ALAA found school bus contractor bought all new school buses, with DOCs
- Plan B – retrofit transit buses
  - ALAA found Fairbanks municipal buses replaced in December 2006 and were equipped with particulate traps

# Alaska Diesel Retrofit Projects

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## American Lung Association of Alaska (ALAA) Fairbanks Retrofit

### Plan C – retrofit anybody

- ALAA made numerous inquiries throughout federal, state, and municipal departments to ID fleets for retrofits
- ALAA contracted with Cummins Northwest to retrofit **six Department of Transportation snow plows** - completed in March 2007

### Plan D – purchase of clean vehicles

- Two community organizations received hybrid vehicles

# North Slope Retrofit

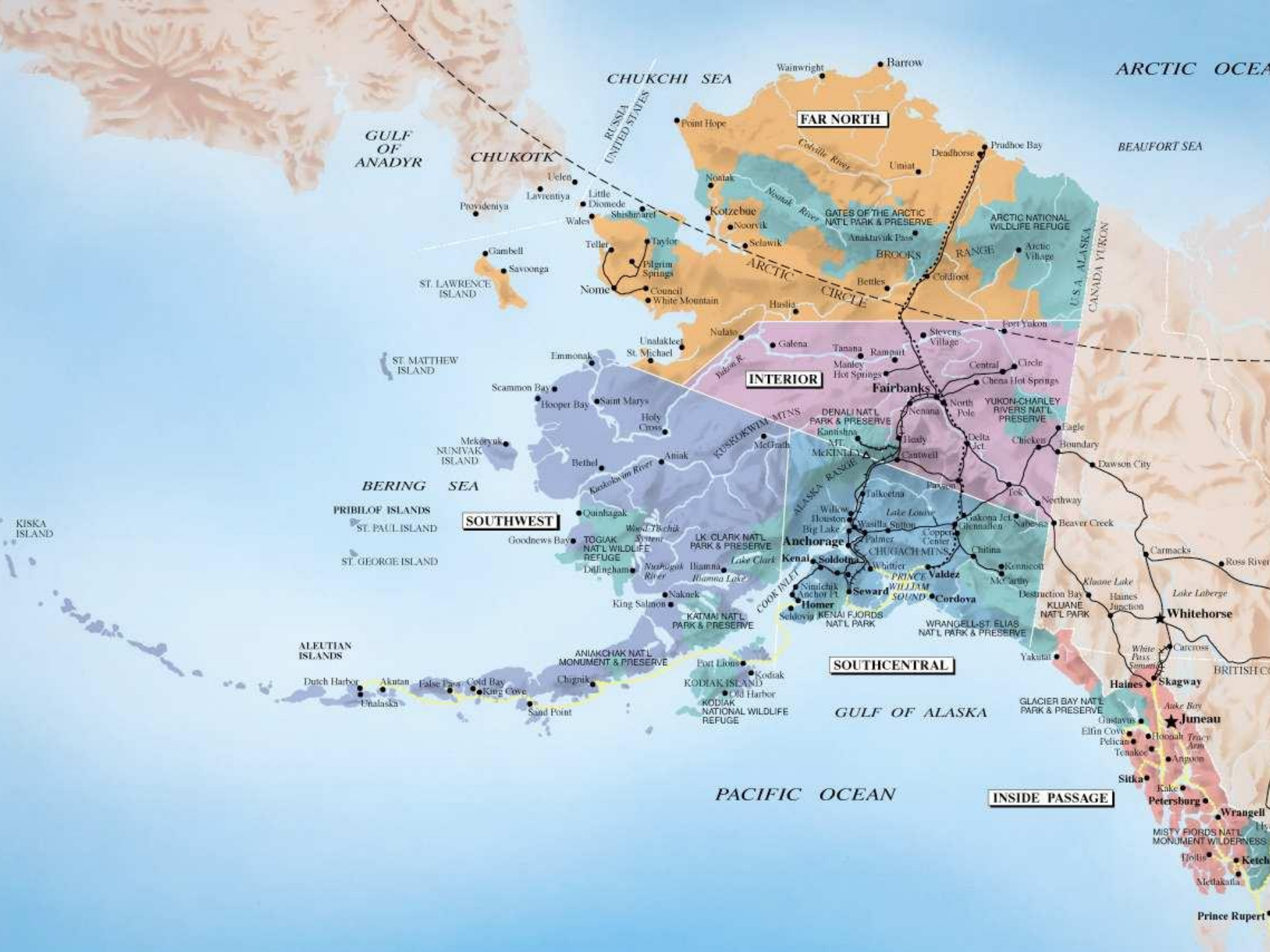


# Alaska Diesel Retrofit Projects

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## North Slope Retrofit Background

- Moving specialty fuels to remote areas of Alaska is expensive
- Fuel costs in rural Alaska are already some of the highest in the nation
- Alaska asked for and received flexibility in implementing the ULSD rules in these areas.



CHUKCHI SEA

ARCTIC OCEAN

GULF OF ANADYR

BEAUFORT SEA

CHUKOTK

RUSSIA  
UNITED STATES

**FAR NORTH**

ST. LAWRENCE ISLAND

Nome

ARCTIC CIRCLE

GATES OF THE ARCTIC NATL PARK & PRESERVE

ARCTIC NATIONAL WILDLIFE REFUGE

ST. MATTHEW ISLAND

**INTERIOR**

Fairbanks

BERING SEA

**SOUTHWEST**

Denali NATL PARK & PRESERVE

YUKON-CHARLEY RIVERS NATL PRESERVE

PRIPILOF ISLANDS

ST. PAUL ISLAND

ST. GEORGE ISLAND

Goodnews Bay

TOGIAK NATL WILDLIFE REFUGE

ANCHORAGE

Kenai

SOLDOTNA

ALEUTIAN ISLANDS

Dutch Harbor

False Pass

Cold Bay

King Cove

Chignik

Sand Point

King Salmon

KATMAI NATL PARK & PRESERVE

**SOUTHCENTRAL**

GULF OF ALASKA

Homer

CORDOVA

Whitehorse

ANIAKCHAK NATL MONUMENT & PRESERVE

KODIAK ISLAND

KODIAK NATIONAL WILDLIFE REFUGE

WRANGELL-ST. ELIAS NATL PARK & PRESERVE

Skagway

Juneau

Sitka

Petersburg

Wrangell

Ketchikan

Metlakatla

Prince Rupert

PACIFIC OCEAN

**INSIDE PASSAGE**

BRITISH COLUMBIA

# Alaska's Diesel Strategy

## History of North Slope Retrofit Alaska Rule Flexibility

Covered fuel	Before 2006	2006	2007-2009	2010-2011	2012
<b>National</b>					
Highway	500 ppm	15 ppm	15 ppm	15 ppm	15 ppm
Non-Road	HS	HS	500 ppm	15 ppm	15 ppm
Locomotive/Marine	HS	HS	500 ppm	500 ppm	15 ppm
<b>Urban Alaska</b>					
Highway	HS	15 ppm	15 ppm	15 ppm	15 ppm
Non-Road	HS	HS	500 ppm	15 ppm	15 ppm
Locomotive/Marine	HS	HS	500 ppm	500 ppm	15 ppm
<b>Rural Alaska - One step transition in 2010</b>					
Highway	HS	HS	HS	15 ppm	15 ppm
Non-Road	HS	HS	HS	15 ppm	15 ppm
Locomotive/Marine	HS	HS	HS	15 ppm	15 ppm

# Alaska Diesel Retrofit Projects

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## North Slope Retrofit Background

- Initially, because of the Dalton Highway, the north slope was deemed “urban”
- In 2005, North Slope producers BP-Alaska and ConocoPhillips approached ADEC with an offer
  - Designate the North Slope “rural”
  - ConocoPhillips will produce ULSD in one of their two topping plants by January 2008
  - BP and ConocoPhillips would use nothing but ULSD in their diesel burning sources (including sources not regulated such as space heating and stationary engines) facility wide starting Summer 2008

# The North Slope Oil and Gas Industry Diesel Retrofit Project

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## North Slope Retrofit Background

- An initial delay changed the implementation date for ULSD production from January 2008 to January 2009.
- To capture some emission reductions lost to the delay the producers agreed to a diesel retrofit project
- **2 million dollars** would be spent by each entity on retrofits
- Retrofits prioritized by cost of implementation and volume of emissions reduced
- And the winner is ...

# Alaska Diesel Retrofit Projects

## North Slope Retrofit

Anti-idling measures— allow trucks to be turned off without much compromise in cab comfort or worry about re-starting the engine after a soak at ambient temperatures

- temp-a-starts
- webasto heaters
- bull rails
- warm storage



By far the most cost effective means of reducing emissions

# Alaska Diesel Retrofit Projects

North Slope Retrofit  
Anti-idling measures

Bull Rail

Webasto Panel



Warming Shelter

# Alaska Diesel Retrofit Projects

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## North Slope Retrofit - Other activities

### Diesel oxidative catalysts

- Will provide field use experience to help determine utility for other arctic retrofits
  - Funding just approved for the DOC's – 50 per producer
- Electrification of guard shack (shutting down a diesel power generator)
  - Encountering difficulties due to regulations on power providers and users

# Alaska Diesel Retrofit Projects

## North Slope Retrofit - By the numbers

<b>Project</b>	<b>No. pieces of equipment</b>	<b>fuel savings (gal/year)</b>
Temp-a-start/Webasto heater	250 (95 completed)	1,300,000 17%
Bull rails	218 (Completed)	1,400,000 18%
Warm storage	41	150,000 1%
Guard shack electrification	1	19000 3%
Diesel OxCats	100 (nonroad)	0
<b>Total</b>		<b>2,869,000</b>

# Alaska Diesel Retrofit Projects

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## North Slope Retrofit - By the numbers

Fuel savings equates to the following annual reduction of emissions:

PM10	5.5 tons
CO	TBD
SOx	27 tons (at 1000ppm); about half at 500 ppm
GHG	40,400 tons CO <sub>2</sub>

# Alaska Diesel Retrofit Projects

## DERA

### Oh DERA, oh DERA



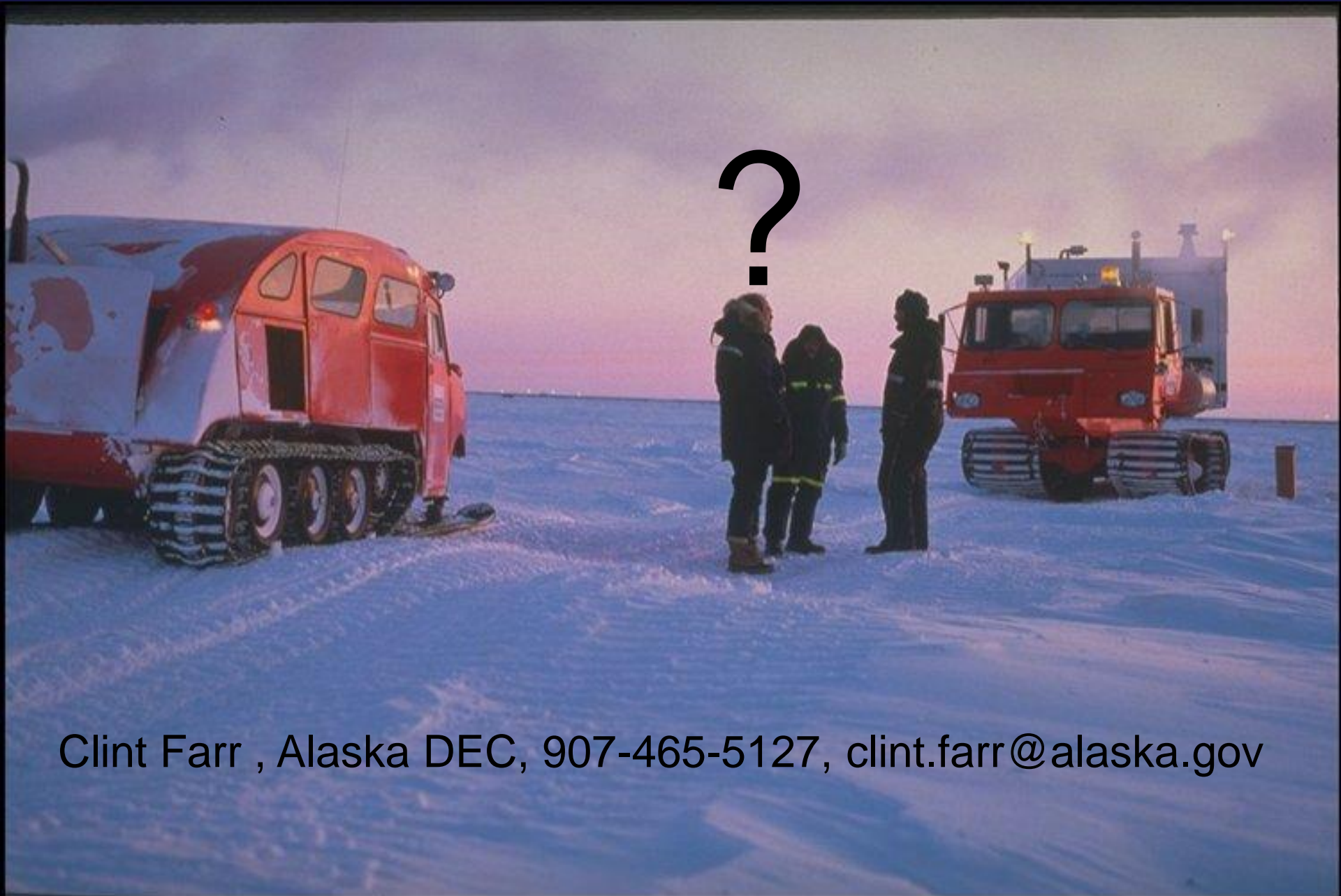
# Alaska Diesel Retrofit Projects

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## DERA

What does the future hold?

- Matching funds to Alaska Energy Authority for diesel engine efficiency project implementation
- Base funds to ADEC for direct management of retrofit projects
- Projects in negotiation include –
  - Biodiesel
  - Power plant retrofits
  - Port of Anchorage retrofits
  - Marine repower



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