

# Temperature Compensation At the Retail Pump

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# Presentation Outline

- The Problem
- The Solution
- Temperature Compensation Myths

# The Problem

The petroleum industry uses a unique measurement unit throughout the production and distribution processes.

It is the “US Petroleum Gallon”

or, 231 cubic inches, at 60 degrees F.

# The Problem

U.S. petroleum retailers use a different measurement unit in fuel sales.

It is the “US Standard Gallon”.

or, 231 cubic inches... period.

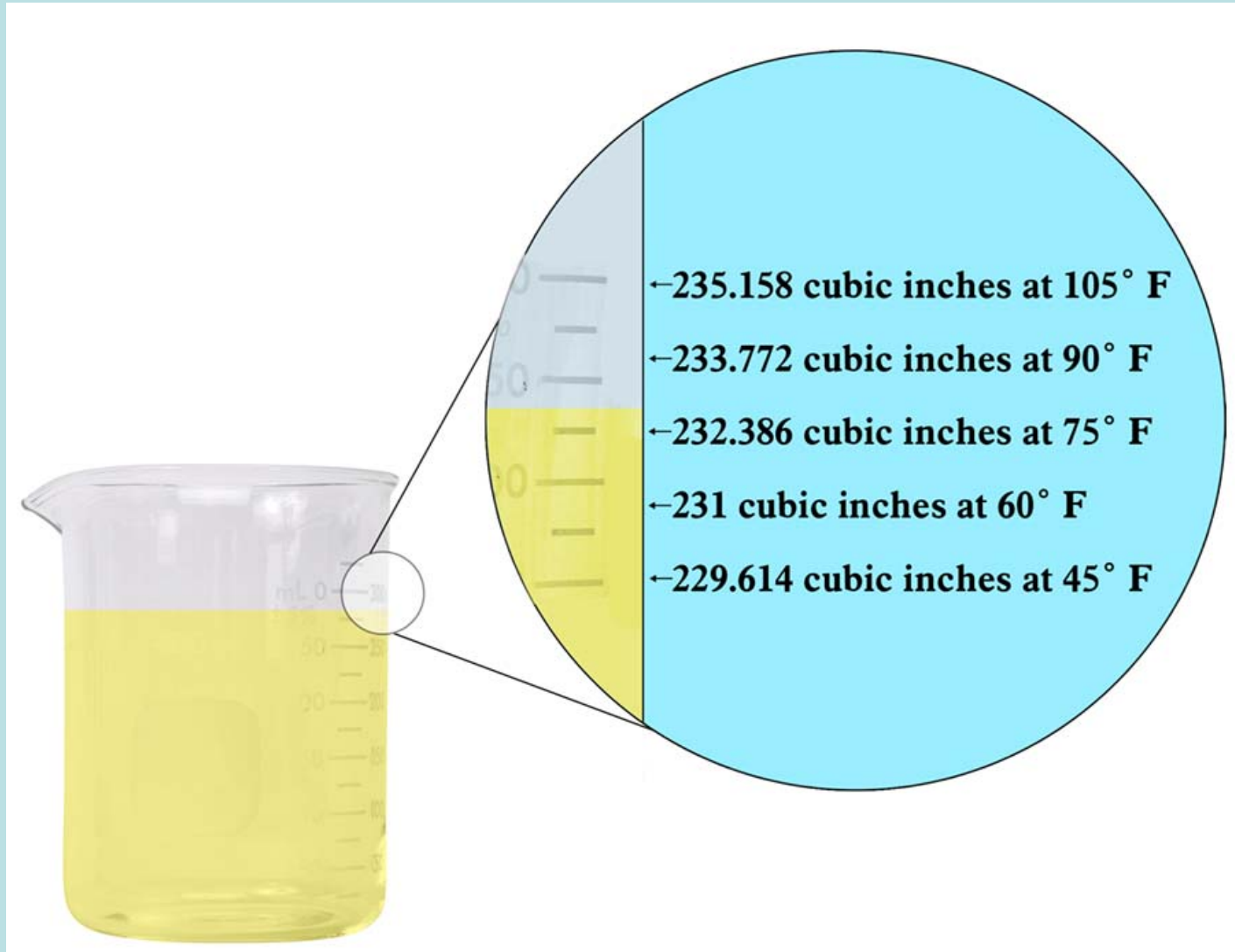
# The Problem

Unlike many other liquids, fuel experiences significant expansion and contraction with temperature change.

Gasoline: 1% per 15 degrees F change

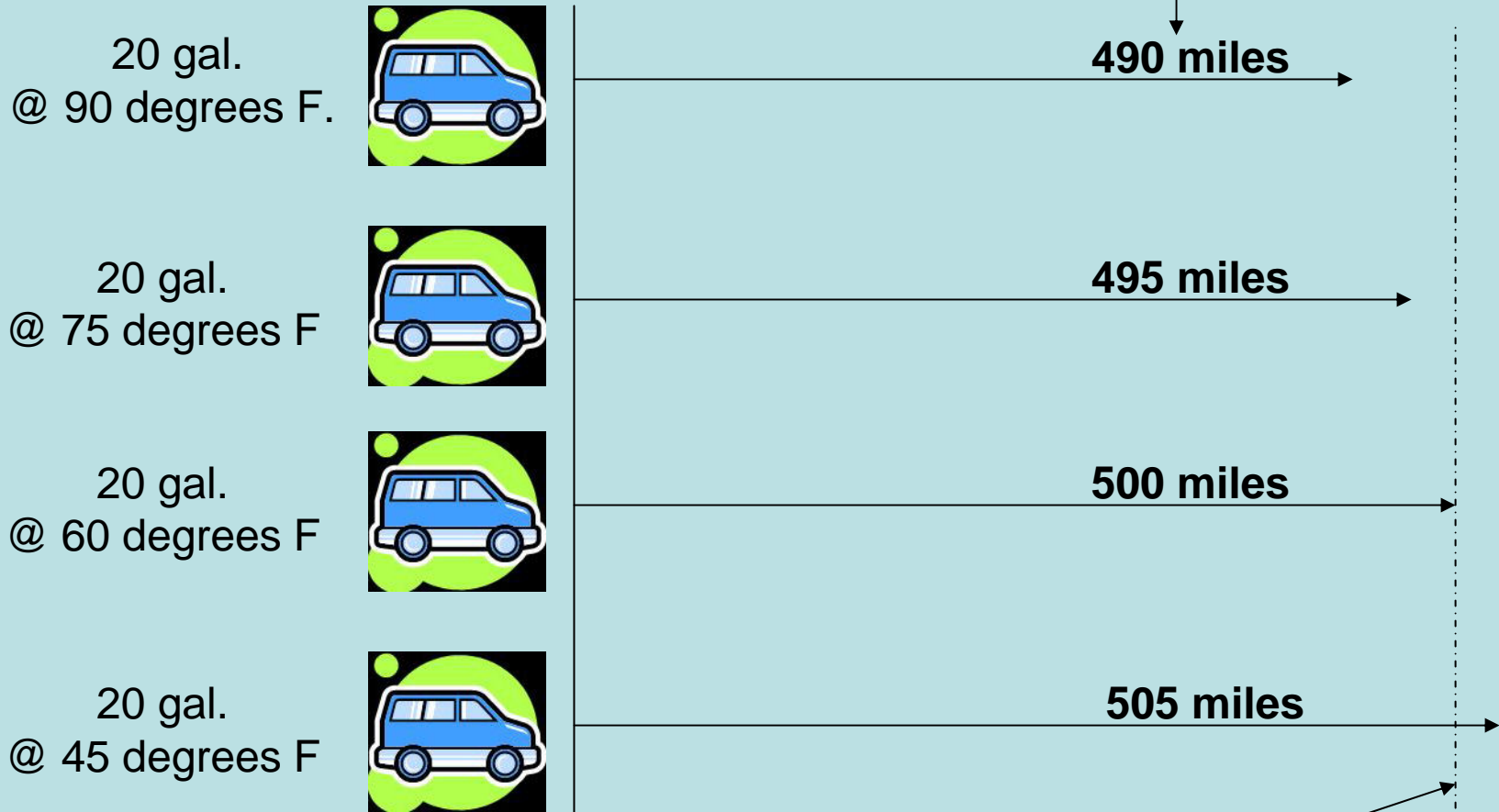
Diesel: .6% per 15 degrees F change

# The Problem



Four Identical Cars: each tank holds 20 gal. gas; each engine gets 25 mpg.

Distance each car traveled on 20 standard US gal.



Distance all four cars would have traveled on 20 gal. of temperature compensated gasoline.



# The Problem

		EFFECT ON RETAIL GAS CONSUMPTION IN MILLIONS OF GALLONS			CONSUMERS' GAIN OR LOSS IN MILLIONS OF DOLLARS				
STATE	AVERAGE FUEL TEMPERATURE				STATE	AVERAGE FUEL TEMPERATURE	EFFECT ON RETAIL GAS CONSUMPTION IN MILLIONS OF GALLONS	CONSUMERS' GAIN OR LOSS IN MILLIONS OF DOLLARS	
Paying an additional \$50 million or more	California	75°	158	-\$509	Paying \$0 to \$10 million more	Hawaii*	86°	2	-\$6
	Texas	78°	143	-\$416		Delaware	64°	1	-\$3
	Florida	82°	122	-\$367		Pennsylvania	60.3°	1	-\$3
	Georgia	72°	41	-\$123		Washington, D.C.	66°	0.7	-\$2
	Arizona	82°	39	-\$115		Idaho	60.5°	0.2	-\$0.6
	Louisiana	77°	28	-\$81					
	North Carolina	69°	25	-\$74	Rhode Island	59.8°	-0.05	\$0.1	
	Alabama	72°	22	-\$63	West Virginia	59.6°	-0.2	\$0.6	
	South Carolina	73°	22	-\$61	Indiana	59.9°	-0.3	\$0.9	
	Tennessee	70°	21	-\$60	Wyoming	55°	-1	\$3	
	Virginia	66°	16	-\$46	Washington	59.5°	-1	\$3	
	Mississippi	74°	16	-\$46	Montana	57°	-0.9	\$3	
	Arkansas	71°	11	-\$32	New Hampshire	58°	-1	\$4	
	Nevada	75°	10	-\$31	Vermont	54°	-1.4	\$4	
	Oklahoma	69°	11	-\$31	Alaska	47°	-2	\$7	
	New Jersey	63°	8	-\$22	Massachusetts	59°	-2	\$7	
	Maryland	64°	7	-\$22	Maine	55°	-2.5	\$7	
	New Mexico	69°	6	-\$17	Connecticut	59°	-3	\$8	
	Missouri	62°	5	-\$15	Nebraska	54°	-3	\$10	
Kentucky	63°	5	-\$14	Iowa	57°	-4	\$11		
Kansas	65°	4	-\$12	Ohio	59°	-4	\$12		
Oregon	63°	3.5	-\$10	Illinois	57°	-9	\$29		
New York	61°	3	-\$9	Wisconsin	55°	-9.3	\$29		
Utah	63°	3	-\$7	Michigan	57°	-10	\$29		
Colorado	62°	2	-\$7	Minnesota	53°	-13	\$37		

\* Hawaii sells a larger gallon based on the assumption of an 80 degree fuel temperature.

# The Problem

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		AVERAGE FUEL TEMPERATURE						
STATE					STATE			
Paying an additional \$50 million or more	California	75°	158	-\$509	Hawaii*	86°	2	-\$6
	Texas	78°	143	-\$416	Delaware	64°	1	-\$3
	Florida	72°	100	-\$307	Pennsylvania	60°	1	-\$3
	Georgia	72°	92	-\$282	Washington	60°	1	-\$2
	Arizona	82°	39	-\$115	Idaho	60.5°	0.2	-\$0.6
	Louisiana	77°	28	-\$81				
	North Carolina	69°	25	-\$74	Rhode Island	59.8°	-0.05	\$0.1
	Alabama	72°	22	-\$67	Virginia	60°	-0.2	\$0.6
	South Carolina	73°	22	-\$67	Indiana	59.5°	-0.3	\$0.9
	Tennessee	70°	21	-\$60	Wyoming	55°	-1	\$3
Paying \$10 million to \$50 million more	Virginia	66°	16	-\$46	Washington	59.5°	-1	\$3
	Mississippi	77°	15	-\$42	Delaware	64°	-1	\$3
	Arkansas	73°	15	-\$42	Connecticut	59°	-1	\$4
	Nevada	75°	10	-\$31	Massachusetts	59°	-1	\$4
	Oklahoma	69°	11	-\$31	Vermont	54°	-1.4	\$4
	New Jersey	67°	9	-\$27	Alaska	47°	-2	\$7
	Maryland	66°	9	-\$27	Maine	50°	-2	\$7
	New Mexico	69°	8	-\$24	Minnesota	53°	-2.5	\$7
	Missouri	62°	5	-\$15	Colorado	59°	-3	\$8
	Kentucky	63°	5	-\$14	Nebraska	54°	-3	\$10
Paying \$5 million to \$10 million less	Kansas	61°	4	-\$11	Iowa	57°	-4	\$11
	Oregon	61°	3.5	-\$10	Illinois	59°	-4	\$12
	New York	61°	3	-\$9	Ohio	57°	-9	\$29
	Utah	63°	3	-\$7	Wisconsin	55°	-9.3	\$29
	Colorado	62°	2	-\$7	Michigan	57°	-10	\$29
					Minnesota	53°	-13	\$37

Hawaii sells a larger gallon based on the assumption of an 80 degree fuel temperature.

Sources: Tank temperatures from National Institute of Standards and Technology. The effect on retail gas consumption was calculated using information from National Institute of Standards and Technology and Energy Information Administration. Cost in dollars calculated using AAA average cost of regular gas for each state on July 31, 2006.

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**Consumer losses in warm states are ten times larger than consumer gains in cool states.**

# The Problem

		EFFECT ON RETAIL GAS CONSUMPTION IN MILLIONS OF GALLONS			CONSUMERS' GAIN OR LOSS IN MILLIONS OF DOLLARS				
STATE		AVERAGE FUEL TEMPERATURE	EFFECT ON RETAIL GAS CONSUMPTION IN MILLIONS OF GALLONS	CONSUMERS' GAIN OR LOSS IN MILLIONS OF DOLLARS	STATE		AVERAGE FUEL TEMPERATURE	EFFECT ON RETAIL GAS CONSUMPTION IN MILLIONS OF GALLONS	CONSUMERS' GAIN OR LOSS IN MILLIONS OF DOLLARS
Paying an additional \$50 million or more	California	75°	158	-\$509	Paying \$0 to \$10 million more	Hawaii*	86°	2	-\$6
	Texas	78°	143	-\$416		Delaware	64°	1	-\$3
	Florida	79°	121	-\$363		Pennsylvania	60°	1	-\$2
	Georgia	72°	100	-\$300		Washington	60°	1	-\$2
	Arizona	82°	39	-\$115		Idaho	60.5°	0.2	-\$0.6
	Louisiana	77°	28	-\$81		Rhode Island	59.88°	-0.0	\$0.1
	North Carolina	69°	25	-\$74		West Virginia	59.5°	-0.2	\$0.6
	Alabama	72°	22	-\$66		Indiana	59.5°	-0.3	\$0.9
	South Carolina	73°	22	-\$66		Wyoming	55°	-1	\$3
	Tennessee	70°	21	-\$60		Washington	59.5°	-1	\$3
Paying \$10 million to \$50 million more	Virginia	66°	16	-\$46	Montana	55°	-1	\$3	
	Mississippi	70°	14	-\$41	New Hampshire	55°	-1	\$4	
	Arkansas	70°	13	-\$38	Vermont	54°	-1.4	\$4	
	Nevada	75°	10	-\$31	Alaska	47°	-2	\$7	
	Oklahoma	69°	11	-\$31	Massachusetts	59°	-2	\$7	
	New Jersey	67°	9	-\$27	Maine	55°	-2.5	\$7	
	Maryland	67°	9	-\$27	Connecticut	59°	-3	\$8	
	New Mexico	69°	6	-\$17	Nebraska	54°	-3	\$10	
	Missouri	62°	5	-\$15	Iowa	57°	-4	\$11	
	Kentucky	63°	5	-\$14	Ohio	59°	-4	\$12	
Paying \$5 million to \$40 million less	Kansas	65°	4	-\$12	Illinois	57°	-9	\$29	
	Oregon	63°	3.5	-\$10	Wisconsin	55°	-9.3	\$29	
	New York	61°	3	-\$9	Michigan	57°	-10	\$29	
	Utah	63°	3	-\$7	Minnesota	53°	-13	\$37	
	Colorado	62°	2	-\$7					

**Consumer losses in warm states can be \$30 to \$50 a car for gasoline.**

Hawaii sells a larger gallon based on the assumption of an 80 degree fuel temperature.  
 sources: Tank temperatures from National Institute of Standards and Technology. The effect on retail gas consumption was calculated using information from National Institute of Standards and Technology and Energy Information Administration.  
 Cost in dollars calculated using AAA average cost of regular gas for each state on July 31, 2006.  
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	Texas	78°	143	-\$416	Delaware	64°	1	-\$3	
	Florida	72°	100	-\$307	Pennsylvania	63°	1	-\$3	
	Georgia	72°	99	-\$303	Washington	61°	1	-\$2	
	Arizona	82°	39	-\$115	Idaho	60.5°	0.2	-\$0.6	
	Louisiana	77°	28	-\$81	Rhode Island	50.88°	-0.0	\$0.1	
	North Carolina	69°	25	-\$74	West Virginia	50°	-0.2	\$0.6	
	Alabama	72°	22	-\$67	Indiana	59.9°	-0.3	\$0.9	
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	Tennessee	70°	21	-\$60	Washington	59.5°	-1	\$3	
Paying \$10 million to \$50 million more	Virginia	66°	16	-\$46	Colorado	60°	-0.1	\$3	
	Mississippi	76°	16	-\$46	New Hampshire	50°	-1	\$3	
	Arkansas	74°	11	-\$33	Vermont	54°	-1.4	\$4	
	Nevada	75°	10	-\$31	Alaska	47°	-2	\$7	
	Oklahoma	69°	11	-\$31	Alaska	59°	-2	\$7	
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	Utah	63°	3	-\$7	Minnesota	53°	-13	\$37	
	Colorado	62°	2	-\$7					

**Consumer losses in warm states can be \$400 to \$700 per truck for diesel fuel.**

Hawaii sells a larger gallon based on the assumption of an 80 degree fuel temperature.  
 sources: Tank temperatures from National Institute of Standards and Technology. The effect on retail gas consumption was calculated using information from National Institute of Standards and Technology and Energy Information Administration.  
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Arizona	82°	39	-\$115	Washington D.C.	60°	0.7	-\$2
Louisiana	77°	28	-\$81	Idaho	60.5°	0.2	-\$0.6
North Carolina	68°	25	-\$74	Rhode Island	61°	-0.05	\$0.1
Illinois	68°	22	-\$68	West Virginia	60°	0	\$0
South Carolina	75°	22	-\$68	Indiana	59.5°	-0.3	\$0.9
Tennessee	70°	21	-\$60	Wyoming	55°	-1	\$3
Virginia	66°	16	-\$46	Washington	59.5°	-1	\$3
Michigan	64°	16	-\$46	Delaware	64°	1	\$3
Ohio	64°	11	-\$32	Massachusetts	56°	-1	\$4
Nevada	75°	10	-\$31	Vermont	54°	-1.4	\$4
Oklahoma	69°	11	-\$31	Alaska	47°	-2	\$7
New Jersey	63°	9	-\$27	Massachusetts	56°	-2	\$7
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Missouri	62°	5	-\$15	Connecticut	59°	-3	\$8
Kentucky	61°	5	-\$14	Nebraska	54°	-3	\$10
Kansas	61°	5	-\$12	Iowa	57°	-4	\$11
Illinois	68°	22	-\$68	Minnesota	59°	-4	\$12
New York	61°	3	-\$9	Indiana	57°	-9	\$29
Utah	63°	7	-\$21	Wisconsin	55°	-9.3	\$29
Idaho	60.5°	0.2	-\$0.6	Michigan	57°	-10	\$29
Montana	62°	5	-\$15	Minnesota	53°	-13	\$37

**National consumer losses, minus national consumer gains, still equal a net loss of 2.5 billion a year. (at \$3.27 a gal.)**

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Sources: Tank temperatures from National Institute of Standards and Technology. The effect on retail gas consumption was calculated using information from National Institute of Standards and Technology and Energy Information Administration. Cost in dollars calculated using AAA average cost of regular gas for each state on July 31, 2006.

# The Solution

Retrofit retail pumps with temperature compensation kits.

Digital Pump kits: \$1,000 to \$2,000 per pump (1,2 or 3 products)

Mechanical pump kits:  
\$1,875 (single product) to  
\$5,725 (3 products)

(cost figures include \$200 for labor)

# The Solution

Total estimated cost to retrofit the nation's one million retail pumps is approximately \$2 billion.

Not \$25 billion, or even \$4 billion...

# The Solution

I have two words for those who oppose temperature compensation at the retail pump:

Canada...

and

?

# The Solution

I have two words for those who oppose  
temperature compensation at the retail pump:

Canada...

and

**CANADA !!!**

# The Solution

“Canada,” because the oil industry supported temperature compensation at the retail pumps. During the '90s Canada achieved 90% compliance with a voluntary program.

Canadian fuel retailers were on the losing end of the temperature equation, and they were seeking equity in the marketplace.

# Myths About Retail Temperature Compensation

**MYTH:** In-ground tanks keep fuel at 60 degrees F.

**FACT:** Double walled fiberglass tanks tend to keep fuel at the temperature it was delivered... for a long time. Also large vendors turn fuel very rapidly, greatly reducing fuel dwell time in their tanks.

# Myths About Retail Temperature Compensation

**MYTH:** Buy your Fuel in the morning, it's cooler.

**FACT:** That is only true for a 5 gal. can in some farmer's barn. 35,000 gal. tanks do not dramatically change temperature in daily cycles.

# Myths About Retail Temperature Compensation

**MYTH:** Temperature only causes tablespoons of difference in amount of fuel delivered.

**FACT:** A 25 gallon fill-up of 75 degree F. gasoline equates to a loss of nearly one quart. The same fill-up at 90 degrees F equates to nearly a half gallon.

# Myths About Retail Temperature Compensation

**MYTH:** Fuel expands and contracts in a truck's tanks, so what's the problem?

**FACT:** The only point that fuel temperature expansion and contraction have an impact on a trucker's wallet is at the retail pump.

# Myths About Retail Temperature Compensation

**MYTH:** Hot fuel is a political ploy.

**FACT:** Temperature compensation at the retail pump is a universal consumer issue. In a perfect world all politicians would step up to protect their consumer constituents.

# Myths About Retail Temperature Compensation

**MYTH:** Cold winter fuel offsets warm summer fuel. It's a wash.

**FACT:** I simply refer you back to the previous map and chart...

# Myths About Retail Temperature Compensation

**MYTH:** With temperature compensation, the consumer will rarely receive an actual gallon of fuel.

**FACT:** This is meant to scare consumers. Consumers will receive equivalent BTUs per gallon with temperature compensation, and can shop by price.

# Myths About Retail Temperature Compensation

MYTH: Since fuels and fuel blends have different BTU values, and there are seasonal differences, temperature compensation cannot deliver the same BTUs every fill-up.

FACT: This is an apples and oranges argument. On any given intersection, consumers will be able to shop, by price, for the **same labeled** product, knowing all the gallons have equivalent BTU values.

# Myths About Retail Temperature Compensation

**MYTH:** 90% of fuel retailers are small mom and pop operations.

**FACT:** Several large oil production companies and refiners own 25% of the stations that sell their brand fuel.

# Myths About Retail Temperature Compensation

**MYTH:** The cost to retro-fit the pumps will far outweigh the benefit to the consumers.

**FACT:** The one-time cost to retro-fit retail pumps is very close to the extra amount consumers already pay annually for hot fuel.

# Myths About Retail Temperature Compensation

**MYTH:** The cost of retro-fitting the pumps will raise the price of fuel for all consumers.

**FACT:** This is an attempt to scare consumers. Consumers have borne the burden of hot fuel sales for decades. Once the problem is fixed they will reap the benefits for future decades.

# Temperature Compensation Conclusion

**The Problem: Not using the US Petroleum Gallon to the very end of the distribution chain, the retail pump.**

**The Solution: Retro-fitting retail pumps with temperature compensating kits.**

**The Myths: There is a lot of mis-information being disseminated in an attempt to confuse consumers.**

# Temperature Compensation Conclusion

U.S. consumers are becoming much more knowledgeable about issues surrounding temperature compensation at the retail pump due to ever increasing media coverage.

So are state legislators and state attorneys general.

# Media Outlets Featuring Hot Fuel Articles/Features

- Kansas City Star
- Reuters
- NPR Marketplace
- CNBC
- Miami Herald
- Land Line Magazine
- Traffic World
- New York Times
- NBC Miami Chan. 6
- Transport Topics
- Charlotte Observer
- e-trucker.com
- Fleet Owner
- The Trucker

# Temperature Compensation Conclusion

This power point presentation is available for  
download at:

[ooida.com](http://ooida.com)

Thank you !