



# The Defense Logistics Agency



## Hydrogen Powered Forklift Test-bed Brief

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**on behalf of John Christensen, R&D Director**

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# The DLA Enterprise

**FY02 Sales/Services: \$21.5B**  
**FY03 Sales/Services: \$25B**  
**FY04 Sales/Services: \$28B**  
**FY05 Sales/Services: \$31.8B**  
**FY06 Sales/Services: \$35.5B**  
**FY07 Projected: \$34.4B**

- Land/Maritime: \$3.2B
- Aviation: \$3.4B
- Troop Support: \$11.6B
- **Energy: \$13.5B**
- Distribution: \$1.5B
- Other: \$1.2B
- ~95% of Services' repair parts
- 100% of Services' subsistence, fuels, medical, clothing & textile, construction & barrier materiel

## Foreign Military Sales

- Sales: \$1.02B
- Shipments: 520K
- Supporting 126 Nations

## Scope of Business

- 54,000 Requisitions/Day
- 8,200 Contracts/Day
- #58 Fortune 500 – Above Sprint Nextel
- **#3 in Top 50 Distribution Warehouses**
- **26 Distribution Depots**
- **25M Annual Receipts and Issues**
- 5.2 Million Items – eight supply chains
- 1411 Weapon Systems Supported
- 132.8M Barrels Fuel Sold
- \$14.6B Annual Reutilizations/Disposals

## People

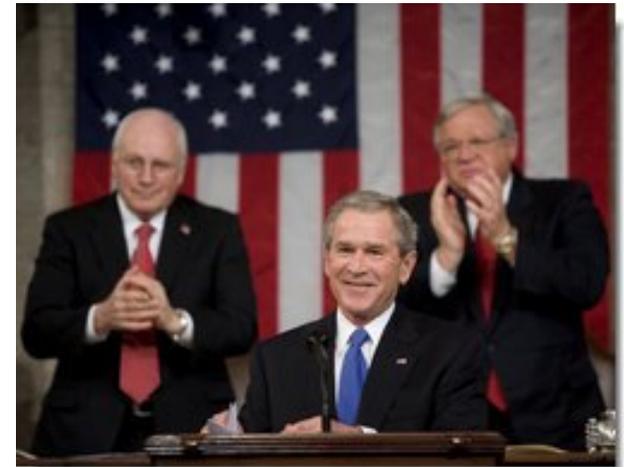
- 20,805 Civilians
- 519 Active Duty Military
- 754 Reserve Military
- Located in 48 States/28 Countries



# National Advanced Energy Initiative

## President Bush Press Conference 25 Apr 06

"The Advanced Energy Initiative is focused on three promising ways to reduce gasoline consumption. One is increasing the use of ethanol, another is improving hybrid vehicles, and finally, one is developing hydrogen technology. All three go hand-in-hand; all three are an important part of a strategy to help us diversify away from hydrocarbons."



## Advanced Energy Initiative 2006

-- to push for breakthroughs in two vital areas.  
...how we power our homes and offices,  
...how we power our automobiles.

**Cooperative with DOE, DOT, EPA, and DOC(NIST)**



# DOD's Role in President's Advanced Energy Initiative

- Basic and Applied Research
  - Department of Energy
  - Department of Transportation
  - Department of Commerce
- First Adopter – Department of Defense
  - Move H2 sub-systems Down the learning / cost Curve
    - H2 Storage
    - Fuel Cells
    - Distribution
- H2 Powered Material Handling Equipment Near Term Opportunity
  - Provides operational advantages – not just advancing technology
- DDSP and DDJC provide critical concentration of forklifts
  - DDSP first – conventional H2 Fueling
  - DDJC – Potentially renewable Energy Source H2



# Initiative Purpose

- **Background**
  - **Reducing Petroleum Dependence**
  - **Advancing Fuel Cell Manufacturing Maturity**
- **Proposed Test**
  - **Forklift truck background**
  - **Proposed Test**
  - **Schedule**
- **Discussion**
- **Site walkaround**
- **Wrap Up**



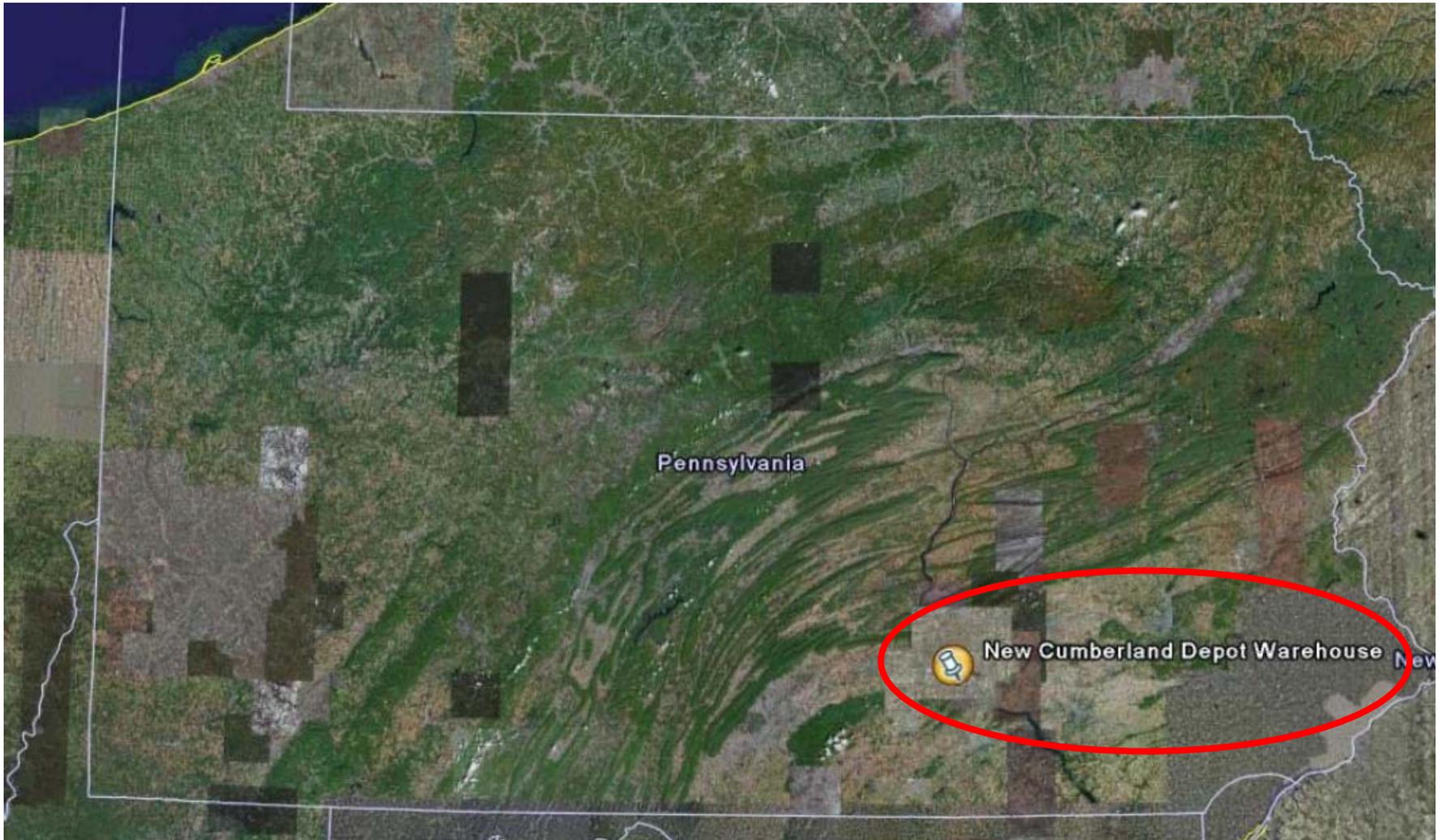
# Defense Distribution Depot Susquehanna

- Eastern DLA Strategic Distribution Platform
  - New Cumberland and Mechanicsburg facilities.
  - Provides military and commercial repair parts, clothing and textiles, medical supplies and industrial and electronic components to military customers throughout the United States and the world.
- **DDC MISSION:**
  - **Provide full range of distribution services and information enabling a seamless, tailored, worldwide DoD distribution network that delivers effective, efficient and innovative support to combatant commands, military services, and other agencies during peace and war.**



# Defense Distribution Depot Susquehanna

## *New Cumberland Location*





# Defense Distribution Depot Susquehanna

## *New Cumberland Location*





BROAD AGENCY  
ANNOUNCEMENT (BAA)

RESEARCH AND DEVELOPMENT  
FOR HYDROGEN-FUELED MATERIAL HANDLING EQUIPMENT  
AND HYDROGEN VEHICLE FUELING STATION  
PILOT PROJECTS

PRE-PROPOSAL  
CONFERENCE AND SITE VISIT

21 NOVEMBER 2006



# Hydrogen Logistics-ManTech Initiative Participants

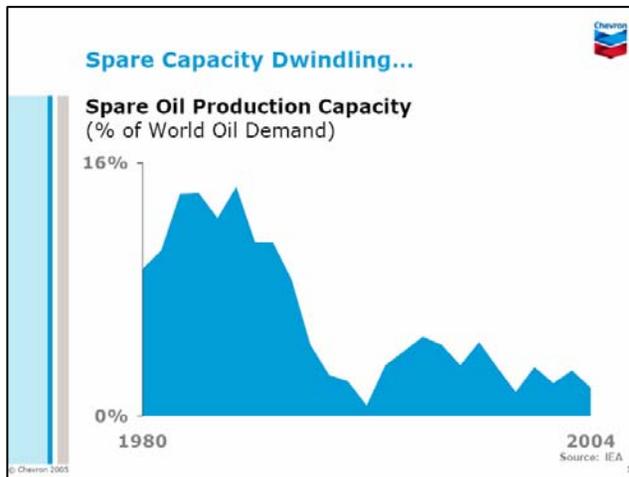
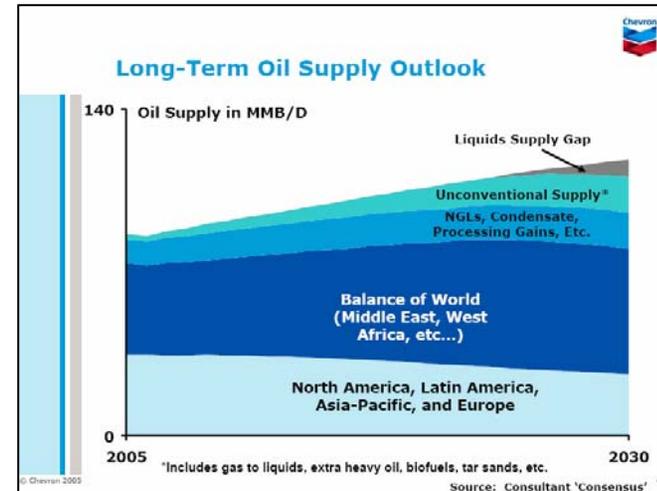
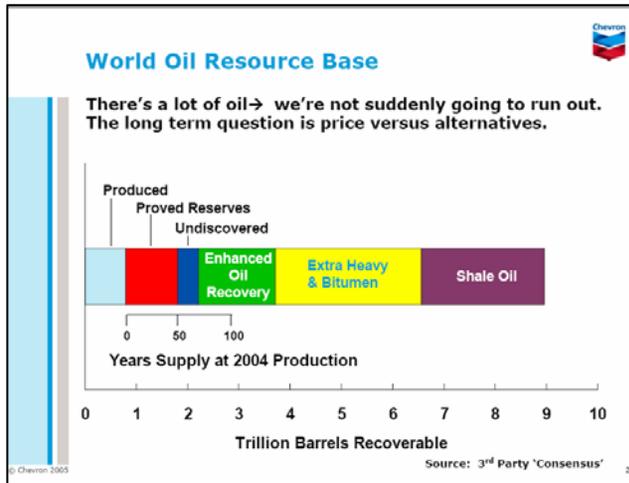


12 All Day Meetings with Energy Group and Industry Leaders and Other Alternative Fuel Innovators





# Hydrogen Logistics ManTech Initiative Energy Supplier View Point



The U.S.:

- Won't run out of petroleum in the near term
- Economy will be subjected to continuing "energy shocks"
- Industry must make an investment decision soon: petroleum vs. alternative energy sources



# Hydrogen Logistics ManTech Initiative Auto Industry's View Point

## GM's Objective

- Design and validate an automotive-competitive fuel cell propulsion system by 2010
- By automotive competitive, we mean a system that has the performance, durability, and cost (at scale volumes) of today's internal combustion engine systems



GM

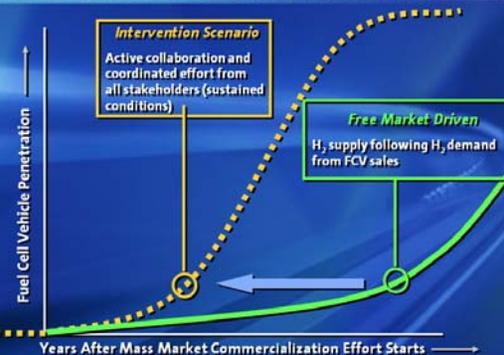
DAIMLERCHRYSLER

## DaimlerChrysler Fuel Cell Strategy



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## Interventions on Both the FCV and H<sub>2</sub> Side Can Significantly Shorten the Time to Inflection Point and Reduce Cost and Risk

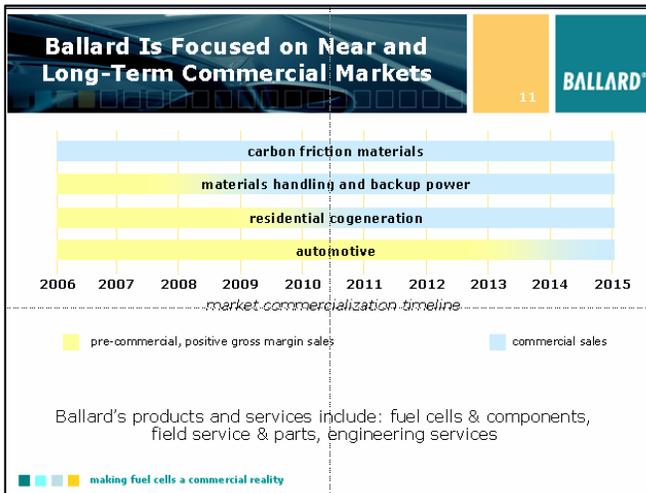
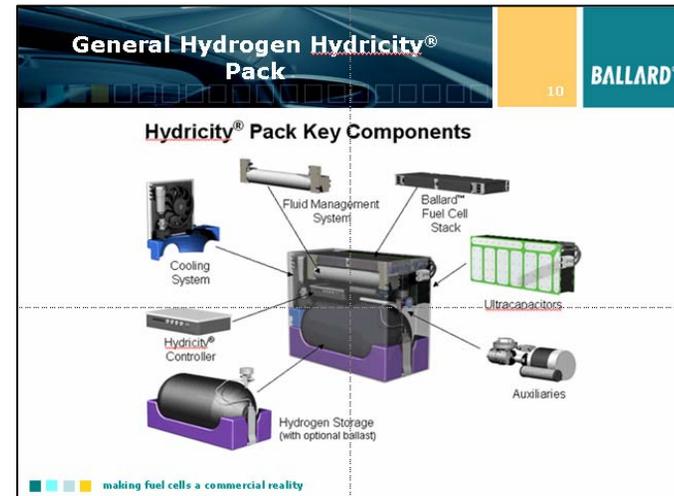
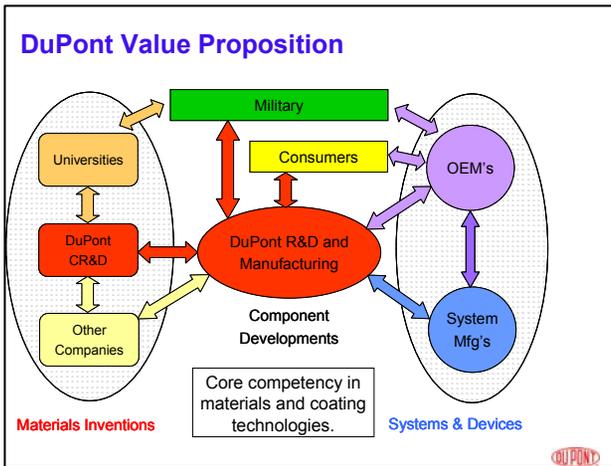


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- Major Auto Firms Committed
- Recognize critical Government role
- DOD as an early adopter will help Hydrogen (H<sub>2</sub>) vehicle transition
- Concurrent Infrastructure Critical



# Hydrogen Logistics ManTech Initiative Sub-tier Industry View Points

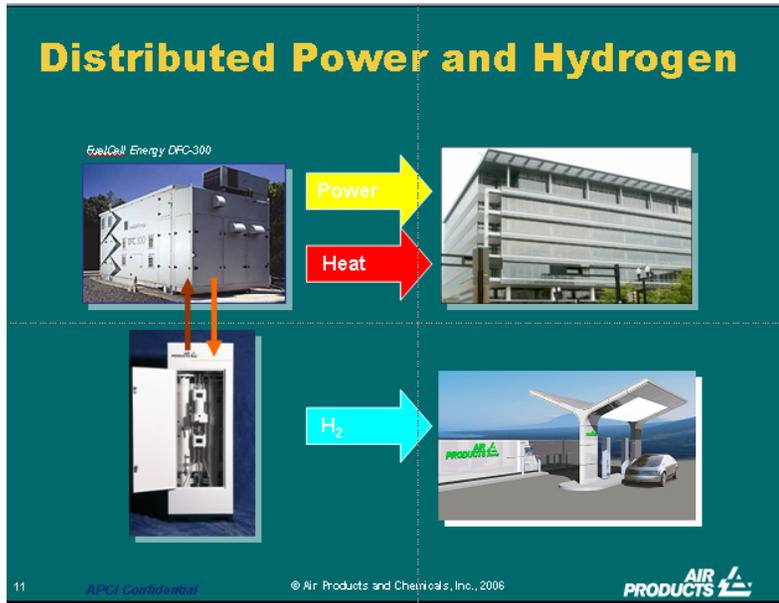


- Fuel Cell Volume is key to Sub-tier
- Exercise component manufacturers' to reduce cost and increase reliability
- Forklift applications are ready for early adopters
- Greater military operational usage dependent on increased commercialization



# Hydrogen Logistics ManTech Initiative

## H2 Supplier View Point

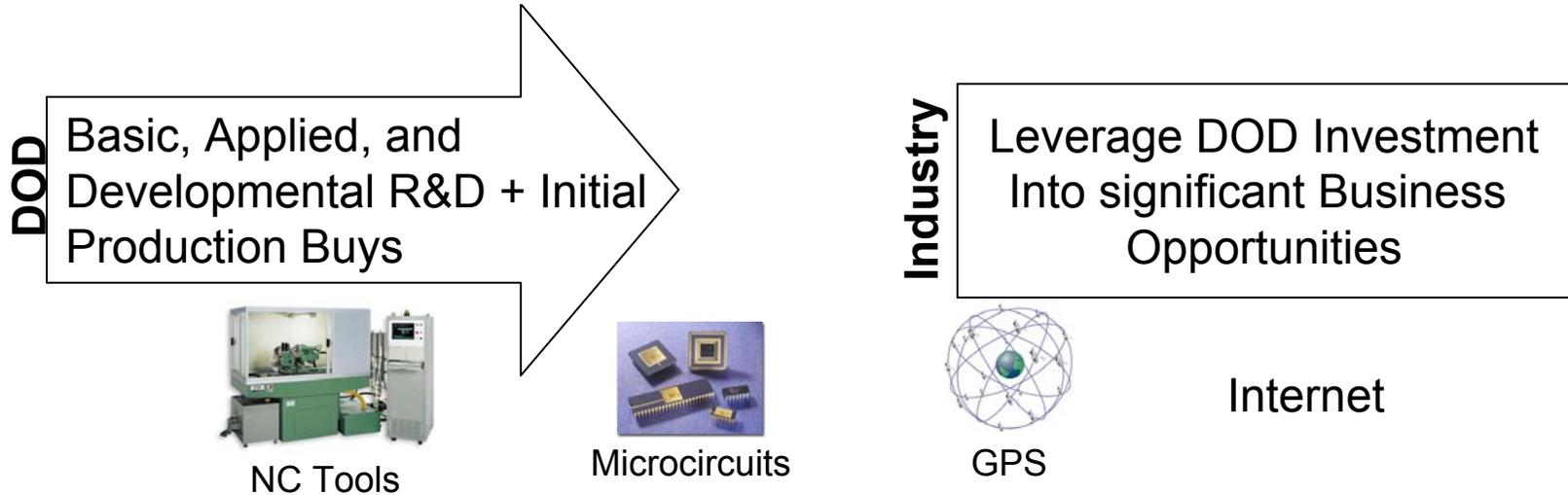


- Fixed Installation and vehicle efforts can be complementary if properly coordinated

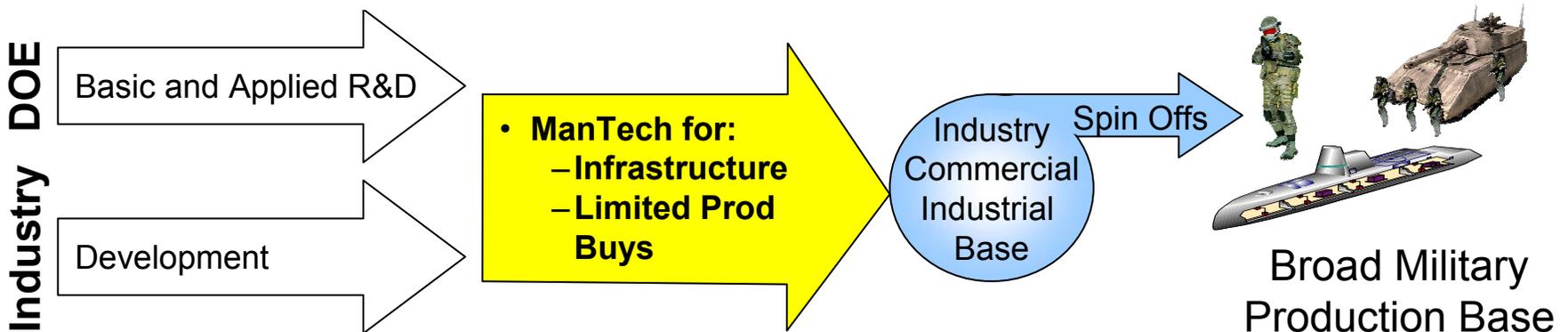


# DOD's Role: Technology Transition Historical vs. H2 Potential

## Historical DOD Technology Transition

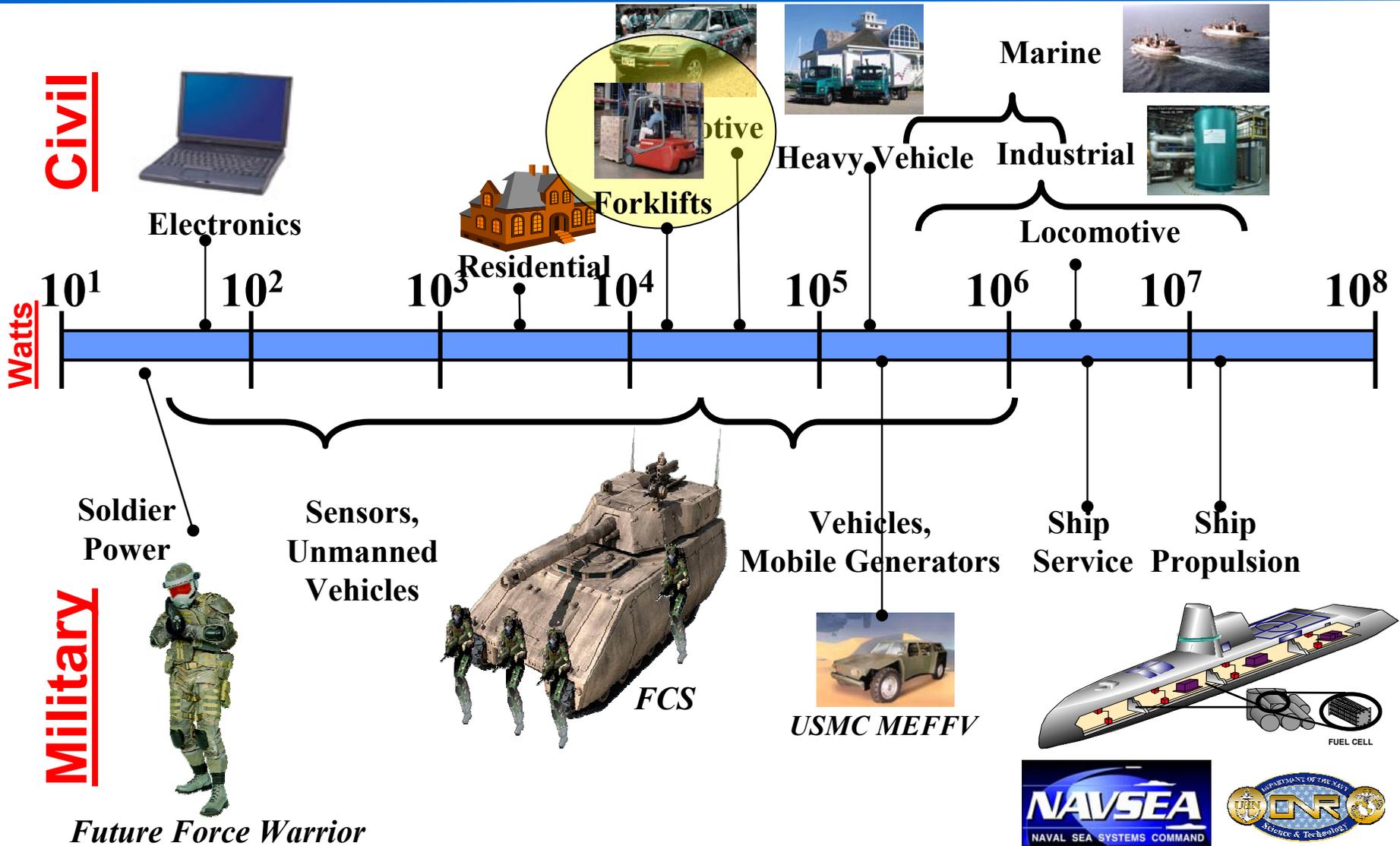


## Potential H2 DOD Technical Transition Model





# Leveraging Civil / Military Power Requirements





# Hydrogen Logistics Initiative

## Fuel Cell Benefit to DOD

Direct benefit to military applications

- Increased Fuel Efficiency
- Quiet, low-heat, zero-emissions
- Energy density
- Fuel diversity



Soldier Power



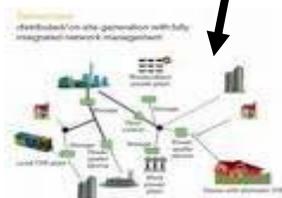
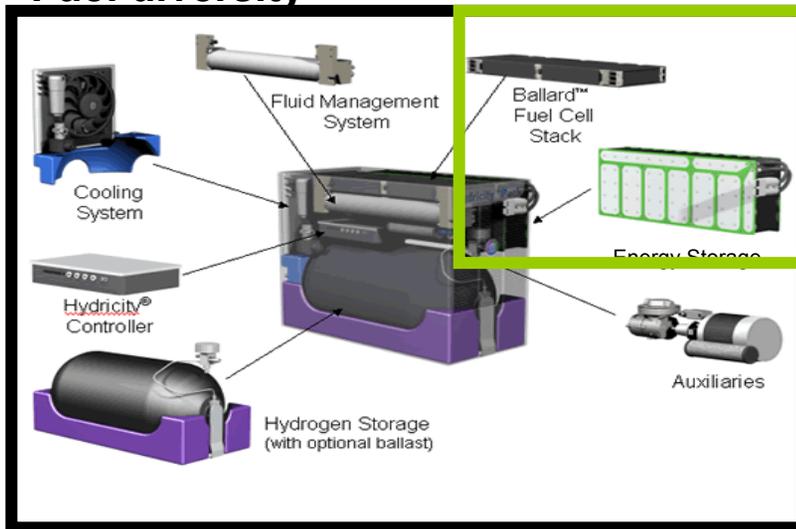
COMBATT APU



UAV



UUV



Micro-grids



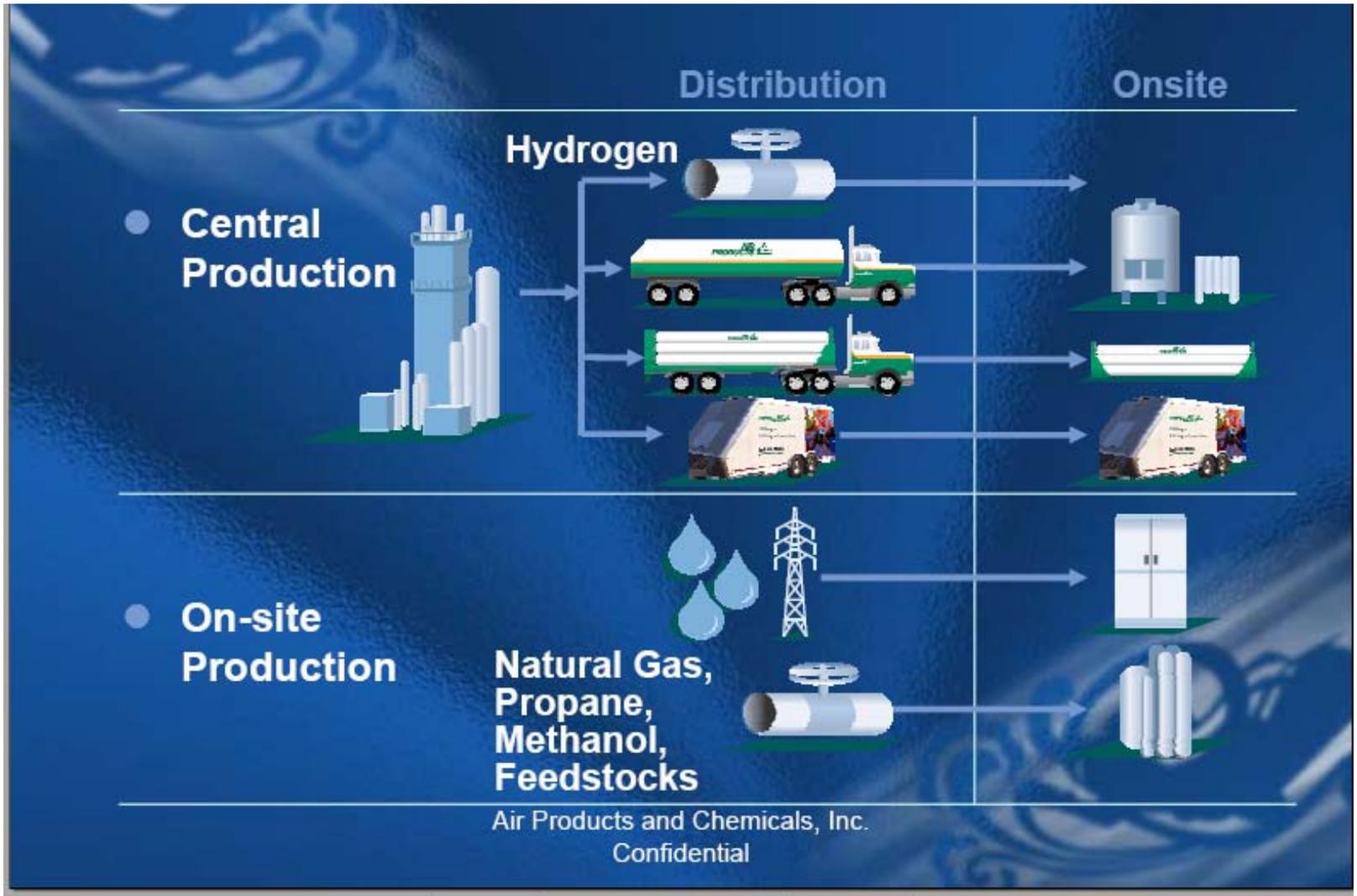
Portable Gen-sets



DDX



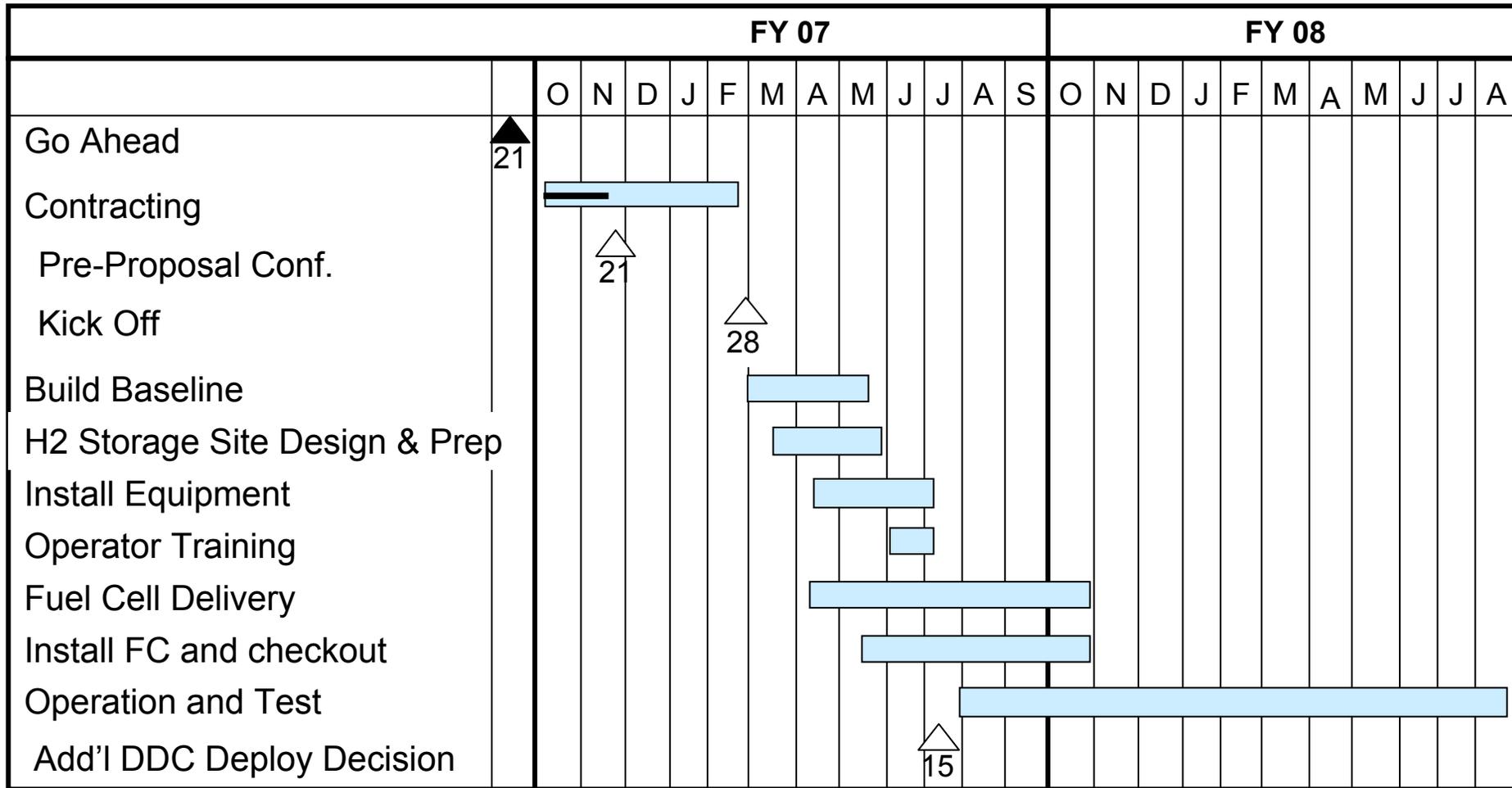
# Hydrogen Sourcing Options





# H2 Powered Forklift Pilot

## High Level Schedule



Task Plan
  Task Progress

15 Milestone



# Summary

- H2 Fuel Cell Forklifts have potential to improve DLA Distribution Operations
- Testing in DDC will provide real data that will allow an informed decision regarding costs and benefits for all DOD/others
- If successful, additional warehouses/sites could be outfitted with H2 Powered Forklifts