



TriPac

**Auxiliary Heating/Cooling
Temperature Management System**



TriPac

The Need for an APU

- **Fuel prices** continue to rise and are a significant portion of the operating cost for a fleet.
- **Anti-idle laws** that prohibit truck idling are growing in coverage and enforcement
- **Idling is done to keep drivers comfortable**, engines warm, and batteries charged.
- **Idling has a significant cost** – fuel, engine wear and maintenance.

The Idling Issue

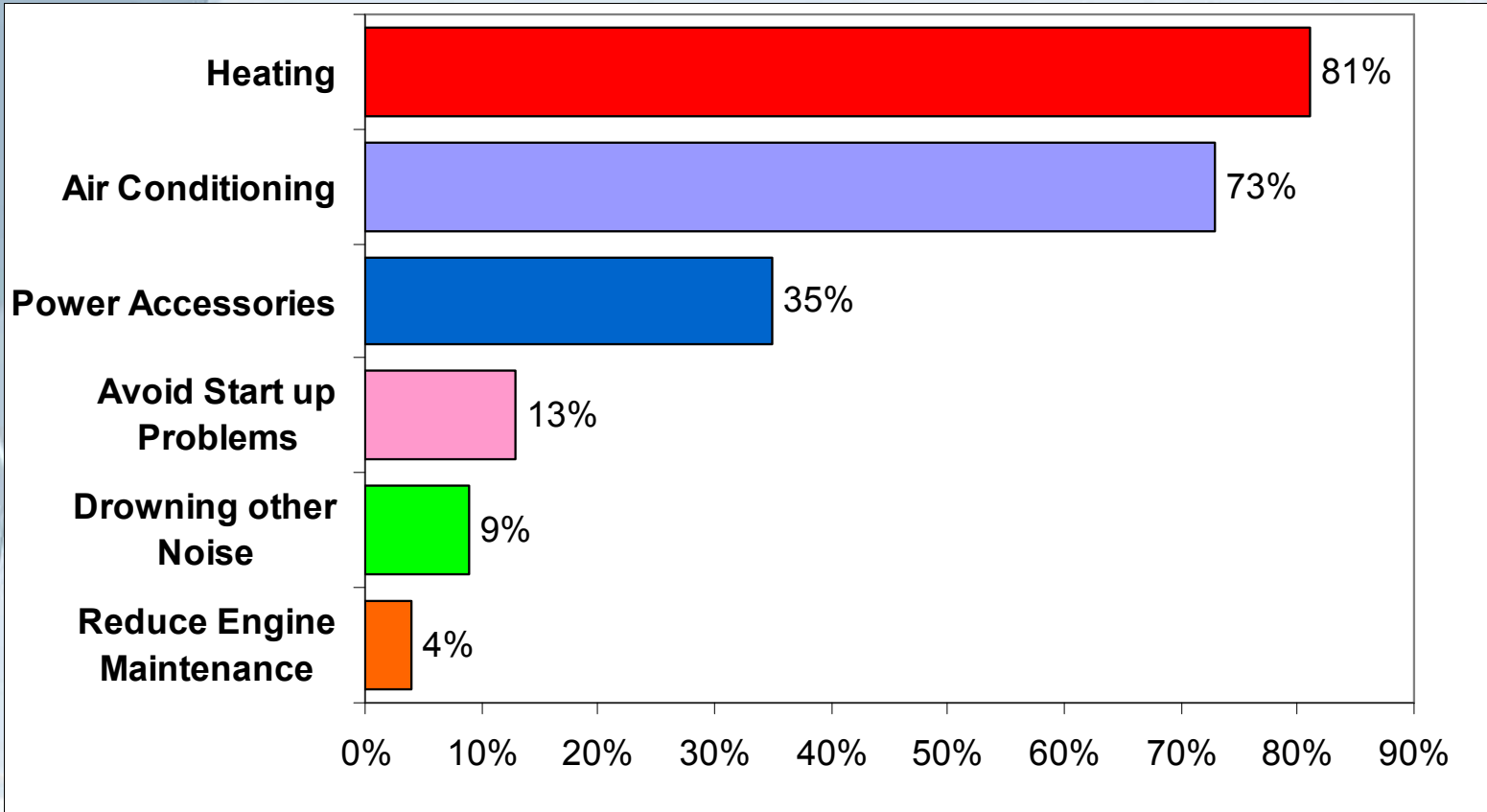
- There are approximately **2.3 million** diesel trucks in the U.S.*
- **600,000** are equipped with sleeper cabs*
- Drivers traditionally idle engines at rest
- A typical “over the road” tractor will idle approximately **2400** hours a year
- Estimated that idling burns **5%** of all fuel in U.S.
- **1.2 billion gallons** of fuel per year are consumed by idling

* **Source:** U.S. Census Bureau, 2002 Economic Census

Why Do Truck Drivers Idle?

1. To manage temperature in sleeper
2. To keep batteries charged
3. To warm engine for easy startups
4. To provide hotel power in sleeper
5. Out of Habit

Reasons For Idling: A Graphical View



Source: "Heavy-Duty Truck Idling Characteristics",
Results from a Nationwide Truck Survey, UC Davis

Why is Idling a Problem?

1. Environmental

- Emissions, health Impact

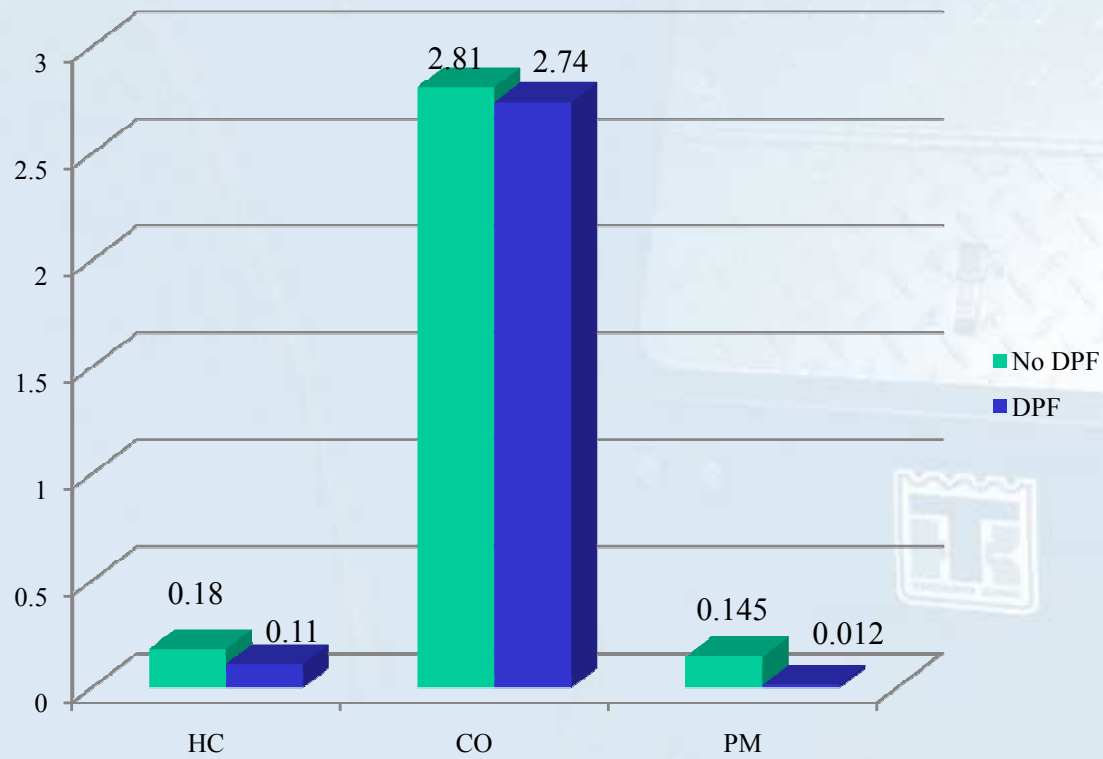
2. Financial

- Maintenance Costs (wear and tear of tractor unit)
- Fuel consumption

Green is in -

- Almost all companies, large to small; are positioning themselves as environmentally conscious.
- APU's (TriPac) supports our customers green efforts.
- A non-DPF equipped TriPac is more than 50% cleaner than a low NOX tractor engine

DPF Reduced Emissions



2009 – A Changing Environment?

ATRI Top 10 Critical Issues to Industry

	2008	2007	2006	2005
1	Fuel Costs	Hours of Service	Driver Shortage	Fuel Costs
2	Economy	Driver Shortage	Fuel Issues	Driver Shortage
3	Driver Shortage / Retention	Fuel Issues	Driver Retention	Issuance Costs
4	Government Regulations	Congestion	Hours of Service	Hours of Service
5	Hours of Service	Government Regulation	Congestion	Tolls / Highway Funding
6	Congestion	Tolls / Highway Funding	Government Regulation	Tort Reform
7	Tolls / Highway Funding	Tort Reform	Highway Infrastructure	Government Regulation
8	Environmental Issues	Truck Driver Training	Tort Reform	Congestion
9	Tort Reform	Environmental Issues	Tolls / Highway Funding	Environmental Issues
10	Onboard Truck Technology	Onboard Truck Technology	Environmental Issues	Truck Security

Health Costs of Idling

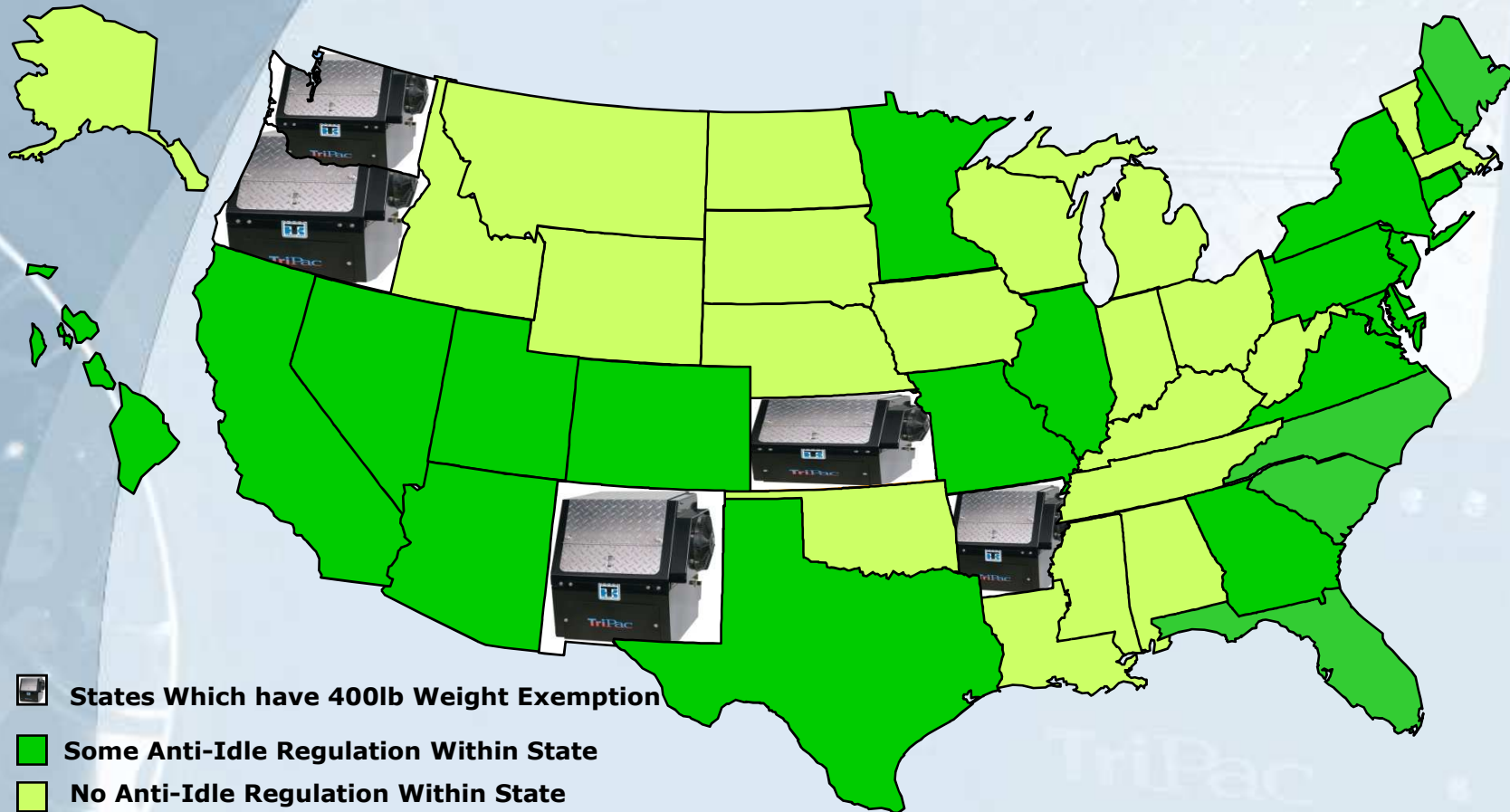
- Particulate matter contributes to over **15,000** premature deaths a year
- One gallon of diesel fuel produces 8.35 pounds of Green House Gases (GHG's)
 - An hour of idling produces **10.44 pounds** of GHG's
 - A years worth of idling (estimated 2,400 hours) produces over **12.5 tons** of GHGs
- **60%** of all vehicle particulate matter in the air comes from heavy duty diesels
- Air pollution alone costs the state of CA **\$6 billion** a year in associated health costs

Source: <http://www.epa.gov/ARD-R5/naaqs/pm.htm>

Anti-Idling Legislation

- CARB workshop (June 4, 2003) announced that California aims to ban all truck idling by 2007
- 21 states and thousands of municipalities regulate truckers with anti-idling laws
- Current regulations limit idling from 0 to 15 minutes
- Fines range from warnings to \$50,000 or jail time

Anti-Idle Regulations and Weight Exemption by State



The Financial Costs of Idling

- Average Class 8 trucks idle 8 hrs/day, 300 days/yr or 2400 hrs per truck per year
- Fuel consumption during idling ranges between .8 – 1.5 gal/hr
- Estimate average diesel price per gallon \$2.50

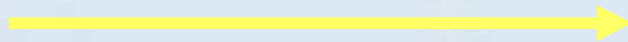
2400 hrs (.8 gal/hr) at \$2.50/gal
= \$4,800 idling cost per year*

* Subject to change as a result of varying fuel prices

Hidden Financial Costs of Idling

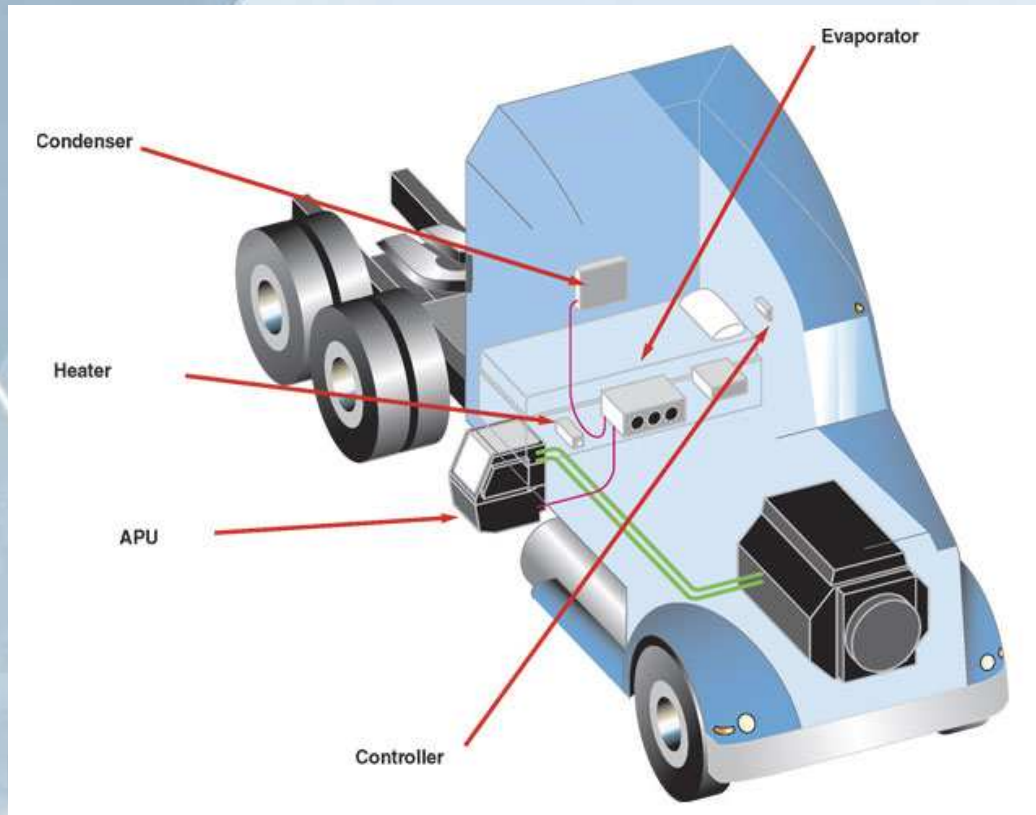
Take a look at what idling will cost you in maintenance.

Also, consider the **wear and tear** idling will cost you and your unit!



Annual Maintenance Cost of Idling	
(1) hour of idling equals how many	50
Tractor oil change interval	15,000
Cost per oil change	\$150
Average truck speed	50 mph
Engine wear "idle miles"	150000
Total engine wear miles	250000
Percent "idle miles"	60%
Number oil changes per year	6.67
Total engine wear miles per change	37500
Cost of "idle time" oil changes	\$600.00
Total engine maintenance cost	\$1,000.00

What is an Integrated APU ?



An integrated APU can provide functionality normally supplied by idling main engine, through single user interface (common control system).

Integrated APUs can be automatically-enabled by tractor engine shut-down.

TriPac

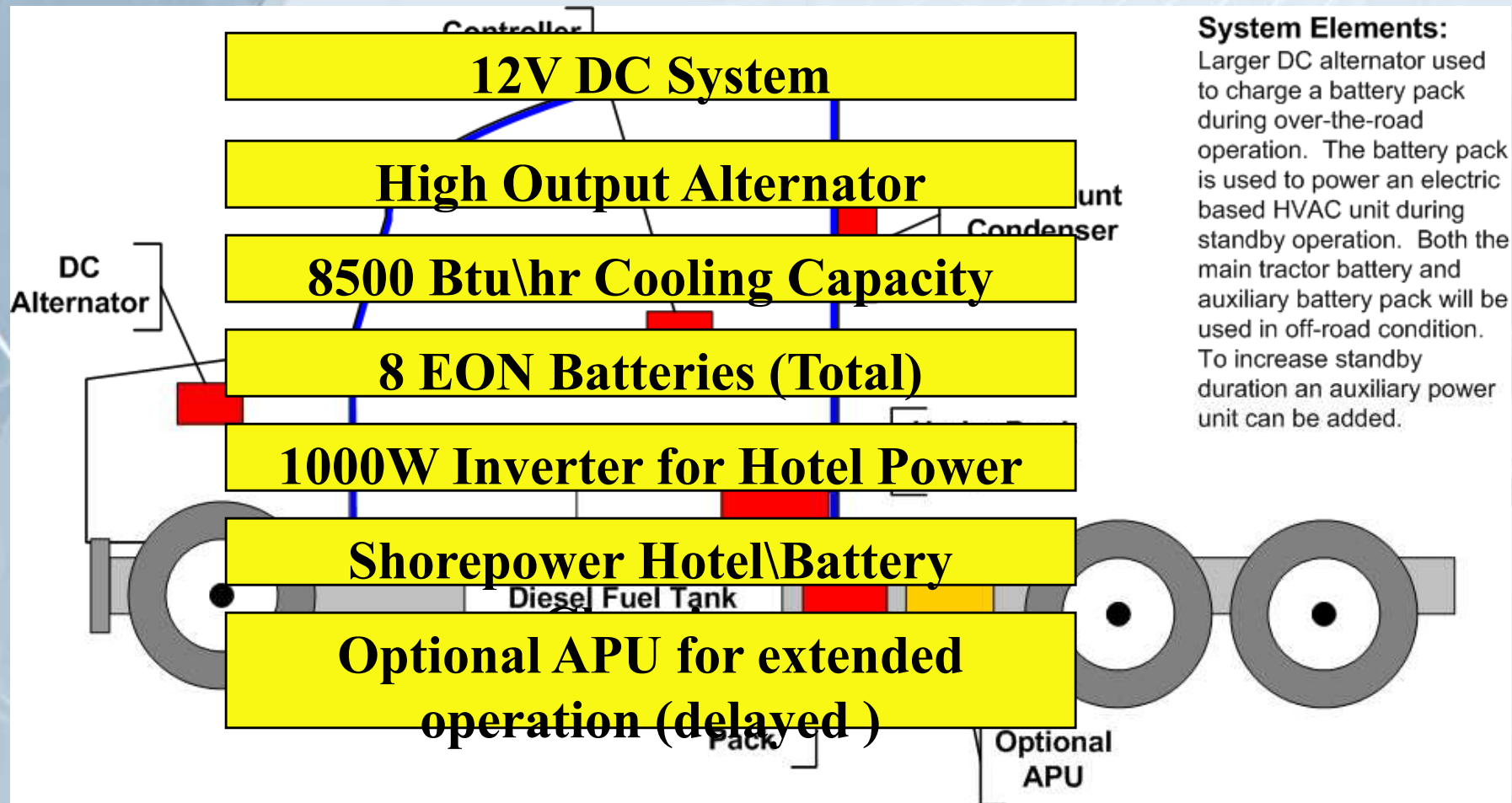
Why Buy an Integrated APU ?

- **Lower overall cost of ownership**
 - Lower diesel fuel consumption (APU versus tractor engine).
 - Reduced truck engine maintenance (reduced idle miles).
- **Driver retention**
 - Truck cab sleeper compartment climate control and electric power.
- **Improve overall system reliability**
 - Providing truck engine preheating
 - Provide truck battery charging
- **Better for the environment**
 - Less fuel and emissions

What's New and Coming

- Next Generation System
 - Electrical based system
 - Exceed by 2-3X the actual cooling capacity of any system on the market today
 - 8500 BTU's cooling
 - Exploring various heating options
 - Electrical and new fuel fired heaters will be investigated
 - Product will perform in keeping with the Thermo King and TriPac reputation

What's New for 2009



System Elements:

Larger DC alternator used to charge a battery pack during over-the-road operation. The battery pack is used to power an electric based HVAC unit during standby operation. Both the main tractor battery and auxiliary battery pack will be used in off-road condition. To increase standby duration an auxiliary power unit can be added.

Engine Vs. Battery Solutions

- Heating
 - Myth - battery solutions are maintenance free
 - Fact - battery based solutions cannot provide a reliable heat source
 - Fueled fire heater is required and it requires maintenance
 - Or – idle, there goes the fuel savings
- Cooling
 - Myth - The systems on the market today have sufficient cooling capacity of around 8000 BTU's
 - Fact - Claimed performance and realized performance are two different things
 - Our testing shows systems with less than 5000 BTU's of cooling capacity

Legitimate Tools

Making Your Decision Simple.

TriPac Payback Calculator

Each BLUE Cell below can be edited to allow for customization.
If a value is not known, please leave the "average" in place.

TRI-PAC Equipment Cost: **\$8,500.00**

Cost of Operating a Truck with Idle Time	
Section 1: Annual Fuel Cost of Idling	
Annual miles driven	130000
Price of Fuel per gallon	\$2.30
Gallons per hour idling truck	1.2
Hours idling per day	10
Operating days per year	300
Idling hours per year	3000
Fuel cost per hour idling	\$2.76
Annual fuel cost from idling	\$8,280.00
Section 2: Annual Maintenance Cost of Idling	
(1) hour of idling equals how many miles?	50
Tractor oil change interval	15,000
Cost per oil change	\$150
Average truck speed	50 mph
Engine wear "idle miles"	150000
Total engine wear miles	280000
Percent "idle miles"	54%
Number oil changes per year	8.67
Total engine wear miles per change	32308
Cost of "idle time" oil changes	\$696.43
Total engine maintenance cost	\$1,300.00
Total annual maint. & fuel cost	\$8,976.43

Cost of Operating a TRI PAC Unit		
Section 3: Fuel Cost of the TRI PAC		
	AC	Heat
Percent Heat & Air Conditioning	75%	25%
Percent system is OFF in start/stop	20%	
Total hours system is running	1800	750
Fuel consumption per hour**	0.14	0.04
Fuel cost for Heat and A/C	\$579.60	\$69.00
TOTAL Fuel Cost	\$648.60	
Section 4: Annual Maint. Cost of the TRI PAC Unit		
Shop Rate \$/hr	\$80.00	
Oil Change Interval (hours)	1000	
Oil Filter	\$7.50	
Oil (3 qts)	\$4.50	
Labor hours	1	
Annual Oil Change Cost	\$165.60	
Air Cleaner	\$12.00	
Fuel Filter & Strainer	\$17.00	
Espar Glow Pin Screen	\$4.50	
Labor Hours	3.5	
Annual General Maintenance Cost	\$313.50	
Total annual maint. & fuel cost	\$1,127.70	

Cost Analysis and Payback				
	Idling Tractor	TriPac	Savings	TRI PAC Payback in Months
Annual Fuel Cost	\$8,280.00	\$648.60	\$7,631.40	13.0
Annual Maint Cost	\$696.43	\$479.10	\$217.33	
Total Annual Cost	\$8,976.43	\$1,127.70	\$7,848.73	



ABC Thermo King
1000 TRI PAC Drive
Minneapolis, MN 00111
Contact: Tim Minor
Phone: 205-655-0171
Cell: 205-837-7158

Features
Microprocessor control...simple operation
Truck cab cooling and heating
Automatic truck battery charging
Truck engine pre-heating for easy starts
Noise dampening for quiet operation
Automatic start/stop for max fuel savings
120V power for on board appliances

TRI PAC Benefits
Reduce unnecessary fuel consumption by over 85%
Extend truck engine maintenance intervals
Reduce wear on truck engine

The Thermo King Difference
Unmatched Service Network
Quality Products
Proven Components
Leading Performance

Proven Components
Yanmar 2 CYL. Diesel engine (Tier II)
Thermo King TM-15 AC Compressor
Fuel fired bunk heater
65 AMP, 12V DC Alternator
120V inverter (optional)



TriPac Payback Calculator

It is possible to change the cells highlighted in Blue to Customize the Payback Calculator

APU Payback Analysis for:
Sample Customer

Cost of Operating a Truck with Idle Time	
Annual Fuel Cost of Idling	
Annual miles driven	100000
Price of Fuel per gallon	\$2.85
Gallons per hour idling truck	1.2
Hours idling per day	10
Operating days per year	300
Idling hours per year	3000
Fuel cost per hour idling	\$3.42
Annual fuel cost from idling	\$10,260.00
Annual Maintenance Cost of Idling	
(1) hour of idling equals how many miles?	50
Tractor oil change interval	15,000
Cost per oil change	\$150
Average truck speed	50 mph
Engine wear "idle miles"	150000
Total engine wear miles	250000
Percent "idle miles"	60%
Number oil changes per year	6.67
Total engine wear miles per change	37500
Cost of "idle time" oil changes	\$600.00
Total engine maintenance cost	\$1,000.00
Total annual maint. & fuel cost	\$10,860.00

What's the Difference?

Annual Fuel Cost		
Idling Tractor	TRI PAC	Rigmaster
\$10,260.00	\$564.30	\$3,078.00

Annual Oil Change and Maintenance Cost		
Idling Tractor	TRI PAC	Rigmaster
\$600.00	\$423.90	\$679.00

Total Annual Fuel and Operating Cost		
Idling Tractor	TRI PAC	Rigmaster
\$10,860.00	\$988.20	\$3,757.00

Savings	
TRI PAC	Rigmaster
\$9,871.80	\$7,103.00

TRI PAC Payback in Months
10.3

Rigmaster Payback in Months
13.3

Cost of Operating a TRI PAC Unit		
Fuel Cost of the TRI PAC		
	AC	Heat
Percent Heat & Air Conditioning	50%	50%
Percent system is OFF in start/stop	20%	50%
Total hours system is running	1200	750
Fuel consumption per hour**	0.14	0.04
Fuel cost for Heat and A/C	\$478.80	\$85.50
TOTAL Fuel Cost	\$564.30	
Annual Maintenance Cost of the TRI PAC Unit		
Shop Rate \$/hr	\$80.00	
Oil Change Interval (hours)	1000	
Oil Filter	\$7.50	
Oil (3 qts)	\$4.50	
Labor hours	1	
Annual Oil Change Cost	\$110.40	
Air Cleaner	\$12.00	
Fuel Filter & Strainer	\$17.00	
Espar Glow Pin Screen	\$4.50	
Labor Hours	3.5	
Annual Maintenance Cost	\$313.50	
Total annual maint. & fuel cost	\$988.20	

Cost of Operating the Rigmaster Unit

Fuel Cost of the Rigmaster Unit		
	AC	Heat
Percent Heat & Air Conditioning	50%	50%
Percent system is OFF in start/stop	0	0
Total hours system is running	1500	1500
Fuel consumption per hour**	.363	.357
Fuel cost for Heat and A/C	\$1,951.83	\$1,526.18
TOTAL Fuel Cost	\$3,078.00	
Annual Maintenance Cost of the Rigmaster Unit		
Shop Rate \$/hr	\$80.00	
Oil Change Interval (hours)	400	
Oil Filter	\$7.50	
Oil (3 qts)	\$4.50	
Labor hours	1	
Annual Oil Change Cost	\$345.00	
Air Cleaner	\$12.00	
Fuel Filter & Strainer	\$17.00	
Fan and Generator Belts	\$65.00	
Labor Hours	3	
Annual Maintenance Cost	\$334.00	
Total annual maint. & fuel cost	\$3,757.00	

Long Term Operating Cost Differences

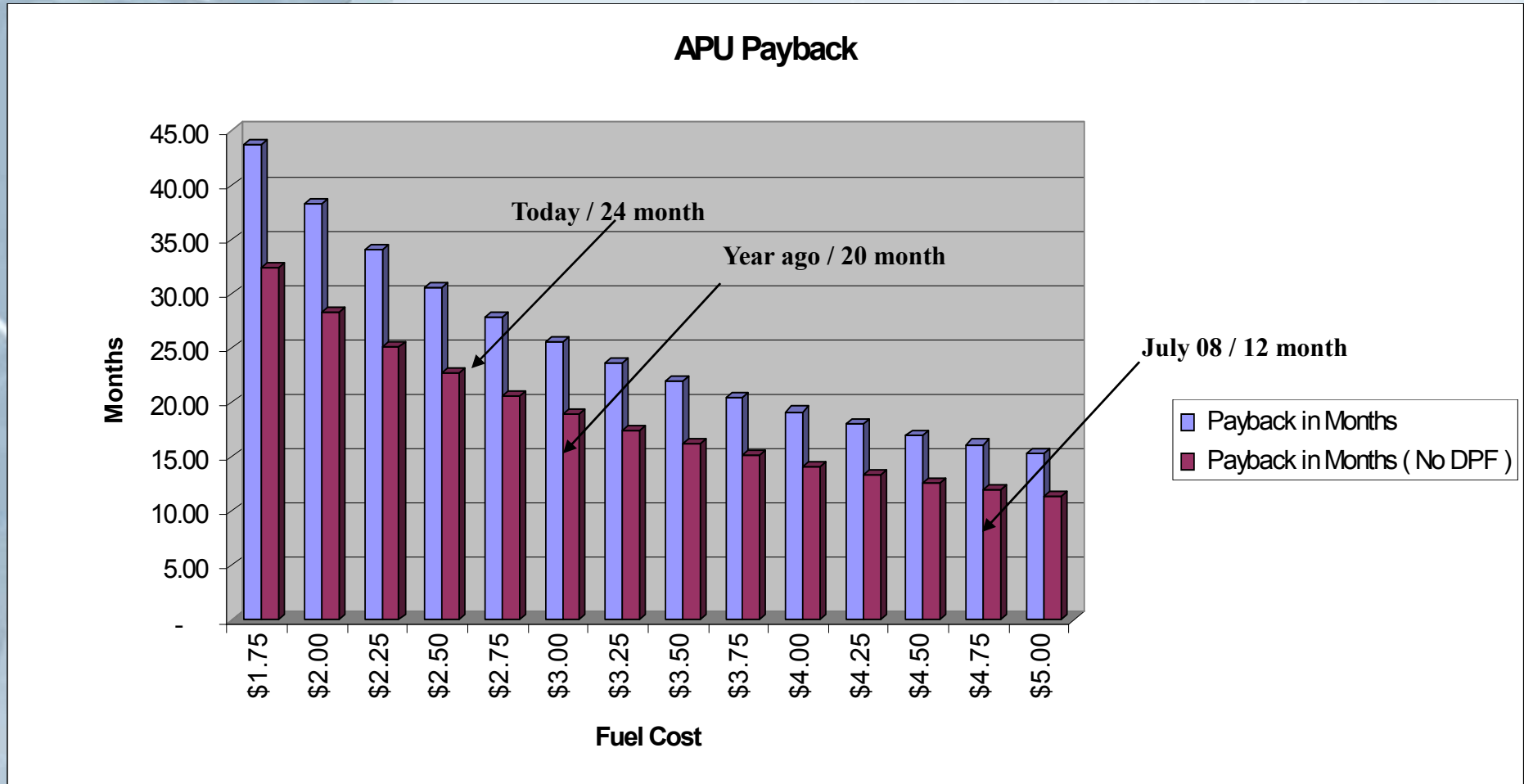
(For reference only...assumes fuel and parts cost remain the same as in year 1)

3 Years		
Total Annual Fuel and Operating Cost	TRI PAC	Rigmaster
\$32,580.00	\$2,964.60	\$11,271.00

5 years		
Total Annual Fuel and Operating Cost	TRI PAC	Rigmaster
\$54,300.00	\$4,941.00	\$18,785.00

2009 Market Drivers

Fuel Costs



Assumptions: 2250 idle hours annually, 1.0 gal per hour tractor idle, \$8500 APU Cost, \$3000 DPF Cost, 2/10 Gal hr usage for APU

**APU
Equipped**

