



***Petroleum Displacement Reporting
North Carolina State Vehicle Fleet
DRAFT report view***

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Petroleum Displacement Plan

- ~ Who is involved?**
- ~ What is the PDP?**
- ~ How did NC measure up to PDP goals?**
- ~ A few standout accomplishments**
- ~What needs to happen next?**
- ~ What else could we do?**



Who are we? NC Solar Center

- Part of the College of Engineering at NC State University,
- grant /contract/state appropriated funding
- Created in 1988 & serves as clearinghouse for information, training, technical assistance deployment, demonstration and applied research
- **Our role in Petroleum Displacement Plan is to measure success and report on that progress to State Energy Office**



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State Petroleum Displacement Plan

Session Law 2005-276

- All State agencies, universities, and community colleges that have State-owned vehicle fleets shall develop and **implement plans to achieve a twenty percent (20%) reduction or displacement of the current petroleum products consumed by January 1, 2010.**
 - The plan shall not impede mission fulfillment of the agency.
 - A State-owned vehicle fleet consists of more than 10 motor vehicles, designed for highway use and titled to the aforementioned entities.
 - Specialty vehicles, that are used for educational or emergency purposes are subject to ten percent (10%) reductions.
 - Agencies shall report annually by September 1st to the Department of Administration (DOA) on the efforts undertaken to achieve the reductions and the DOA shall compile and forward a report to the Joint Legislative Commission on Governmental Operations.



What's new with PDP?

An extension to 2011

- **SECTION 14.14.(b)** Section 19.5(c) of S.L. 2005-276 reads as rewritten:
- Page 154 Session Law 2009-451 SL2009-0451
- "**SECTION 19.5.(c)** Agencies shall report by September 1, 2006, and annually thereafter
- on September 1, through September 1, 2011, to the State Energy Office within the Department of Commerce on the efforts undertaken to achieve the reductions. The Department of Commerce State Energy Office shall compile and forward a report to the Joint Legislative Commission on Governmental Operations by November 1, 2006, and annually thereafter on November 1, through November 1, 2011, on the agencies' progress in meeting their plans."



State PDP Requirements

- The total petroleum use is **26.1** million gallons[^] for FY 2004-2005 baseline year
 - [^]Includes adjustments (equal to the percentage increase in mileage) from ten organizations that justified their expanded fleet use
- The petroleum reduction goal is **4.6** million gallons
 - This is an 17.5% reduction accounting for over 6,000 emergency/educational vehicles that only have to meet a 10% displacement



Statistics so far (9-29-09)

- PDP participants have submitted 35 reports for 2008-09 covering 34 agencies
- 4 have not submitted reports:
 - NC School of the Arts
 - NC State Ports Authority
 - UNC Wilmington
 - Wilson Community College



State Vehicles in the '08-'09 PDP count

- Current total = 28,635

- Fleet increases since FY 04-05
 - FFVs: 2,204
 - Diesels: 631
 - Elec: 148
 - Hybrid: 57

Vehicle Types	FY 2004-05 Baseline yr	FY 2008-09	
	#	#	% change
Gasoline	10,816	9,957	-8%
Hybrid	78	135	73%
Flex-fueled Vehicles	4,752	6,956	46%
Comp Natural Gas	14	9	-36%
Diesel	4,498	5,129	14%
Propane	192	145	-24%
Emergency/Ed (10%)	6,007	6,143	2%
Electric	13	161	1138%
Total	26,370	28635	5%



Success!!

So why don't we feel better about it?

- Total petroleum use in FY 2007-08 was 21.3 MGs- we have exceeded the reduction goal ahead of time. We displaced 4.9 MG, reached -18.64% reduction, - 17.5% was the goal. Preliminary look at the numbers:
 - ✓ Fleet size is up 5% yet mileage is down by 3.1%
 - ✓ 3.5 % was displaced through E10 use
 - ✓ 4.3 % was displaced through biodiesel use
 - ✓ CNG and propane were not significant
 - ✓ Only 0.1% was displaced through E85 use, so far.
 - ✓ 4.12% *may* have been conservation and efficiency
 - ✓ Can we attribute 6.62% to the ECONOMY ?

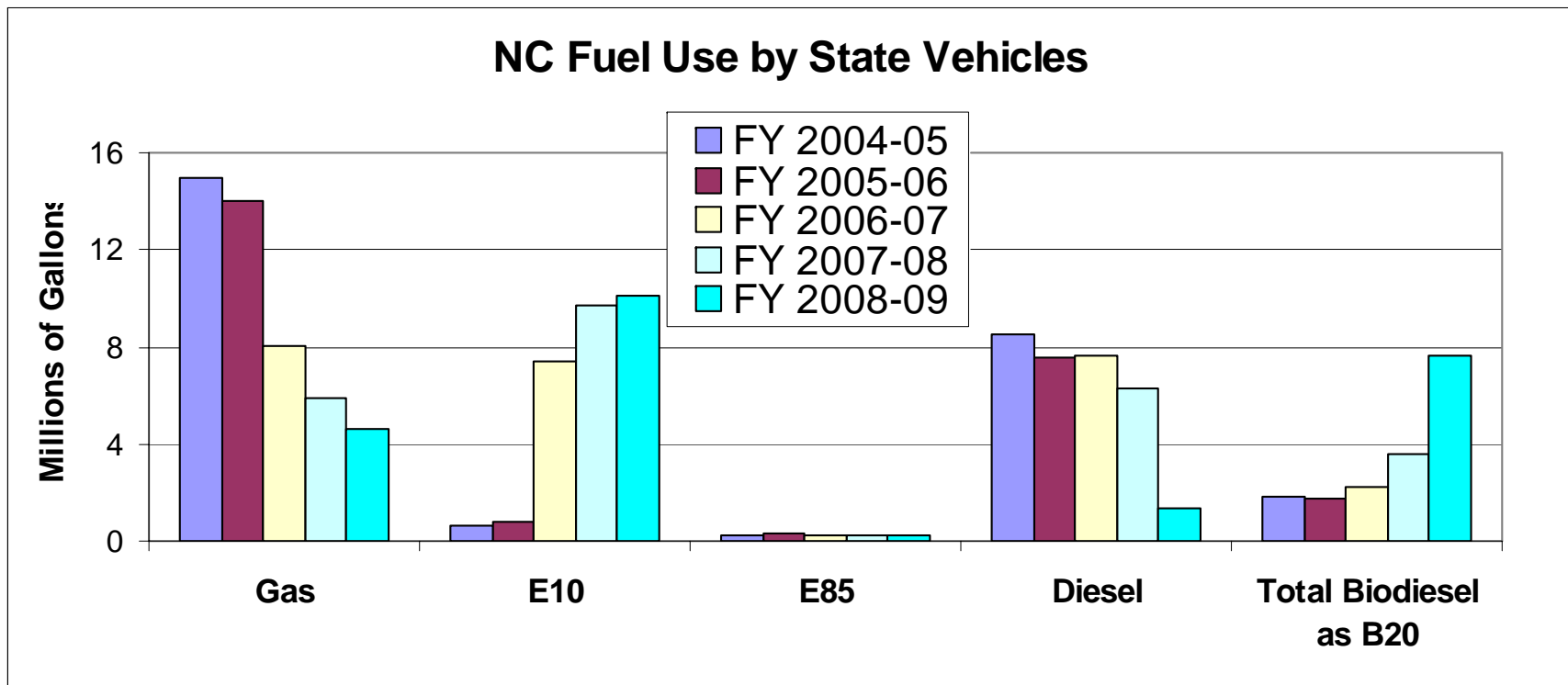


Reduction in Miles

- State budget cuts= deep mileage cuts
- Miles down by 3.1%, a PDP record
- Combining trips
- Carpooling
- Adjusting routes
- Video and tele-conferencing (webinars)
- Public Transit
- Biking or Walking
- Staffing Adjustments



Biofuels replace Petro-fuel





Biofuel Price Trend

Price Difference	Start of FY '09-'09	End of FY '08-'09	Highest	Lowest	Trend?
Gas vs. E10	Gas costs 2.6% more than E10	E10 is ½% more than Gas- almost neutral choice	Nov'08 E10 cost \$.276 more/gal than gas	May'09 E10 costs \$.12 less/ gal. than gas	Close to neutral- E10 almost the same as gas
Gas vs. E85	Gas costs 14.6% more than E85	E85 costs 6% more than Gas	Sept '08 E85 is \$.90/ gal less than gas	Dec '08 E85 cost \$.50/gal more than gas	Hard to say- 6 mth avgs hint at E85 costing less
ULSD vs. B20	B20 costs 5.6% more than ULSD	B20 is almost 17% more than ULSD	Oct '08 B20 cost \$.90/gal more than ULSD	July '08 B20 is \$.08/gal less than ULSD	B20 costs more



Success not equal to size

- Top ten fleets influence goal achievement and 3 have surpassed it, 3 more are closing in.
- the top 5 account for 90% of use.
- Small, medium, large-successes and failures
- Steady progress beats playing “catch-up”
- Embracing change is the key

agency	2008-09 PDP achieved	PDP goal by 2010
D.O.T	-27%	Goal: -20%
MFM	-8%	-19%
CC & PS	-7%	-10%
Corrections	-19%	-11%
DENR	-20%	-13%



Conservation



- Elimination of unnecessary idling
- Lower speeds and slower accelerations
- Using overdrive gears and cruise control
- Removing excess weight
- Proper maintenance
 - Regular oil changes with correct oils
 - Frequently changing air filters
 - Correctly inflated tires
 - Reporting of decreased performance





Efficiency

- Purchasing more efficient conventional vehicles
 - Cars & vans typically get better mpg than SUVs or trucks
 - Smaller engines (6 instead of 8, 4 instead of 6 cylinder) save fuel
- Choosing the proper vehicle for the task
 - Depending on number of passengers
- Hybrid Electric Vehicles (HEVs)
 - The lower operating costs (due to higher mpg) will compensate for the increased incremental cost over it's lifetime, especially for city driving
 - Some power-hybrid models have auxiliary electricity that may eliminate the need for idling





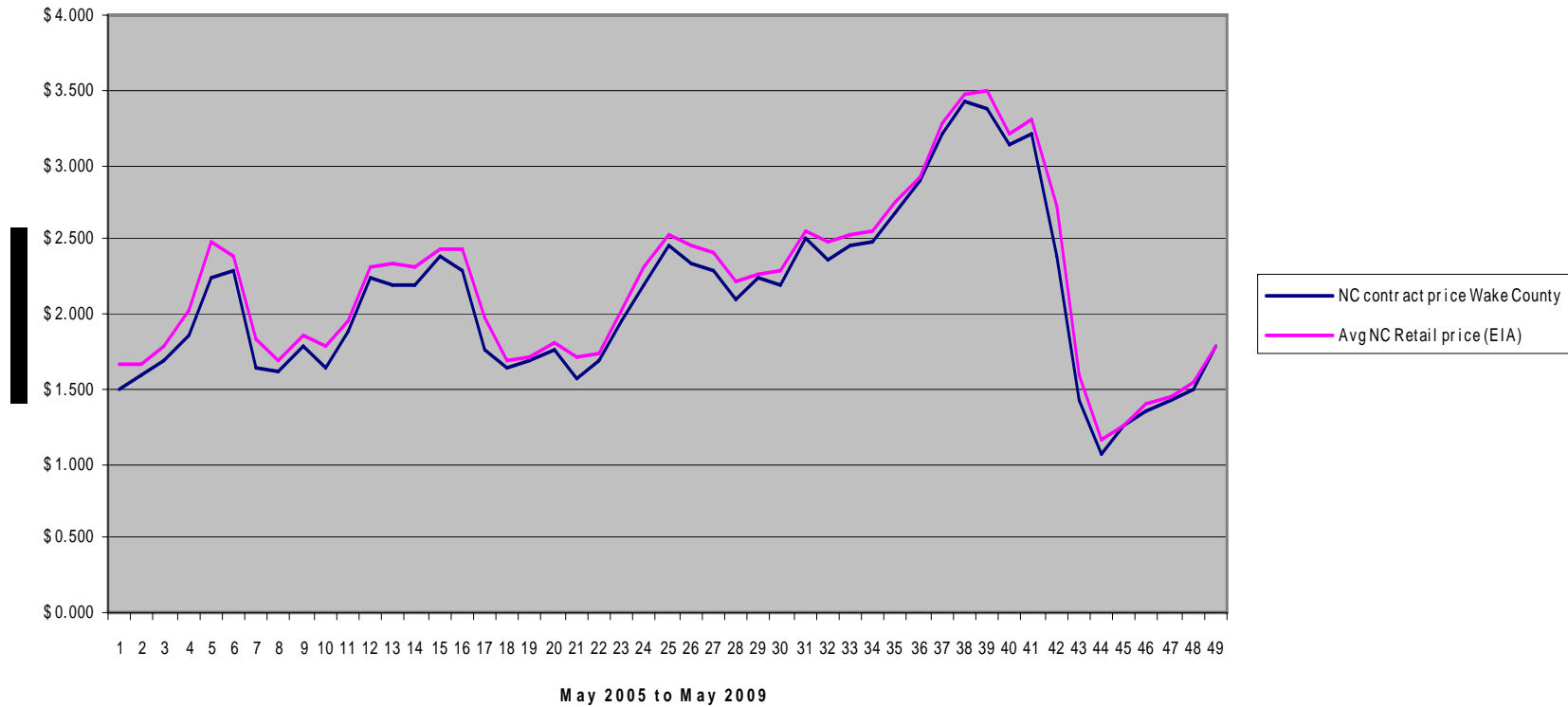
The biggest influence

- ‘Curtailment of non-essential travel’
- High fuel price hit the State fleet budget just like everyone else then, dropped like a rock
- Could there be a bright side? Economy/ alt-fuel use comes to the forefront
- Is it a fluke or a glimpse of the future?



New highs, new lows

Gasoline avg Price in NC





Fuel price has continued to fluctuate wildly

Avg. Wake County Contract price July 2008				
Gas	E10	E85	ULSD	B20
\$3.547	\$3.4502	\$3.0521	\$4.1208	\$4.4343
highest	Highest, almost 10 cents below Gas	Highest, almost 50 cents below Gas	highest	Highest, and 31 cents more than Diesel
Avg. Wake County Contract price Dec, '08 to March '09				
\$.9668	\$1.0882	\$1.4737	\$1.2776	\$1.5887
Lowest, (12/'08) drop of 74%	Lowest, (1/'09) drop of 68% but costs more than Gas	Lowest, (12/'08) drop of 52%, but costs more than Gas	Lowest, (3/'09) drop of 69%	Lowest, (3/'09) drop of 64% yet still more than Petro-Diesel

All gasoline vehicles within the State Fleet are capable of using E10.

- If the State had purchased *only* E10, an additional 4,635,000 gallons of E10 would have saved 463,500gal of petro-based gas.
- If we had been able to use only B20, an additional 1,393,000 gallons would have saved 278,600 gals of petro-diesel
- Economics are hard to predict and difficult to justify



We've hit the Goal

Can we hold on, do better?

- In year 4 of the plan we predicted being more than 80% toward goal
- We've exceeded goal
- Plans put in motion should help us with further success- especially E85 fueling
- B20 is in every county, E10 is at every pump (DOT fueling)
- What else can we do?



Can success be duplicated?

- 9 agencies have done exceptionally well
 - Rowan-Cabarrus CC -57%
 - UNC Asheville -45%
 - Caldwell CC -37%
 - UNC Charlotte -37%
 - NC A&T -22%
 - Appalachian State U -25%
 - Western Carolina U -22%
 - DENR -20%
 - NC DOT -27%
- Is there a common thread in their success?



Survey the successful: How'd you do it?

- 2 questions: what helped most? And was that according to your plan?
- Answer: support at highest levels to embrace change.
- 100% alt-fuel makes biggest impact
- No one's plan went "according to plan" budget challenges meant adapt, don't abandon the PDP



what has worked?

- UNC Charlotte has used NEV's extensively to meet PDP goals
- DOT has decided all Diesel will be B20, all Gasoline will be E10, E85 will be used where appropriate, exceptions are few
- UNC Asheville uses a little of everything
- DENR uses everything



Neighborhood Electric Vehicles (NEVs)

- NEVs have electric motors and batteries that are recharged by plugging into 110 volt outlets They use NO petroleum.
- NEVs are “street legal” and can be driven on public roads of 35mph or less
- Silent operation
- Excellent for short distance
- Transport of people, equipment, and food.
 - Airports, Parks, Campuses, Meter Maids, etc.
- A light duty vehicle that can haul up to 1,000





Ethanol

- In fulfilling the requirement to buy AFV's North Carolina already has thousands of Flex fuel vehicles
- If we would use E85: 5 vehicles would use the same amount of petroleum as 1 using gasoline
- Using E85 in only half of the State's Flex Fuel vehicles would displace 2.4 million gallons Petroleum



Biodiesel

- Commercially available B20 that meets ASTM standard (D7467 1.1.2.1) is not an experiment- it is a substitute for diesel fuel
- Price can be an obstacle
- Universal usage is crucial to PDP success
- As NC fuel stocks develop, local industry benefits



Conclusions

- It is fair to say the NC budget emergency and imposed travel restrictions saved fuel
- If that were not the case?...
 - Largest users say they would still keep PDP on track with efficient vehicles and alt-fuels
 - Increased miles would be offset with better newer equipment
 - Reducing ‘non-essential’ travel is the new normal
 - Record keeping has improved
 - Most fleet drivers are aware of need to drive efficiently



Recommendations

- Repetition of strategies and tactics that have worked
- Incentives: Reward achievement, encourage effort
- Strive for 100% alt fuel or alt tech (Biofuel, Electric) where practical
- Accept nothing less than Flex-Fuel capability
- Replace older vehicles with more fuel-efficient ones, "right-size" the fleet
- Encourage the use of alternative fuels
 - E10 and B20 available on State purchasing contract or available from DOT in all 100 counties
- Develop bid procedures and purchasing policy that ensure fuel-efficient and alternative fueled vehicles. Recent legislation assures NC State vehicles will be within top 15% efficiency in their class



How do we continue PDP success?

- **Encouraging drivers to be aware of economy/ alt-fuel/ efficiencies**
 - Have an MPG competition
 - Require tire pressure check
 - Support fuel saving technologies
- Adopt best practices from PDP success**