Polar Energy Conservation Systems

2006/2007 Cape Dorset Fuel Study

Fuel Study Objectives

- Evaluate benefits of installing Fitch Fuel Catalyst on Vehicles and Buildings.
- Install Fitch Fuel Catalyst on selected assets.
- Compile historical and real-time fuel data provided by Hamlet employees.
- Monitor, record, and analyze current consumption within day to day operations.
- Report on results.

Fuel Study Terminology and Notes

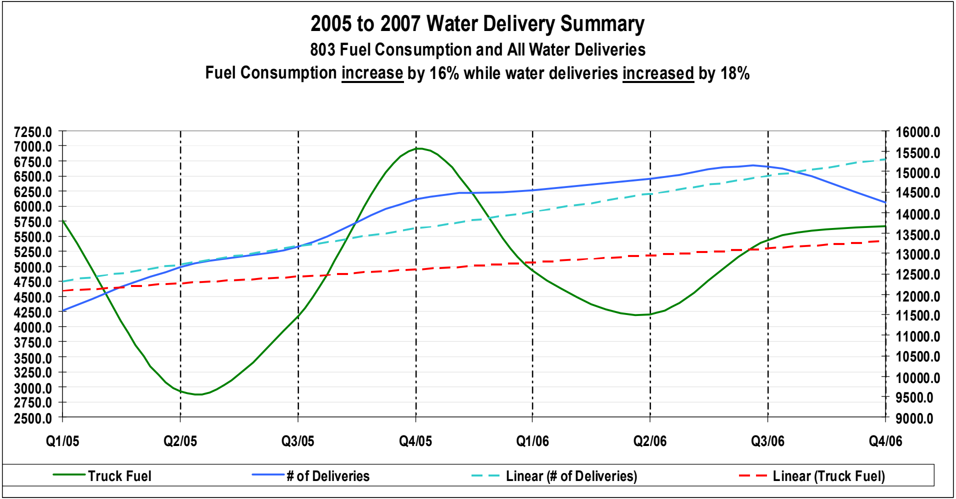
- Fuel Economy is the number of miles driven divided by the amount of fuel consumed. **Higher values are desired**.
- Fuel Consumption is the amount of fuel used by an engine. **Lower values are desired**.
- Noted Fuel Economy ratings are from a Government database that is collecting data real-world data from vehicle owners in North America.
- Averages from real-time data were used to fill-in missing data.
- PPD data does not consistently reflect real-time usage due to billing cycles, adjustments were made using fuel receipt dates where possible.
- Linear Trend Lines are an automated function of Excel and are an accurate representation of a trend over the given period of time.

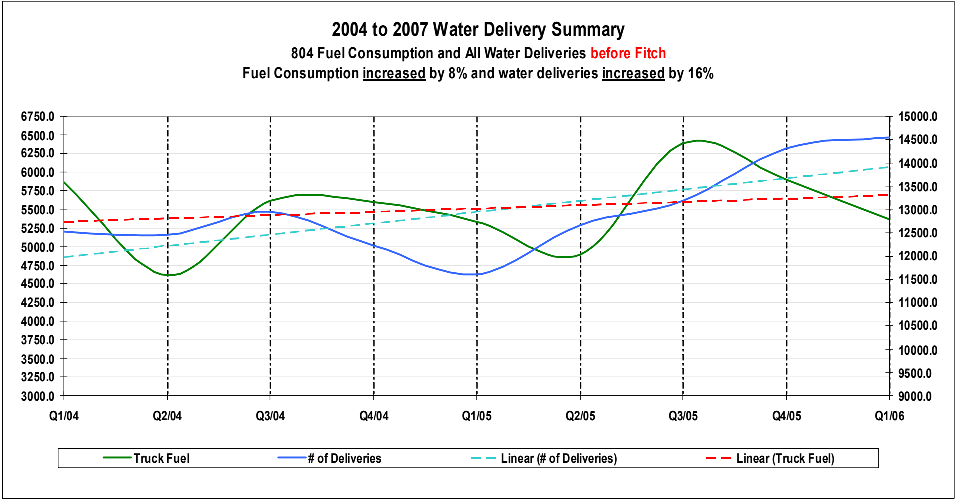
Fuel Study Findings

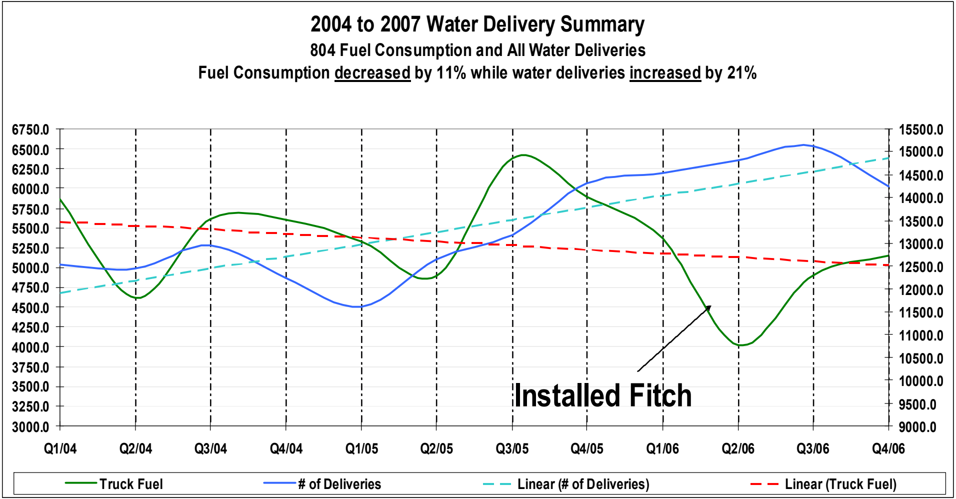
- Three years of historical data was collected and compiled for analysis.
- Analysis of the data showed
  - Most vehicles in Nunavut operate at 50% or more, below vehicles rated Fuel Economy.
  - Winter driving further reduces Fuel economy by an average of 20% across all vehicles and fuel types.
  - Water consumption for 06/07 is the same as in 05/06 but the # of deliveries has increased 17%.
  - Plugging vehicles to keep engine oil warm increases fuel economy by more than 5% and helps reduce excessive engine and starter wear caused by cold start operation, with minimal electrical demand when a timer is used to warm vehicle for several hours prior to use.
  - Several buildings consumed excessive volumes of fuel for heating.
    - Water Truck Fill Station (Water Point) consumed more than 26,000 liters between April and June of 2006 compared to 47,000 liters for the whole 2005/2006 Year.
    - Sam Pudlat School consumed over 175,000 liters from Aug 2005 to Feb 2007 compared to Peter Pitseolak School which consumed only 91,000 liters.
  - Excessive fuel consumption anomaly for 3 months at Water Point was accounted for when estimating ROI and fuel savings.
  - The Fitch Fuel Catalyst was successful in achieving between 10% and 20% fuel savings across all evaluation units.

Water Truck Fuel and Water Deliveries

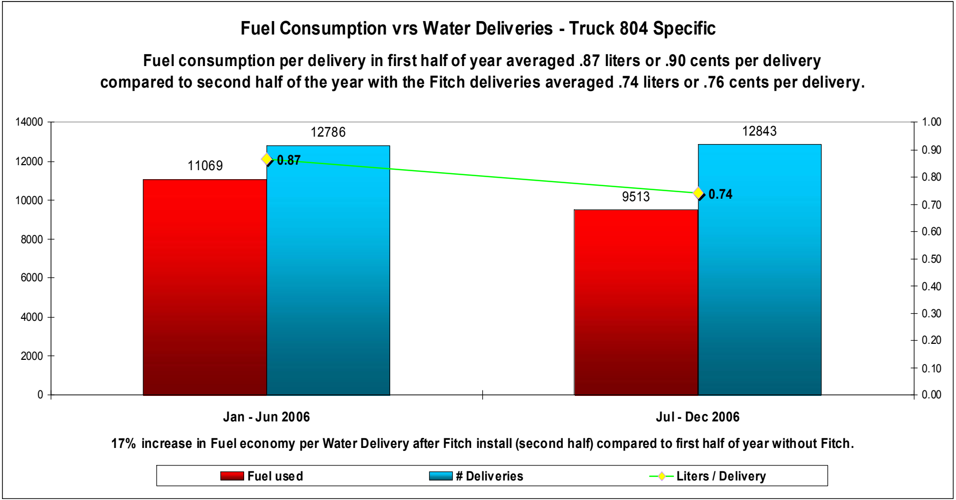
- The next few slides analyze fuel consumption as it relates to water deliveries and water delivered.

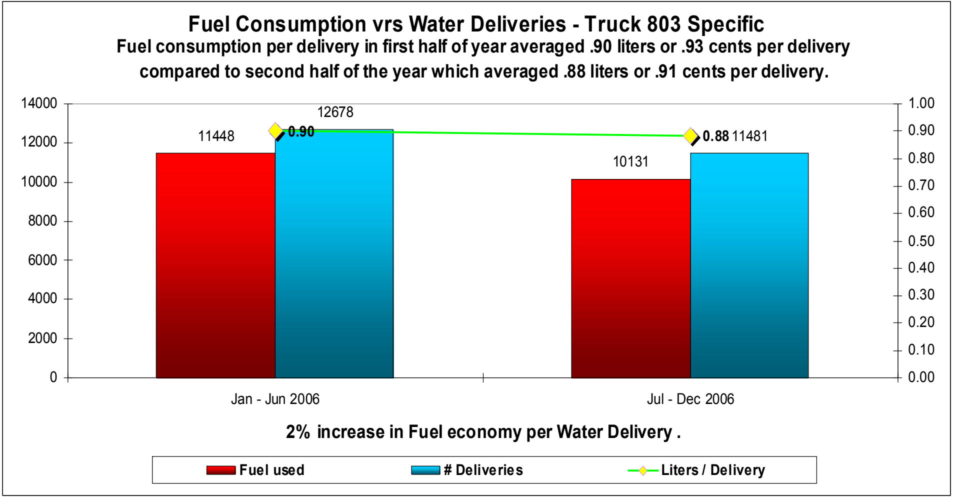

2005 to 2007 Water Delivery Summary
803 Fuel Consumption and All Water Deliveries
Fuel Consumption increase by 16% while water deliveries increased by 18%
7250.0
7000.0
6750.0
6500.0
6250.0
6000.0
5750.0
5500.0
5250.0
5000.0
4750.0
4500.0
4250.0
4000.0
3750.0
3500.0
3250.0
3000.0
2750.0
2500.0
16000.0
15500.0
15000.0
14500.0
14000.0
13500.0
13000.0
12500.0
12000.0
11500.0
11000.0
10500.0
10000.0
9500.0
9000.0
Q1/05
Q2/05
Q3/05
Q4/05
Q1/06
Q2/06
Q3/06
Q4/06
Truck Fuel
# of Deliveries
Linear (# of Deliveries)
Linear (Truck Fuel)

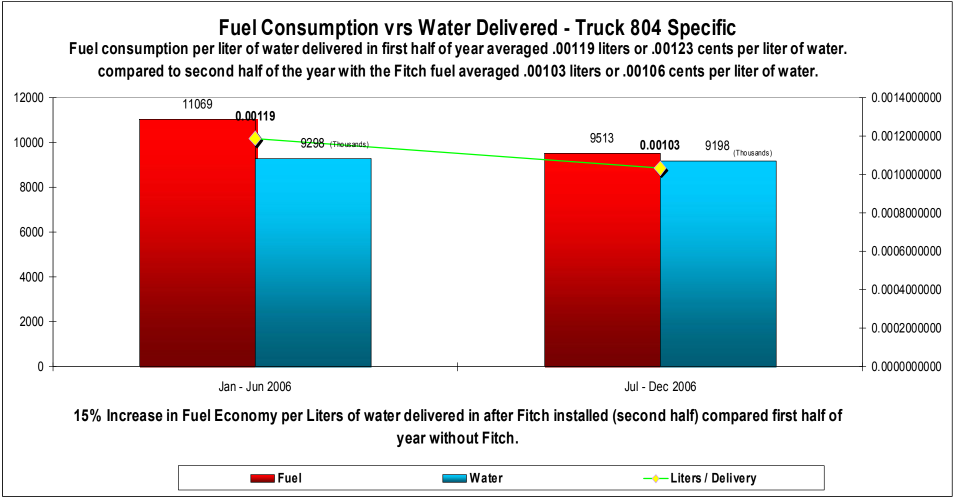

2004 to 2007 Water Delivery Summary
804 Fuel Consumption and All Water Deliveries before Fitch
Fuel Consumption increased by 8% and water deliveries increased by 16%
6750.0
6500.0
6250.0
6000.0
5750.0
5500.0
5250.0
5000.0
4750.0
4500.0
4250.0
4000.0
3750.0
3500.0
3250.0
3000.0
15000.0
14500.0
14000.0
13500.0
13000.0
12500.0
12000.0
11500.0
11000.0
10500.0
10000.0
9500.0
9000.0
Q1/04
Q2/04
Q3/04
Q4/04
Q1/05
Q2/05
Q3/05
Q4/05
Q1/06
Truck Fuel
# of Deliveries
Linear (# of Deliveries)
Linear (Truck Fuel)



2004 to 2007 Water Delivery Summary
804 Fuel Consumption and All Water Deliveries
Fuel Consumption decreased by 11% while water deliveries increased by 21%
6750.0
6500.0
6250.0
6000.0
5750.0
5500.0
5250.0
5000.0
4750.0
4500.0
4250.0
4000.0
3750.0
3500.0
3250.0
3000.0
15500.0
15000.0
14500.0
14000.0
13500.0
13000.0
12500.0
12000.0
11500.0
11000.0
10500.0
10000.0
9500.0
9000.0
Q1/04
Q2/04
Q3/04
Q4/04
Q1/05
Q2/05
Q3/05
Q4/05
Q1/06
Q2/06
Q3/06
Q4/06
Installed Fitch
Truck Fuel
# of Deliveries
Linear (# of Deliveries)
Linear (Truck Fuel)


Fuel Consumption vrs Water Deliveries - Truck 804 Specific
Fuel consumption per delivery in first half of year averaged .87 liters or .90 cents per delivery
compared to second half of the year with the Fitch deliveries averaged .74 liters or .76 cents per delivery.
14000
12000
10000
8000
6000
4000
2000
0
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
11069
12786
0.87
9513
12843
0.74
Jan - Jun 2006
Jul - Dec 2006
17% increase in Fuel economy per Water Delivery after Fitch install (second half) compared to first half of year without Fitch.
Fuel used
Deliveries
Liters / Delivery

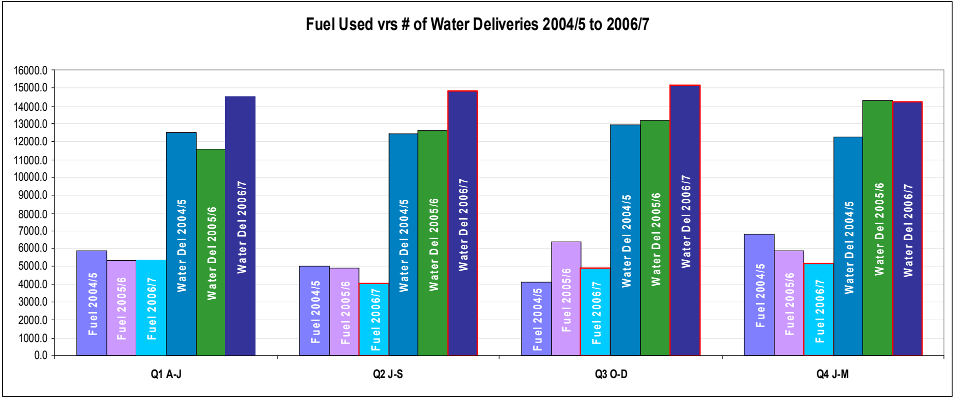

Fuel Consumption vrs Water Deliveries - Truck 803 Specific
Fuel consumption per delivery in first half of year averaged .90 liters or .93 cents per delivery
compared to second half of the year which averaged .88 liters or .91 cents per delivery.
14000
12000
10000
8000
6000
4000
2000
0
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
11448
12678
0.90
10131
0.88
11481
Jan - Jun 2006
Jul - Dec 2006
2% increase in Fuel economy per Water Delivery .
Fuel used
Deliveries
Liters / Delivery

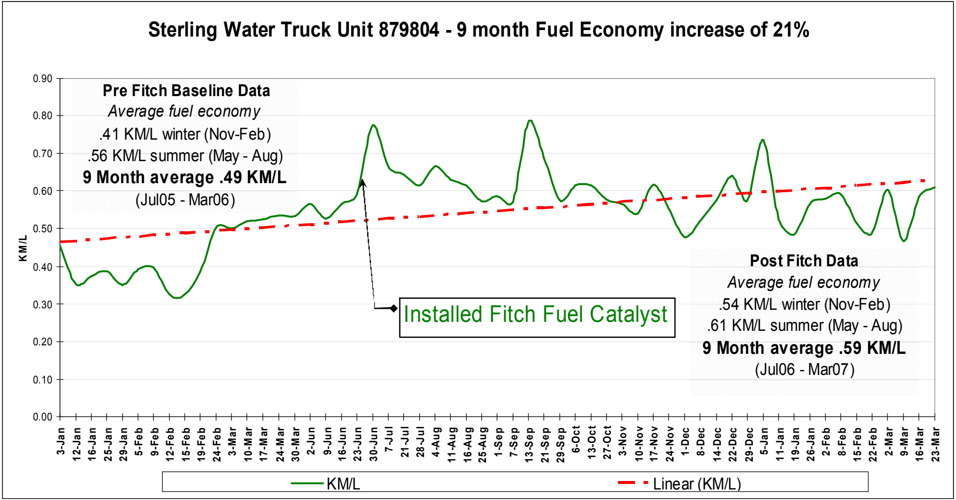

Fuel Consumption vrs Water Delivered - Truck 804 Specific
Fuel consumption per liter of water delivered in first half of year averaged .00119 liters or .00123 cents per liter of water.
compared to second half of the year with the Fitch fuel averaged .00103 liters or .00106 cents per liter of water.
12000
10000
8000
6000
4000
2000
0
0.0014000000
0.0012000000
0.0010000000
0.0008000000
0.0006000000
0.0004000000
0.0002000000
0.0000000000
11069
0.00119
9298 (Thousands)
9513
0.00103
9198 (Thousands)
Jan - Jun 2006
Jul - Dec 2006
15% Increase in Fuel Economy per Liters of water delivered in after Fitch installed (second half) compared first half of year without Fitch.
Fuel
Water
Liters / Delivery

Truck 804 Fuel compared to Water Delivered by Hamlet Fiscal Quarter

This chart shows overall deliveries made between 2004 and 2006 with fuel consumption to deliver that water.

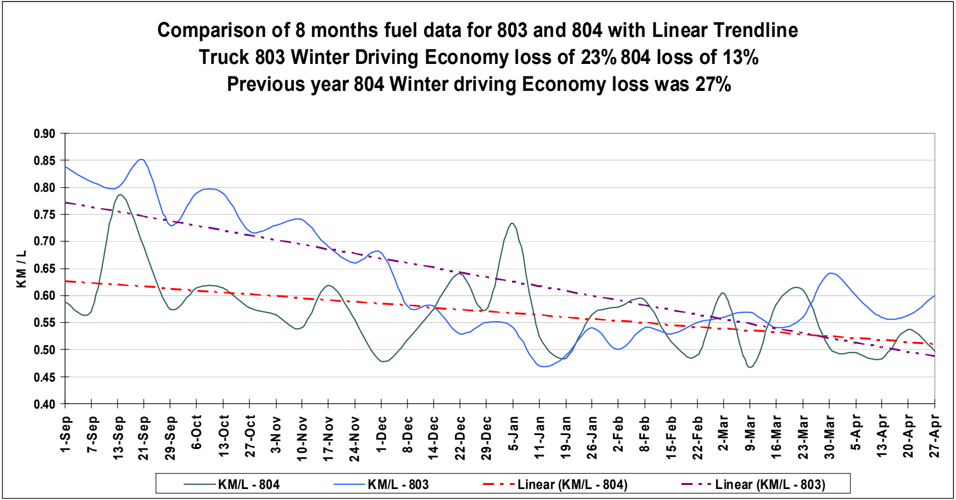
The Fitch was installed beginning of second Quarter 2006.

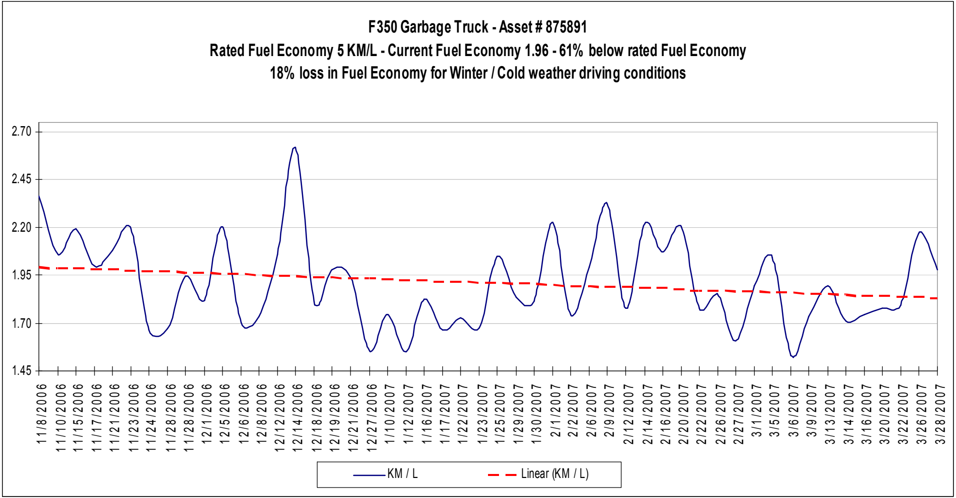


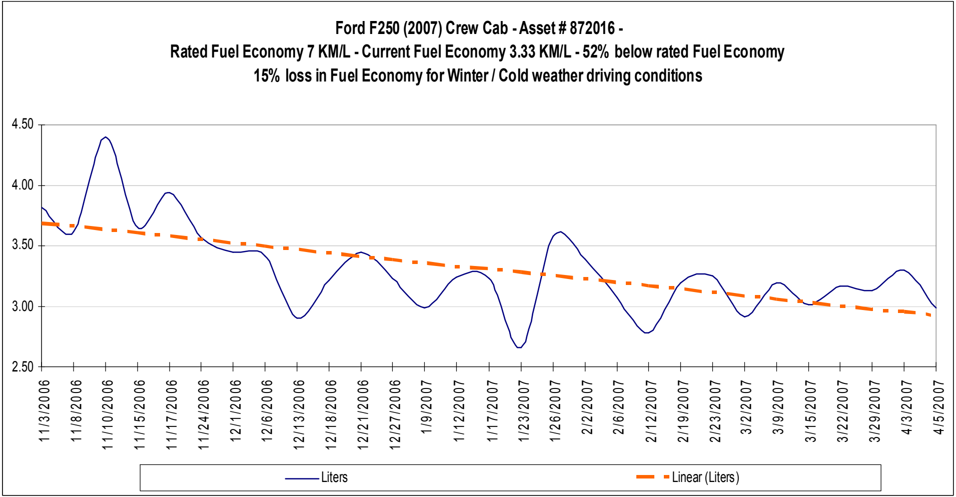

Sterling Water Truck Unit 879804 - 9 month Fuel Economy increase of 21%
Pre Fitch Baseline Data
Average fuel economy
.41 KM/L winter (Nov-Feb)
.56 KM/L summer (May - Aug)
9 Month average .49 KM/L
(Jul05 - Mar06)
Installed Fitch Fuel Catalyst
Post Fitch Data
Average fuel economy
.54 KM/L winter (Nov-Feb)
.61 KM/L summer (May - Aug)
9 Month average .59 KM/L
(Jul06 - Mar07)
KM/L
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
3-Jan
12-Jan
16-Jan
25-Jan
29-Jan
5-Feb
9-Feb
12-Feb
15-Feb
19-Feb
24-Feb
3-Mar
10-Mar
17-Mar
24-Mar
30-Mar
2-Jun
9-Jun
16-Jun
23-Jun
30-Jun
7-Jul
21-Jul
28-Jul
4-Aug
11-Aug
16-Aug
25-Aug
1-Sep
7-Sep
13-Sep
21-Sep
29-Sep
6-Oct
13-Oct
27-Oct
3-Nov
10-Nov
17-Nov
24-Nov
1-Dec
8-Dec
14-Dec
22-Dec
29-Dec
5-Jan
11-Jan
19-Jan
26-Jan
2-Feb
8-Feb
15-Feb
22-Feb
2-Mar
9-Mar
16-Mar
23-Mar
KM/L
Linear (KM/L)

Vehicle Comparisons

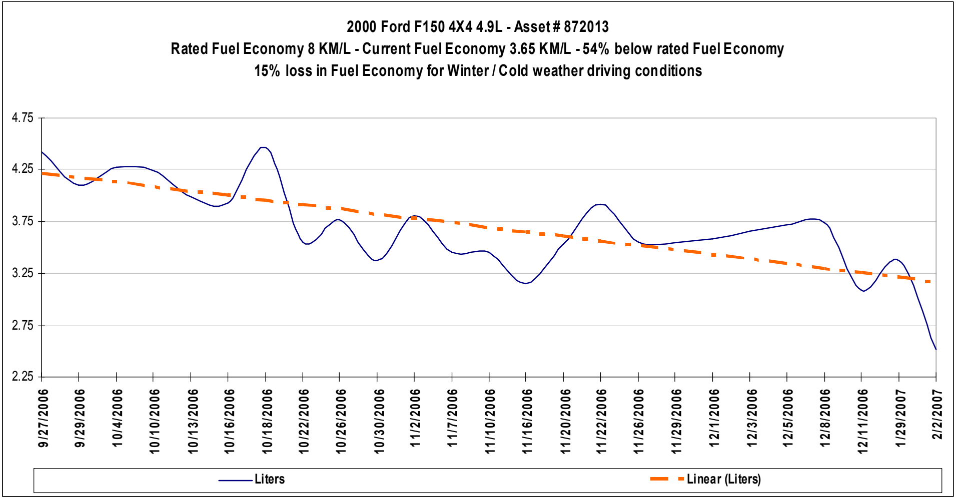
- The next few slides compare Fuel Economy between 804 using the Fitch and various other vehicles without Fitch
- Every vehicle in the study showed average decreases in fuel economy of 20% as the weather got colder.
- Comparatively, 804 only experienced a 13% drop in economy.
- The overall result for 804 is an annualized fuel savings of more than 15%.
- The Ford Econoline was equipped with the Fitch mid winter and winter driving fuel economy loss was reversed. Current winter driving economy with the Fitch is -16% compared to -28% without the Fitch.

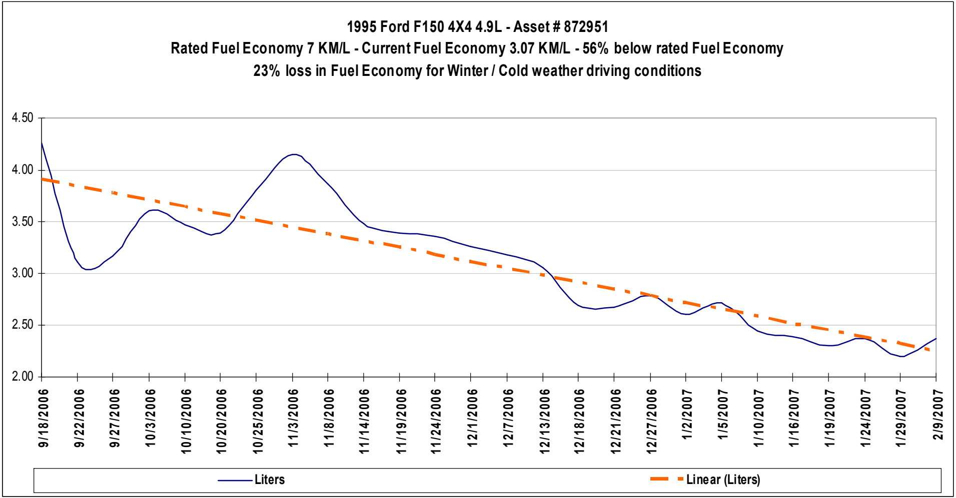

Comparison of 8 months fuel data for 803 and 804 with Linear Trendline
Truck 803 Winter Driving Economy loss of 23% 804 loss of 13%
Previous year 804 Winter driving Economy loss was 27%
KM / L
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
1-Sep
7-Sep
13-Sep
21-Sep
29-Sep
6-Oct
13-Oct
27-Oct
3-Nov
10-Nov
17-Nov
24-Nov
1-Dec
8-Dec
14-Dec
22-Dec
29-Dec
5-Jan
11-Jan
19-Jan
26-Jan
2-Feb
8-Feb
15-Feb
22-Feb
2-Mar
9-Mar
16-Mar
23-Mar
30-Mar
5-Apr
13-Apr
20-Apr
27-Apr
KM/L - 804
KM/L - 803
Linear (KM/L - 804)
Linear (KM/L - 803)


F350 Garbage Truck - Asset # 875891
Rated Fuel Economy 5 KM/L - Current Fuel Economy 1.96 - 61% below rated Fuel Economy
18% loss in Fuel Economy for Winter / Cold weather driving conditions
2.70
2.45
2.20
1.95
1.70
1.45
11/8/2006
11/10/2006
11/15/2006
11/17/2006
11/21/2006
11/23/2006
11/24/2006
11/28/2006
11/28/2006
12/1/2006
12/5/2006
12/6/2006
12/8/2006
12/12/2006
12/14/2006
12/18/2006
12/19/2006
12/21/2006
12/27/2006
1/10/2007
1/12/2007
1/16/2007
1/17/2007
1/22/2007
1/23/2007
1/25/2007
1/29/2007
1/30/2007
2/1/2007
2/2/2007
2/6/2007
2/9/2007
2/12/2007
2/14/2007
2/16/2007
2/20/2007
2/22/2007
2/26/2007
2/27/2007
3/1/2007
3/5/2007
3/6/2007
3/9/2007
3/13/2007
3/14/2007
3/16/2007
3/20/2007
3/22/2007
3/26/2007
3/28/2007
KM / L
Linear (KM / L)

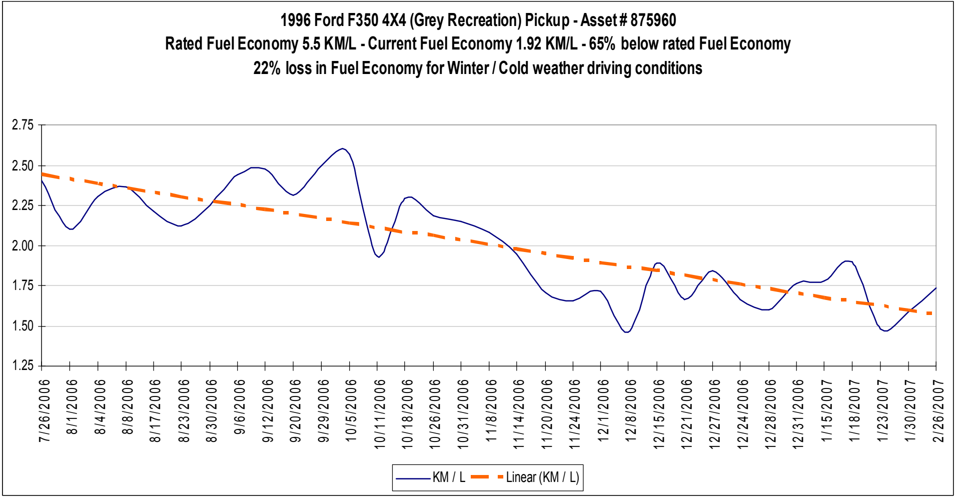


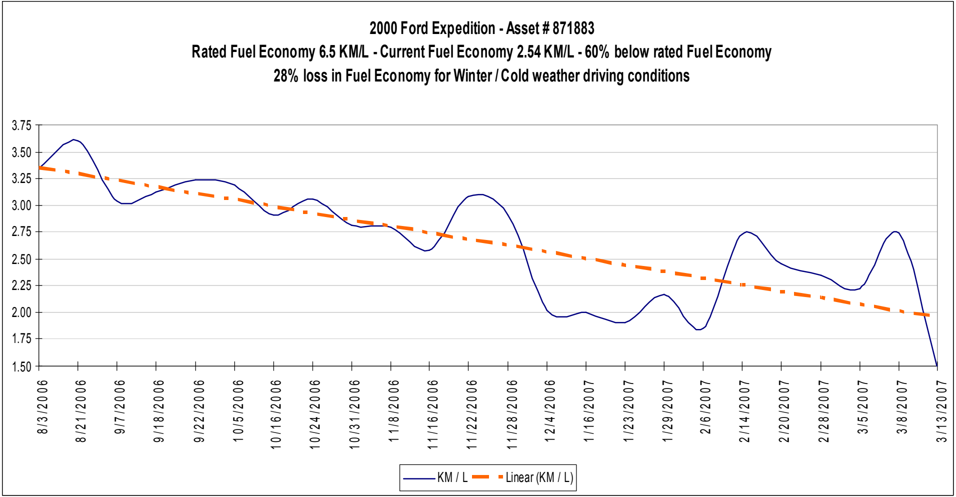
Ford F250 (2007) Crew Cab - Asset # 872016 -
Rated Fuel Economy 7 KM/L - Current Fuel Economy 3.33 KM/L - 52% below rated Fuel Economy
15% loss in Fuel Economy for Winter / Cold weather driving conditions
4.50
4.00
3.50
3.00
2.50
11/3/2006
11/8/2006
11/10/2006
11/15/2006
11/17/2006
11/24/2006
12/1/2006
12/6/2006
12/13/2006
12/18/2006
12/21/2006
12/27/2006
1/9/2007
1/12/2007
1/17/2007
1/23/2007
1/26/2007
2/2/2007
2/6/2007
2/12/2007
2/19/2007
2/23/2007
3/2/2007
3/9/2007
3/15/2007
3/22/2007
3/29/2007
4/3/2007
4/5/2007
Liters
Linear (Liters)

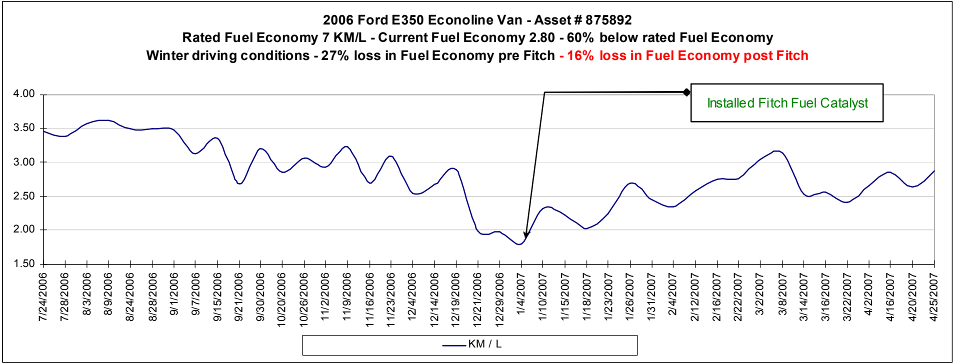

2000 Ford F150 4X4 4.9L - Asset # 872013
Rated Fuel Economy 8 KM/L - Current Fuel Economy 3.65 KM/L - 54% below rated Fuel Economy
15% loss in Fuel Economy for Winter / Cold weather driving conditions
4.75
4.25
3.75
3.25
2.75
2.25
9/27/2006
9/29/2006
10/4/2006
10/10/2006
10/13/2006
10/16/2006
10/18/2006
10/22/2006
10/26/2006
10/30/2006
11/2/2006
11/7/2006
11/10/2006
11/16/2006
11/20/2006
11/22/2006
11/26/2006
11/29/2006
12/1/2006
12/3/2006
12/5/2006
12/8/2006
12/11/2006
1/29/2007
2/2/2007
Liters
Linear (Liters)



1995 Ford F150 4X4 4.9L - Asset # 872951
Rated Fuel Economy 7 KM/L - Current Fuel Economy 3.07 KM/L - 56% below rated Fuel Economy
23% loss in Fuel Economy for Winter / Cold weather driving conditions
4.50
4.00
3.50
3.00
2.50
2.00
9/18/2006
9/22/2006
9/27/2006
10/3/2006
10/10/2006
10/20/2006
10/25/2006
11/3/2006
11/8/2006
11/14/2006
11/19/2006
11/24/2006
12/1/2006
12/7/2006
12/13/2006
12/18/2006
12/21/2006
12/27/2006
1/2/2007
1/5/2007
1/10/2007
1/16/2007
1/19/2007
1/24/2007
1/29/2007
2/9/2007
Liters
Linear (Liters)


1996 Ford F350 4X4 (Grey Recreation) Pickup - Asset # 875960
Rated Fuel Economy 5.5 KM/L - Current Fuel Economy 1.92 KM/L - 65% below rated Fuel Economy
22% loss in Fuel Economy for Winter / Cold weather driving conditions
2.75
2.50
2.25
2.00
1.75
1.50
1.25
7/26/2006
8/1/2006
8/4/2006
8/8/2006
8/17/2006
8/23/2006
8/30/2006
9/6/2006
9/12/2006
9/20/2006
9/29/2006
10/5/2006
10/11/2006
10/18/2006
10/26/2006
10/31/2006
11/8/2006
11/14/2006
11/20/2006
11/24/2006
12/1/2006
12/8/2006
12/15/2006
12/21/2006
12/27/2006
12/24/2006
12/28/2006
12/31/2006
1/15/2007
1/18/2007
1/23/2007
1/30/2007
2/26/2007
KM / L
Linear (KM / L)


2000 Ford Expedition - Asset # 871883
Rated Fuel Economy 6.5 KM/L - Current Fuel Economy 2.54 KM/L - 60% below rated Fuel Economy
28% loss in Fuel Economy for Winter / Cold weather driving conditions
3.75
3.50
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
8/3/2006
8/21/2006
9/7/2006
9/18/2006
9/22/2006
10/5/2006
10/16/2006
10/24/2006
10/31/2006
11/8/2006
11/16/2006
11/22/2006
11/28/2006
12/4/2006
1/16/2007
1/23/2007
1/29/2007
2/6/2007
2/14/2007
2/20/2007
2/28/2007
3/5/2007
3/8/2007
3/13/2007
KM / L
Linear (KM / L)


2006 Ford E350 Econoline Van - Asset # 875892
Rated Fuel Economy 7 KM/L - Current Fuel Economy 2.80 - 60% below rated Fuel Economy
Winter driving conditions - 27% loss in Fuel Economy pre Fitch - 16% loss in Fuel Economy post Fitch
Installed Fitch Fuel Catalyst
4.00
3.50
3.00
2.50
2.00
1.50
7/24/2006
7/28/2006
8/3/2006
8/9/2006
8/24/2006
8/28/2006
9/1/2006
9/7/2006
9/15/2006
9/21/2006
9/30/2006
10/20/2006
10/26/2006
11/2/2006
11/9/2006
11/16/2006
11/23/2006
12/4/2006
12/14/2006
12/19/2006
12/21/2006
12/29/2006
1/4/2007
1/10/2007
1/15/2007
1/18/2007
1/23/2007
1/26/2007
1/31/2007
2/4/2007
2/12/2007
2/16/2007
2/22/2007
3/2/2007
3/8/2007
3/14/2007
3/16/2007
3/22/2007
4/2/2007
4/16/2007
4/20/2007
4/25/2007
KM / L

Cape Dorset Vehicle Summary

- Using a conservative annualized savings of 15% - at current consumption of 450 liters per week the 804 Water Truck will realize savings of more than $3,500.00 per year.
- Using a conservative annualized savings of 15% - at current consumption of 145 liters per week, the Ford Econoline will realize savings of more than $1,000.00 per year.
- **Even at these conservative saving rates, the Fitch Fuel Catalyst pays for itself well within the first year of it's life-cycle (250,000 miles or 5000 operating hours).**
- Based on Fuel Study results and seasonal variances, the annualized savings is expected to be higher than the conservative rates used above.
- Current realized fuel savings for the above evaluated vehicles using current fuel rates is
  - **21% for Sterling Water Truck - 9 month pre Fitch average .49 KM/L and 9 month post Fitch average .59 KM/L**
  - **17% for Ford Econoline - using pre Fitch average 2.3 KM/L and the post Fitch average 2.7 KM/L**

Investment and Payback summary of Fitch Fuel Catalyst for 804 Water Truck

Payback based on annualized fuel savings of 15% at current fuel rates.

Fuel Cost and ROI Analysis	Sterling Truck	879804	
		Liters	
With Fitch		17695	$ 18,207.95
Without Fitch		20880	$ 21,485.38
Fuel Rate		1.029	
Savings to date (10 months)			$ 3,277.43
Fitch Cost			$ 1,200.00
Net savings to date (10 months)			$ 2,077.43
	Monthly Savings	*5 years less Fitch cost*	*Yearly savings*
Project NET Savings over Fitch life	**$ 327.74**	**$ 18,464.59**	**$ 3,692.92**

Investment and Payback summary of Fitch Fuel Catalyst for Ford Econoline

Payback based on annualized fuel savings of 15% at current fuel rates.

Fuel Cost and ROI Analysis	Ford Econoline	875893	
		Liters	
With Fitch		2168	$ 2,363.34
Without Fitch		2537	$ 2,765.11
Fuel Rate		1.09	
Savings to date (4 months)			$ 401.77
Fitch Cost			$ 500.00
Net savings to date (4 months)			$ (98.23)
	Monthly Savings	*5 years less Fitch cost*	*Yearly savings*
Project NET Savings over Fitch life	**$ 100.44**	**$ 5,526.51**	**$ 1,105.30**

Other evaluations

- City of Iqaluit Law Enforcement Ford Expedition for 2005 and 2006 averaged 2.45 KM/L, Fitch was installed in March 2006 and is currently averaging 2.87 KM/L, an increase in economy of 17% from last two years economy before Fitch.
- Rankin Inlet Ford F150 baseline data between April and May averaged 2.89 KM/L, Fitch was installed in June 2006. Average economy of 3.36 KM/L was achieved between June and November. Average economy of 3.03 KM/L was achieved between June and February. Fitch achieved a 5% increase winter driving compared to 2 month summer average. Estimated annualized savings of more then 15%.
- Two identical Yamaha Venture 500XL were extensively monitored, one season of baseline data for these machines averaged between 2.1 and 2.8 KM/L, two seasons Post Fitch averaged between 3.4 and 4 KM/L. Similar conditions were compared such as loads and snow grades which accounts for the variances. The substantial fuel economy increase was only part of the benefits, which also included greater performance and significant reduction in emissions resulting in greatly reduced engine maintenance and plug changes.
- 1999 Toyota 4Runner average KM/L for 2005/2006 pre Fitch was 2.5 KM/L, Fitch was installed in February 2006 and current average over last 14 months is 3.05 KM/L, an increase of 22%.

Cape Dorset Vehicle Recommendations

- 804 Water Truck:
  - **Install Fitch Fuel Catalyst the first of every 250,000 miles or 5000 operating hours.**
  - **Schedule fill-ups twice per week to help minimize fuel tank sludge contamination of fuel system.**
  - **Clean fuel tanks once per year.**
  - **Clean or replace fuel filter every month.**
  - **Replace air filter 4 times per year.**
- Ford Econoline:
  - **Install Fitch Fuel Catalyst the first of every 250,000 miles or 5000 operating hours.**
  - **Clean or replace fuel filter once per quarter.**
  - **Replace air filter twice per year.**
- All Other Vehicles:
  - **Install Fitch Fuel Catalyst on all Hamlet operated vehicles.**
  - **Implement above recommendations to benefit from significant fuel and GHG emissions reductions.**

  Optional:

  Implement mileage and operating time tracking system that will provide effective reporting on fuel consumption and help prevent excessive fuel consumption.

Building Heating with Fitch

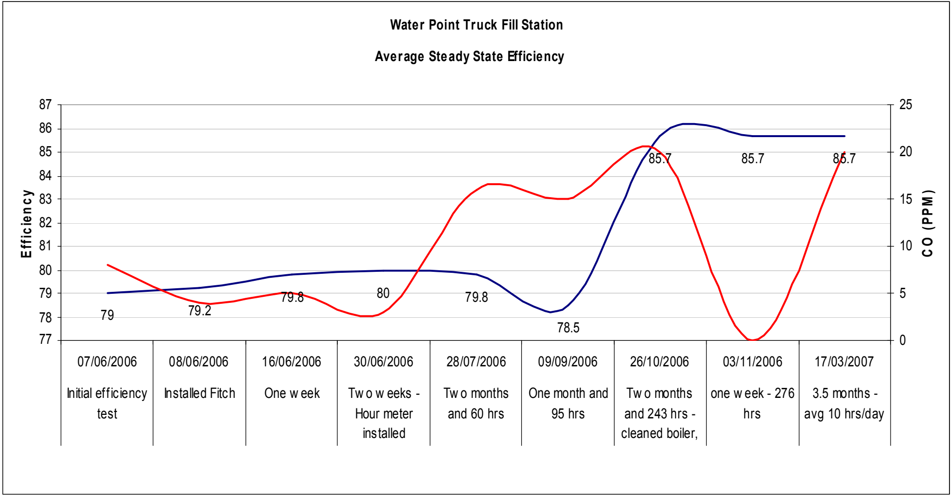
- This next section looks at information gathered and analyzed from boilers and other forms of building heating systems such as Oil Fired Furnaces.
- As we consider this section some key points to keep in mind are:
  - **Unlike a vehicle fuel economy, HVAC systems use the AFUE (Annualized Fuel Utilization Efficiency) method to determine fuel economy. There are many considerations that factor into an AFUE such as individual consumption (in homes where hot water is derived from the boiler), weather, insulation and draft, and the list goes on.**
  - For the purpose of the Fuel Study, the two main factors considered were steady state efficiency and fuel consumption over time. By removing factors outside our control we can make a determination of benefits based on system performance with the theory that if performance increases then the overall effect would be that the system is more economical.
  - **In some cases water consumption and weather were considered due to the significant impact these external factors have on the heating requirements of certain buildings such as the Water Truck Fill Station (Water Point).**
  - CO_2 (Carbon Dioxide) is a result of the combustion process, a higher percentage indicates a more complete burn. The optimal content of C02 for P50 is 13%, indicating most of the energy available in the fuel is being utilized.
  - **Higher C02 does mean higher emissions, but since the effect is lower consumption, the overall result is lower emissions.**
  - Stack Temperature is the resulting heat loss from combustion process. Stack temperatures increase as the heating system builds deposits from normal operations resulting in further heat loss. The Optimal Stack Temperature range is 350 – 400 degrees Fahrenheit.

Fitch Fuel Catalyst benefits for building heating systems

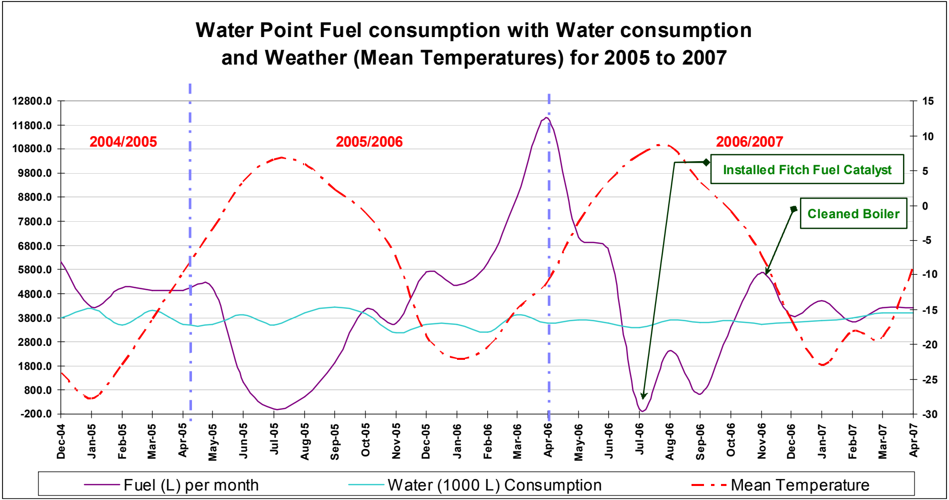
- The Fitch Fuel Catalyst allows for delivery of fresher fuel to the combustion process resulting in a more complete burn of the fuel and an increase in fuel economy.
- Fresh fuel produces a cleaner burn and contributes to fuel economy through
  - Faster heating and recovery times.
  - More energy is recovered from a given amount of fuel.
  - Flame is hotter producing higher stack temperatures.
  - Optimal efficiency with high stack temperatures allow for nozzle reductions.
  - Nozzle reductions mean less fuel is consumed to get the same performance from the heating system while reducing heat loss through the stack.
- Stack temperatures within optimal ranges result in an increase in overall system efficiency.
- Cleaner fuel combustion contributes to longer periods of higher efficiency and less maintenance resulting in significant financial and environmental savings.

Water Point Truck Fill Station

- The Fitch Fuel Catalyst was installed at the Water Point in July 2006.
- Installation of the Catalyst produced an immediate 1% increase in efficiency, which was maintained over a period of 3 months. In addition, an increase in stack temperature of 75 degrees was recorded.
- Water temperature was reduce to 6 degrees to comply with the GN Water Tank maintenance procedures manual.
- Boiler was cleaned end of October.
- Continued high stack temperatures (result of hotter flame due to more complete burn) allowed for a reduction in nozzle size from 4gph to 3gph.
- Boiler efficiency increased to 85.7% (an increase of 8%) and has maintained that efficiency for more than 4 months during the most active months of the year.
- Water consumption was monitored and compared with historical fuel data.
- Water temperature was increased and monitored to verify fuel consumption impact from temperature changes.



Water Point Truck Fill Station
Average Steady State Efficiency
Efficiency
CO (PPM)
87
86
85
84
83
82
81
80
79
78
77
25
20
15
10
5
0
79
79.2
79.8
80
79.8
78.5
85.7
85.7
85.7
07/06/2006
Initial efficiency test
08/06/2006
Installed Fitch
16/06/2006
One week
30/06/2006
Two weeks - Hour meter installed
28/07/2006
Two months and 60 hrs
09/09/2006
One month and 95 hrs
26/10/2006
Two months and 243 hrs - cleaned boiler,
03/11/2006
one week - 276 hrs
17/03/2007
3.5 months - avg 10 hrs/day


Water Point Fuel consumption with Water consumption and Weather (Mean Temperatures) for 2005 to 2007
2004/2005
2005/2006
2006/2007
Installed Fitch Fuel Catalyst
Cleaned Boiler
12800.0
11800.0
10800.0
9800.0
8800.0
7800.0
6800.0
5800.0
4800.0
3800.0
2800.0
1800.0
800.0
-200.0
15
10
5
0
-5
-10
-15
-20
-25
-30
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Oct-06
Nov-06
Dec-06
Jan-07
Feb-07
Mar-07
Apr-07
Fuel (L) per month
Water (1000 L) Consumption
Mean Temperature

Water Point Analysis

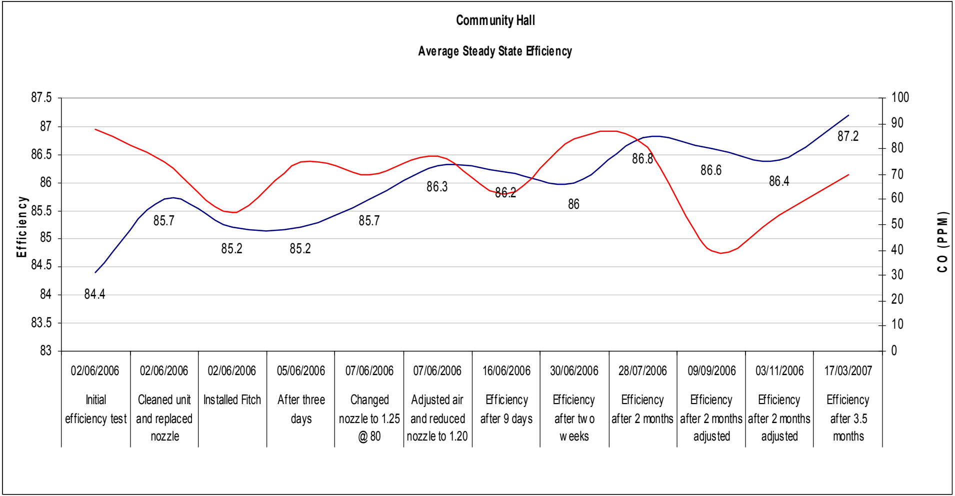
- During the period between March and June 2006 an excess amount of fuel was consumed (34,600 liters) during a time when the fuel normally would have decreased. In 2004 and again in 2005 the consumption was only 16,000 liters each year during the same period. A HVAC controls professional should be contracted to verify that temperature controls and sensors are operating properly.
- Water temperature was decreased when the Fitch was installed, however fuel savings were minimal until the cleaning and subsequent reduction in the nozzle size.
  - 2005 consumption pre Fitch for July to Oct was 6600 compared to 2006 Post Fitch of 6500 liters
- Consumption between Oct and April 2004 and 2005 was 33,100 liters and 45,500 liters compared to Post Fitch 2006 during that period of 29,300 liters. Using the 2004 data this a savings of 3,000 liters for 7 months of operation (a savings of 13%).
- Most of the savings are a result of the nozzle reduction, which was made possible by the fresher fuel being provided by the Fitch Fuel Catalyst and by the increase in overall system efficiency.
- The efficiency increase is a result of the cleaning, which also allowed the cleaner burning fuel provided by the Fitch to combust even more efficiently.
- The Fitch is also contributing to maintaining the units efficiency allowing for longer periods of high efficiency resulting in longer periods of fuel savings and GHG emission reductions.

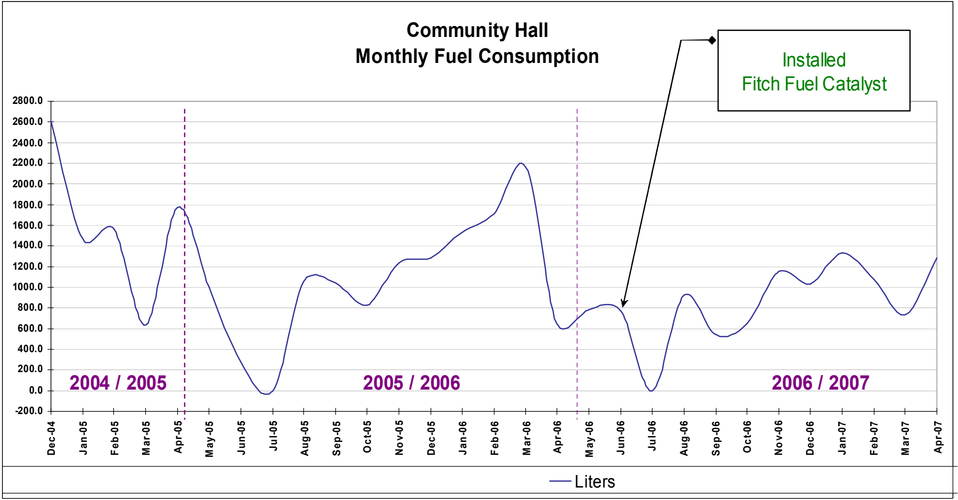
Water Temperature contribution to Fuel Economy

- **Table below shows the effect of changing the water temperature by 3 degrees over a period of two weeks.**
- **Using a baseline of 5 winter months we see that there was negligible impact to fuel consumption from increasing water temperature by 3 degrees.**
- **Last years RT using 4gph nozzle averaged 9 hours per day, average RT now using 3gph nozzle is 10 hours per day.**
- **8% increase in efficiency combined with 25% reduction in nozzle is equal to approximately 30% fuel savings.**
- **Actual fuel savings for last 9 months is approximately 35%, so we will assume the decrease in temperature contributed the additional 5%.**

Water Temperature comparison		Hour Meter	Run time (HRS)	Actual time	
Increased water temp. 3 degrees	3/16/2007 15:30	420			
	3/17/2007 11:30	427	7	20	35%
	3/18/2007 14:00	437.5	10.5	26	40%
	3/20/2007 16:30	458.2	20.7	50.5	41%
	3/23/2007 15:30	482.5	24.3	71	34%
	3/26/2007 15:00	507.9	25.4	71.5	36%
	3/29/2007 15:30	544	36.1	72.5	50%
		AVG daily RT	9.553772071	12.97916667	

Percent Runtime of Actual Time	RT (HRS)	Total time (HRS)	%
Since increase by 3 degrees	124	311.5	40%
10/06 - 03/07 period above	1857	4368	43%
Percent Difference / degree			0%

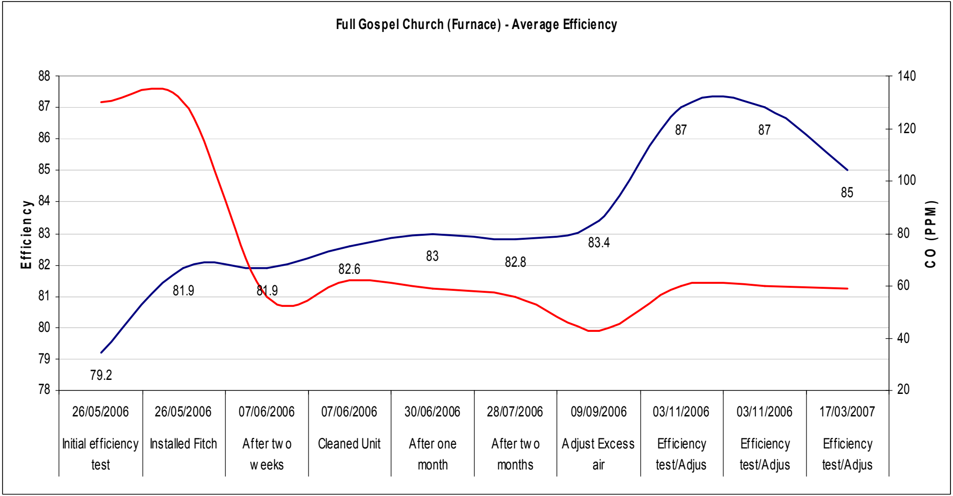

Community Hall
Average Steady State Efficiency
Efficiency
CO (PPM)
87.5
87
86.5
86
85.5
85
84.5
84
83.5
83
100
90
80
70
60
50
40
30
20
10
0
84.4
85.7
85.2
85.2
85.7
86.3
86.2
86
86.8
86.6
86.4
87.2
02/06/2006 Initial efficiency test
02/06/2006 Cleaned unit and replaced nozzle
02/06/2006 Installed Fitch
05/06/2006 After three days
07/06/2006 Changed nozzle to 1.25 @ 80
07/06/2006 Adjusted air and reduced nozzle to 1.20
16/06/2006 Efficiency after 9 days
30/06/2006 Efficiency after two weeks
28/07/2006 Efficiency after 2 months
09/09/2006 Efficiency after 2 months adjusted
03/11/2006 Efficiency after 2 months adjusted
17/03/2007 Efficiency after 3.5 months

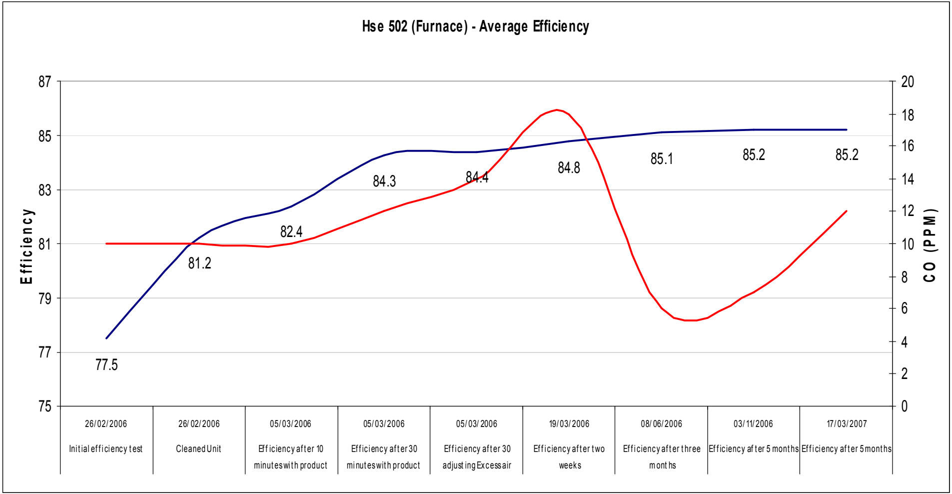


Community Hall
Monthly Fuel Consumption
Installed
Fitch Fuel Catalyst
2800.0
2600.0
2400.0
2200.0
2000.0
1800.0
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
-200.0
2004 / 2005
2005 / 2006
2006 / 2007
Dec-04
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Oct-06
Nov-06
Dec-06
Jan-07
Feb-07
Mar-07
Apr-07
Liters

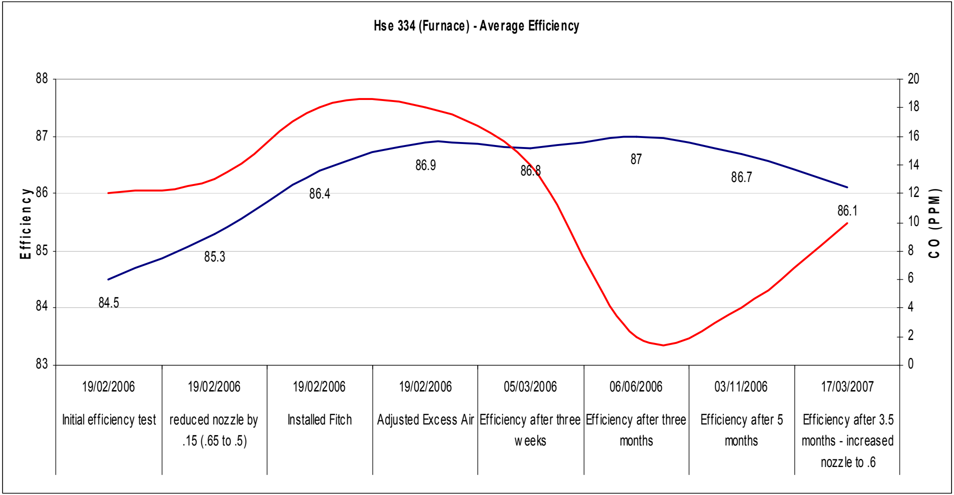
Community Hall Analysis

- During the 2004/5 and 2005/6 years in the months of June to April the Community Hall consumed 10, 500 and 11, 300 liters of fuel respectively. With the Fitch installed in June of 2006 to April of 2007 the Hall consumed 9,300 liters, as reduction of 2,000 liters over last year and 1,000 liters over 2004/5.
- The cleaning at the Community Hall was basic and did not include opening and cleaning out of the boiler pot. Based on what was discovered at the Water Point, the Community Hall and all other boilers would most likely have similar caked on deposits and would benefit even more from a cleaning of that section of the boiler.
- With additional cleaning, the Community Hall would experience even greater savings.


Full Gospel Church (Furnace) - Average Efficiency
Efficiency
CO (PPM)
88
87
86
85
84
83
82
81
80
79
78
140
120
100
80
60
40
20
79.2
81.9
81.9
82.6
83
82.8
83.4
87
87
85
26/05/2006
Initial efficiency test
26/05/2006
Installed Fitch
07/06/2006
After two weeks
07/06/2006
Cleaned Unit
30/06/2006
After one month
28/07/2006
After two months
09/09/2006
Adjust Excess air
03/11/2006
Efficiency test/Adjus
03/11/2006
Efficiency test/Adjus
17/03/2007
Efficiency test/Adjus



Hse 502 (Furnace) - Average Efficiency
Efficiency
CO (PPM)
87
85
83
81
79
77
75
20
18
16
14
12
10
8
6
4
2
0
77.5
81.2
82.4
84.3
84.4
84.8
85.1
85.2
85.2
26/02/2006
Initial efficiency test
26/02/2006
Cleaned Unit
05/03/2006
Efficiency after 10 minutes with product
05/03/2006
Efficiency after 30 minutes with product
05/03/2006
Efficiency after 30 adjusting Excess air
19/03/2006
Efficiency after two weeks
08/06/2006
Efficiency after three months
03/11/2006
Efficiency after 5 months
17/03/2007
Efficiency after 5 months


Hse 334 (Furnace) - Average Efficiency
Efficiency
CO (PPM)
88
87
86
85
84
83
20
18
16
14
12
10
8
6
4
2
0
84.5
85.3
86.4
86.9
86.8
87
86.7
86.1
19/02/2006
Initial efficiency test
19/02/2006
reduced nozzle by .15 (.65 to .5)
19/02/2006
Installed Fitch
19/02/2006
Adjusted Excess Air
05/03/2006
Efficiency after three weeks
06/06/2006
Efficiency after three months
03/11/2006
Efficiency after 5 months
17/03/2007
Efficiency after 3.5 months - increased nozzle to .6

Cape Dorset Building Summary

- Water Point:
  - **Water Point fuel consumption reduced by more than 15,000 liters for Aug-April 2006 compared to Aug-Apr 2005. Approximately 10% of this savings is result of decreasing water temperature from 12 to 6 degrees.**
  - **Installation of Fitch Fuel Catalyst allowed for reduction in nozzle size from 4gph to 3gph and still produced 10% reduction in run time.**
  - **Current Steady State Efficiency increase of 8% has been maintained continuously over 5 month period.**
  - **Savings at Water Point for this year is projected to be greater than $15,000 dollars over last year.**
  - **Savings over Fitch life-cycle for heating applications (5 years), is estimated at approximately $4,000* per year.**
  - **Equivalent GHG emissions reduction of 12 tons per year.**
- Community Hall:
  - **Fuel consumption reduced 2,500 liters for Aug-April 2006 compared to Aug-Apr 2005.**
  - **Installation of Fitch Fuel Catalyst allowed for reduction in nozzle size from 1.25gph to 1.2gph.**
  - **Current Steady State Efficiency increase of 3% has been maintained continuously over 9 month period.**
  - **Savings over Fitch life-cycle for the Community Hall is estimated at approximately $2,000* per year.**
  - **Equivalent GHG emissions reduction of 6 tons per year.**

**** Regular maintenance and related expenses may be required to maintain system efficiency and realize estimated savings.***

Cape Dorset Building Recommendations

- Water Point:
  - **Install Fitch Fuel Catalyst every 5 years.**
  - **Complete system cleaning once per year.**
  - **System Efficiency testing and tuning 3 times per year (once at beginning of each season).**
  - **Replace fuel filter twice per year.**
  - ***Invite a controls expert to come and test temperature controls and sensors.***
- Community Hall:
  - **Install fitch fuel Catalyst every 5 years.**
  - **Complete system cleaning once per year.**
  - **System Efficiency testing and tuning 3 times per year (once at beginning of each season).**
  - **Replace fuel filter twice per year.**
  - ***When all blowers are in use, excess air is drawn into building from stack flue gas draft. This is a health hazard.***
- All Other buildings:
  - **Use above standard guidelines and recommendations for all other buildings to benefit from significant fuel and GHG emissions reductions.**

Cape Dorset Testimonials

- *Matt Jaw:*

  "Hauling loaded Komituk we have to fill-up half way to the soap stone mine. With the Fitch we were able to go ¾ of the way before needing a fill-up. The machine runs smoother and seems to have better torque for hauling."

- *Christina Klazinga:*

  "Daniel and I had the Fitch installed in our furnace in Cape Dorset in early 2006. Originally when I did the calculations to determine if we incurred a saving from the previous year, I was dismayed to find the savings only averaged 5.00 a month. But once I went over the numbers on cost of fuel and amount of fuel used, I was very pleased to find that the savings was much more substantial as the price of fuel had gone from .80/litre in 2005 to .89/litre in 2006 and than up to 1.00/litre by the end of the year. So, even though the cost of the fuel increased by .20/litre we used much less fuel (approx. 367 liters), a savings of approx. 326.00 dollars in one year. We were very pleased with the result."

  Thanks Claude,

  Chris Klazinga and Daniel Essiambre

- *Becky Taukie:*

  "My truck runs much better and I am saving money. I have the Fitch now for my snowmachine also because it really works and I am saving allot of money in gas and my truck is now very quiet and smooth I can't even tell it's running sometimes."

- *Cliff Thoma:*

  "Fitch works great, I am saving allot of fuel and my truck runs much better. I am very happy with the Fitch"