

Reducing Petroleum Consumption Through Direct Fleet Management



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?Overview?

- Intro
- Mandates
- Approach
- Results
- Future Fuel?
- Possible Applications



Garrison Mobile Equipment (GME)

- Commercial grade equipment supporting Installations' operations
- Support deployments, recovery and re-deployment of Forces
- Support Military and Civilian tenants





Mandates and Objectives

- EO13423; EPACT 2005
- Reduce consumption 20% & increase alt. fuel use 100% over 10 years
- Reduce imported oil dependency
- Environmental benefits





Petroleum Reduction & Alternative Fuels

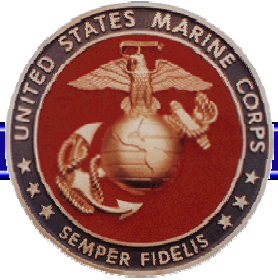


Multi-alternative fuel pump Santa Fe, NM



Alternative Fuel Availability

LOCATION	B20	CNG	PROPANE	E-85
EWTGLant Norfolk VA.		YES		
HQMC Arlington VA.	YES	YES		YES
MCB Quantico Va.		YES		
Marine Bks Wash D.C.	YES	YES		YES
MCLB Albany GA.	YES	YES	YES	
Blt Isl Jacksonville FL.			YES	
MCAGCC 29 Palms CA.	YES	YES		
MCAS Miramar San Diego CA.	YES	YES		
MCB Camp Pendleton CA.	YES	YES		
MCLB Barstow CA.	YES	YES		
MCB Kaneohe Bay HI.			YES	
MCAS Yuma AZ.	YES	YES		
MCAS Cherry Point NC.	YES			YES
MCB LeJeune NC.	YES		YES	YES
MCAS Beaufort SC.				
MCMWTC Bridgeport CA.				
MCRD Parris Island SC.	YES	YES		
MCRD San Diego CA	YES	YES		Limited



Think ELECTRIC!





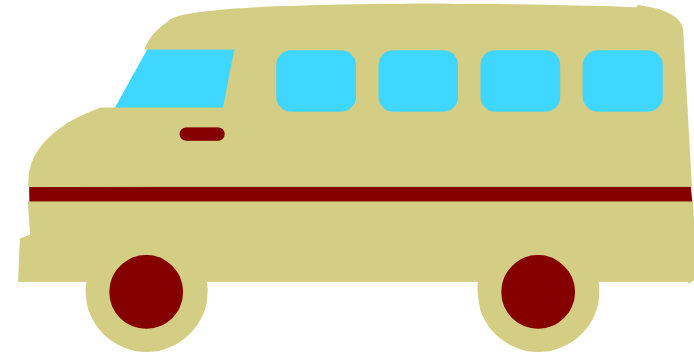
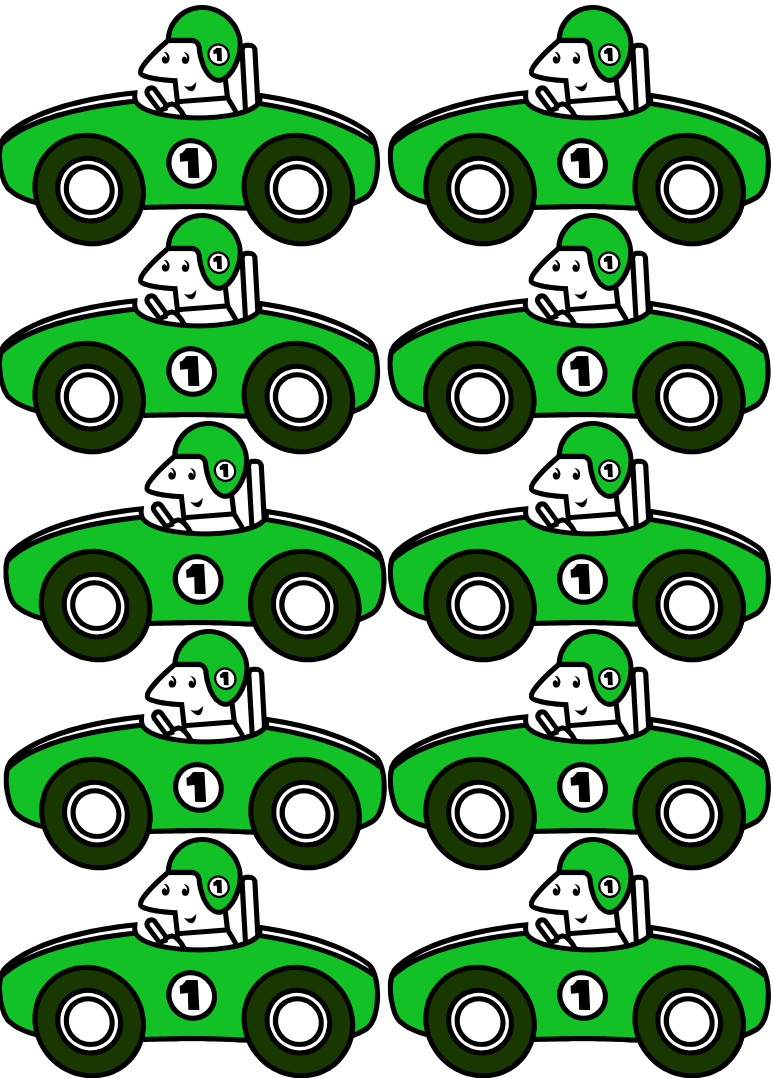
Hybrid Electric and CNG

- Hybrid electric vehicles - target recruiters as high mileage users
- Compressed Natural Gas vehicles – 1 for 1 reduction in petroleum fuel.
- Both assist with fuel reduction mandate





Efficiency...

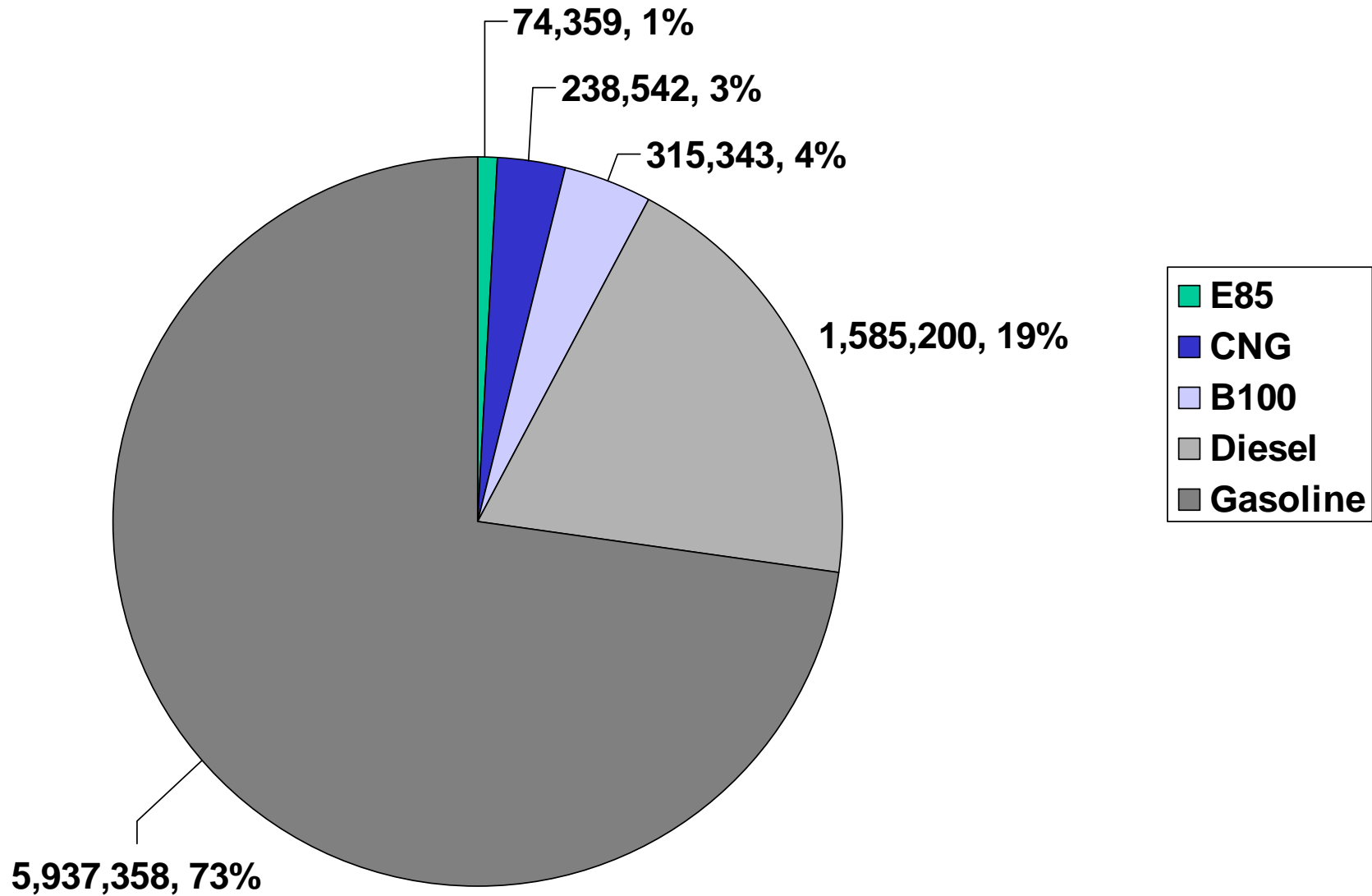


From
this to this...



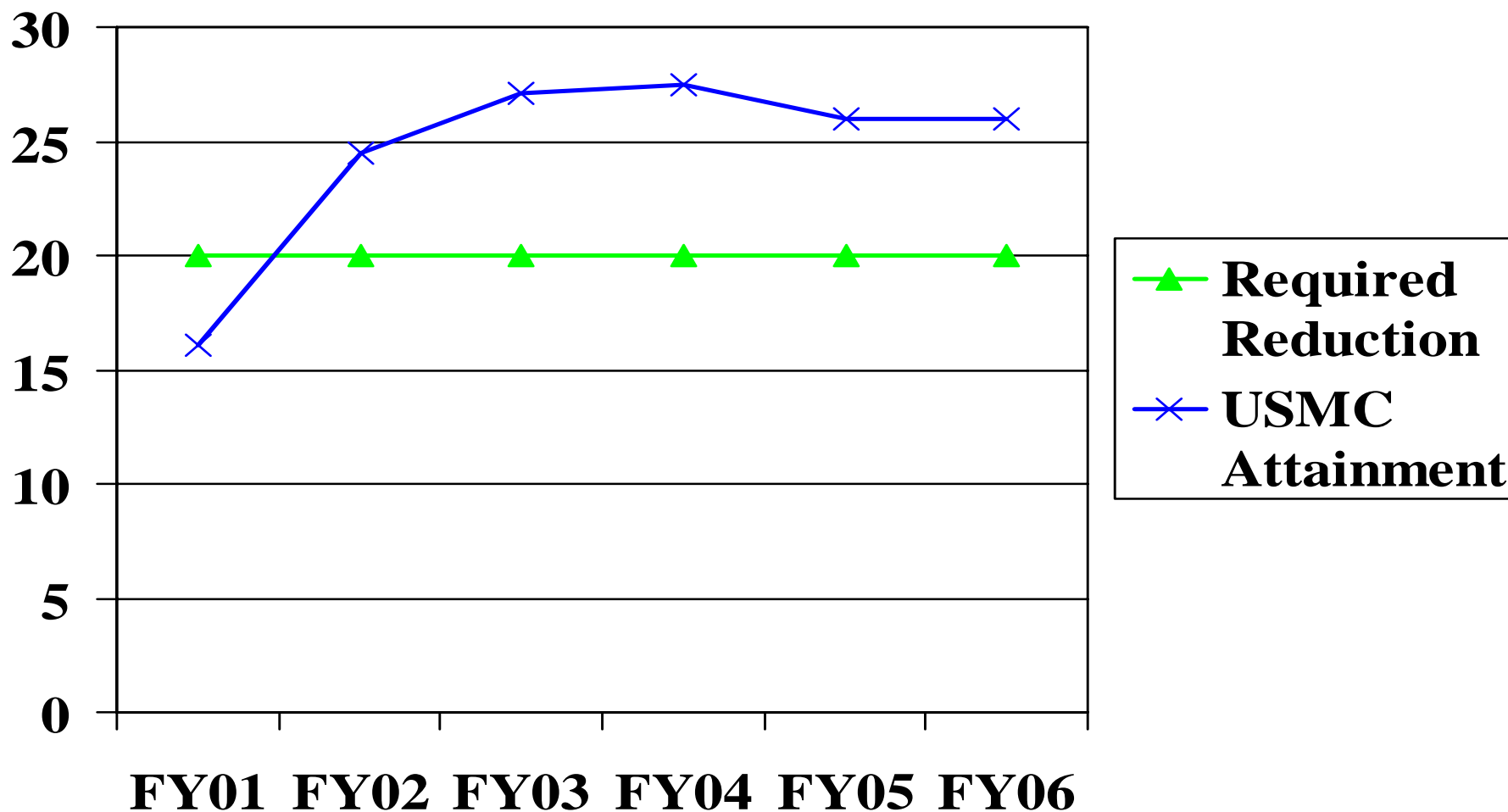


USMC 2006 GME Fuel Consumption (GGE)





Petroleum Reduction (%)





Why Hydrogen?

Agency Motivation:

- National Policy Objectives
- Interest at the SECNAV Level
- Long Term Technology Benefit
- Prove technology before applying to Warfighter requirements



Power 'Spectrum'

Civil



Electronics



Residential



Automotive



Heavy Vehicle

Marine



Industrial



Locomotive

10^1

10^2

10^3

10^4

10^5

10^6

10^7

10^8

Watts

Soldier Power



Sensors, Unmanned Vehicles



FCS

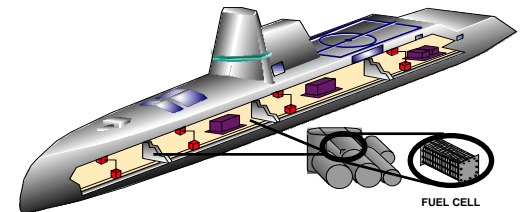
Vehicles, Mobile Generators



USMC RSTV

Ship Service

Ship Propulsion



FUEL CELL

Future Force Warrior





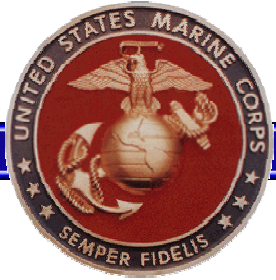
Motivation...

- High energy costs consume DOD resources that could be used for weapon system modernization
- Continue to reduce impact on environment
- Energy Security/Independence



Why USMC and Fuel Cells?

- 2007 White House Closing the Circle Award – Alternative Fuel and Fuel Conservation In Transportation – Military
- Controlled environment (vehicle fleet and facilities)
- Quality operators, maintainers
- Active projects focused on the future



Hydrogen Fuel Station

- Determine Infrastructure Requirements
 - Hydrogen Fueling Requirements
 - Vehicle Operation and Maintenance
 - Building Upgrades
 - Personnel Training
 - Educate users about Hydrogen



Why Camp Pendleton CA?

Location

- Adjacent to City of Oceanside
- Develops CA H2 Highway
- Bridges San Diego and L.A Area
- Supports Public Access



USMC SoCal Location





Project First Phase Oct 05 – Apr 07

- Explore Hydrogen fuel cell vehicle operations & maintenance
- Partner with Naval Facilities Engineering Service Center, TARDEC, General Motors (GMT800 pickup)
- Temporary fueling capability



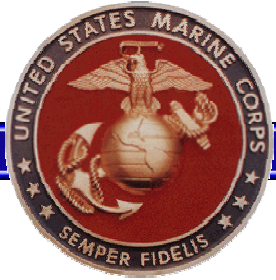


Current Phase...

Demonstrate Hydrogen Fuel Station:

- Compact Methane Reformer (10 kg/day)
- 350 Bar Dispenser
- GM Equinox Fuel Cell Vehicle
- Public Access
- Startup: Nov 2007



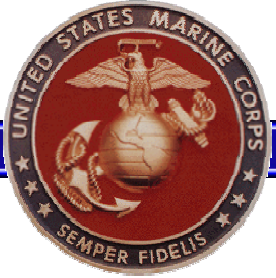


Expansion Planned...

- Demonstrate Hydrogen Fuel Station:
 - Future Expansion up to 100 Vehicles
 - Plan for 700 Bar Dispenser
 - 3 Fuel Cell Vehicles
 - Accommodate Medium and Heavy Vehicles

Potential Fuel Cell Sites





Possible Applications for H2 and Hybrids

- Vehicle applications
- Material Handling Equipment
- Busses/Troop Transports
- Emergency Response – Distributed Power Generation





Summary

- Don't overlook simple efficiencies.
 - Reduce size, utilization and # of vehicles
- Plan alt fuel vehicles and infrastructure
- PUSH electric vehicles
- Direction from the Top – no Buts!
- Establish goals then manage vehicles, fuel, utilization.



Points of Contact

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- **Questions?**