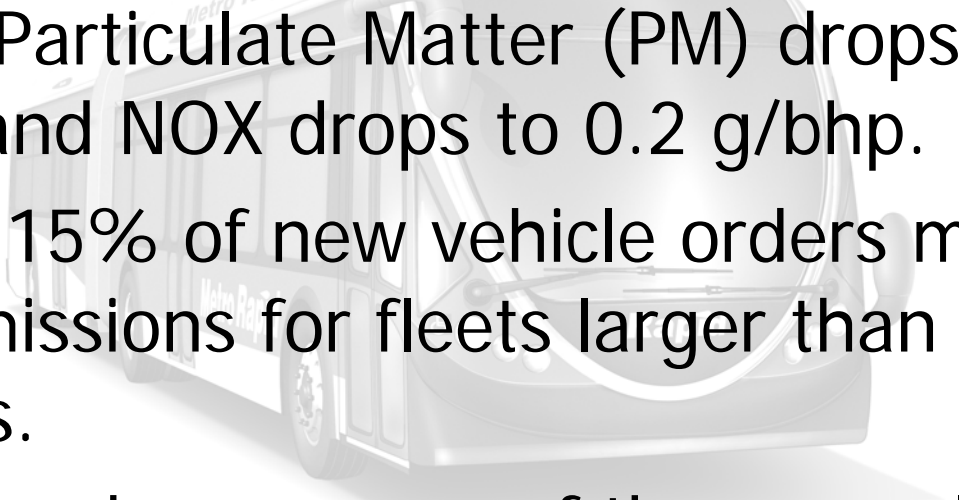

Technologies to Achieve Emission Reductions



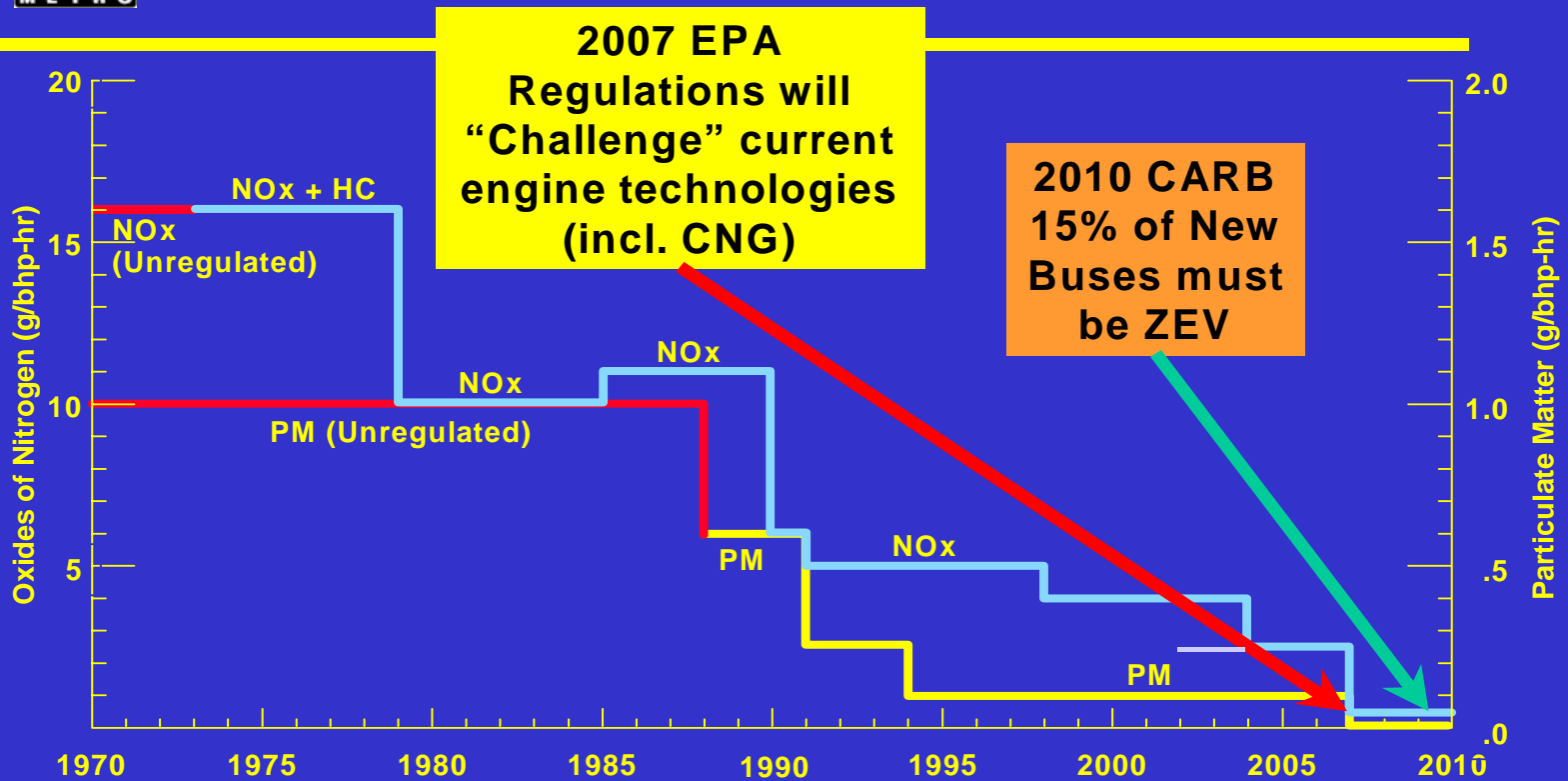
Presented by: Richard Hunt, Executive Vice President, Advanced Transit Vehicle Consortium

Metro Faces Challenges to Meet 2007/2010 Emission Regulations

- 2007 - Particulate Matter (PM) drops to 0.01 g/bhp and NOX drops to 0.2 g/bhp.
 - 2010 – 15% of new vehicle orders must be zero emissions for fleets larger than 200 vehicles.
 - Metro has been aware of these regulations since the 1990's, previously they were addressed in the 30 year plan then later dropped.
- 



Applicable Emission Regulations



The ATVC

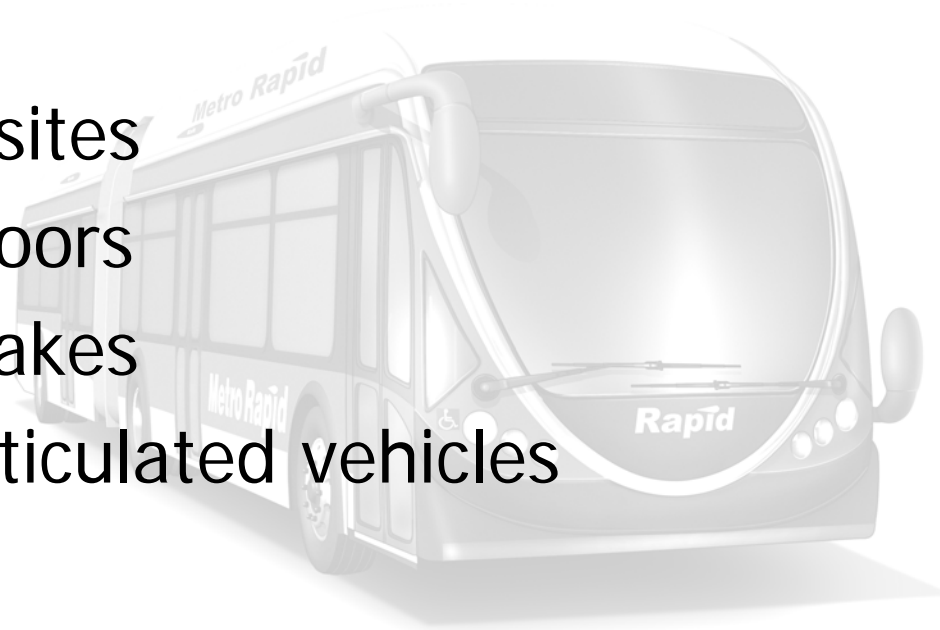
- The ATVC is organized and funded by Metro, LA City, LA County, and AQMD as a working unit to promote clean vehicles and technologies, outside Metro's normal operating structure.
- The ATVC is a non profit California public corporation with its own independent Board of Directors.
- In August 1999, the MTA Board of Directors voted to give the responsibility for continued development and commercialization of the Advanced Technology Buses to the ATVC (formerly FCBC).

WHY ATVC?

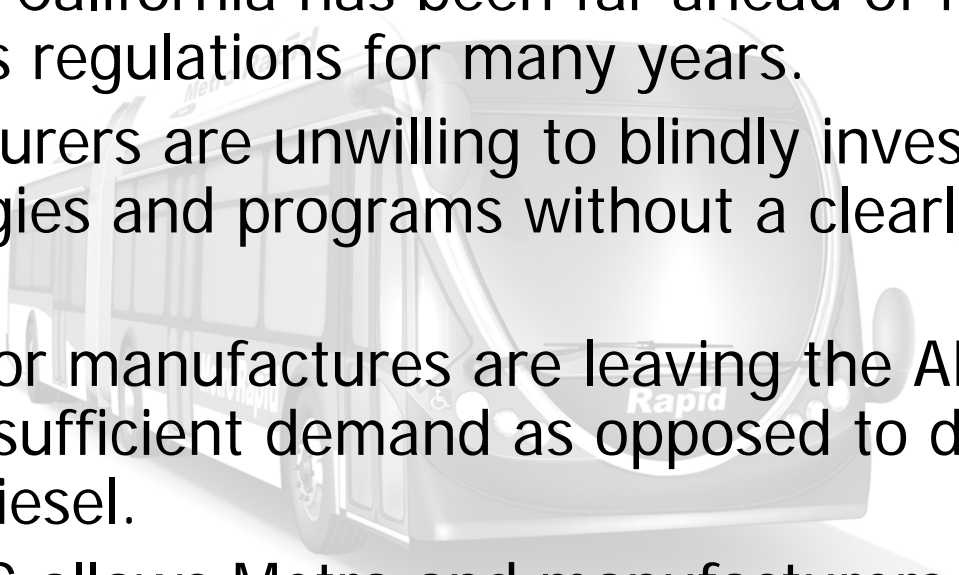
- ATVC initiated projects bypass the yearly Metro capital call and do not compete nor bump Metro's routine maintenance, improvement, and replacement projects.
- ATVC projects offers dedicated funding that is separate from Metro with the funding partners.
- ATVC is able to act more quickly to emerging technologies and is not bound by all of Metro's governmental procurement policies.

Past Achievements of the ATVC:

- Composites
- Wide doors
- Disc brakes
- CNG articulated vehicles



Metro's Unique Position

- Southern California has been far ahead of federal emissions regulations for many years.
 - Manufacturers are unwilling to blindly invest in technologies and programs without a clearly defined market.
 - Some major manufacturers are leaving the AFI market due to insufficient demand as opposed to diesel, e.g. Detroit Diesel.
 - The ATVC allows Metro and manufacturers to work hand in hand in developing new technologies including CNG articulated vehicles, composite CNG vehicles, and gasoline hybrid articulated vehicles.
- 

ATVC Program Funding

Federal Funds:

- Grant - CFP – 200044 01.001 \$2,000,000
- Grant - BOS – 200044 01.002 \$3,114,000*

*Must share use of the vehicle with Muni's as part of grant provisions

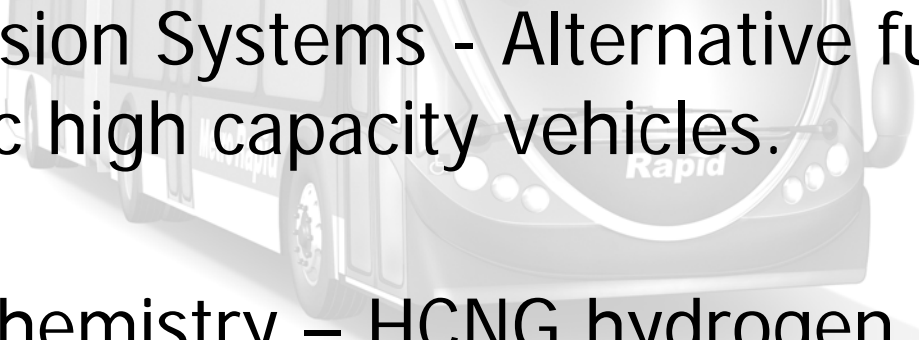
Local Funds:

- ATVC - Sales/Lease Back Revenues(Local Funds) \$2,000,000**
(\$1.925 mil identified for deferral)

**Transferred to ATVC by MTA Board action in May 2000

- OMB has currently programmed over the life of the project. \$6,568,000

Possible Paths to Effect Changes In Emissions Profiles

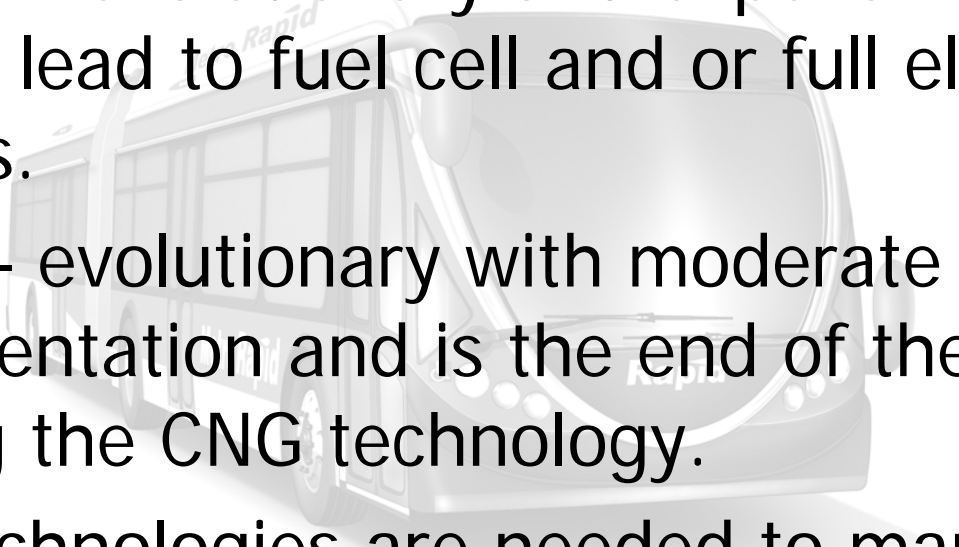
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- Propulsion Systems - Alternative fuel hybrid electric high capacity vehicles.
 - Fuel Chemistry – HCNG hydrogen enriched CNG.

Other Technologies to Evaluate and Monitor for Possible Implementation

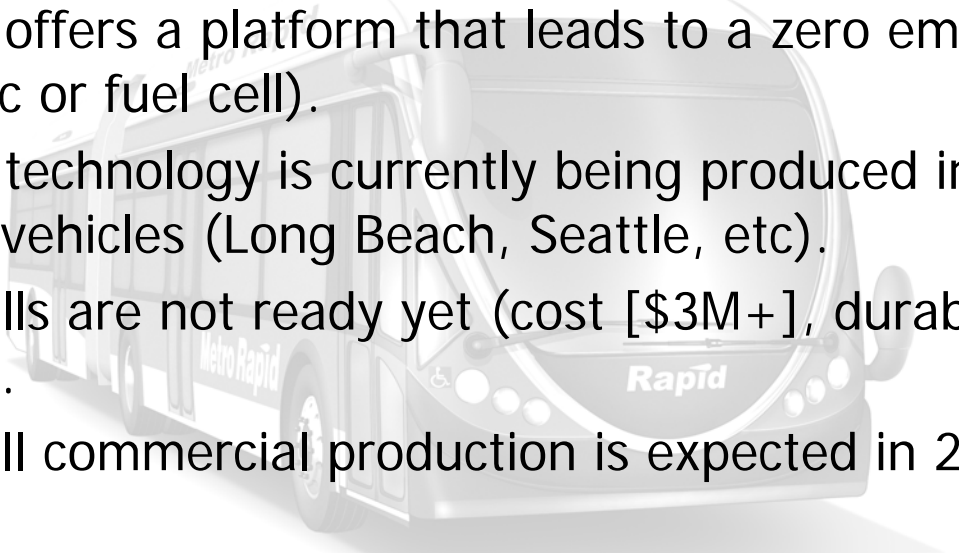
- Hydrogen Internal Combustion
- Fuel Cell
- Battery Electric
- Electric Trolley



Risk and Benefits

- Hybrid – revolutionary and expensive, though it could lead to fuel cell and or full electric vehicles.
 - HCNG – evolutionary with moderate cost of implementation and is the end of the line for existing the CNG technology.
 - Both technologies are needed to manage the risk of non compliance of 2007/2010 regulations.
- 

Why Test A Hybrid?

- Hybrid offers a platform that leads to a zero emission vehicle (electric or fuel cell).
 - Hybrid technology is currently being produced in heavy duty transit vehicles (Long Beach, Seattle, etc).
 - Fuel cells are not ready yet (cost [\$3M+], durability, and power).
 - Fuel cell commercial production is expected in 2020-2025 at best.
 - Hybrid offers lower noise and emissions.
 - Gasoline (with a throwaway engine) has been certified by CARB.
 - Hybrid is the “next” step in the technology ladder.
- 

With the upcoming 2007 and 2010 emissions goals, procuring hybrid powered articulated vehicles using a sole source negotiated procurement will:

- Let Metro take the next logical and technological step toward meeting future emission requirements
- Offer a platform that will lead to Fuel Cell or electric, zero emission vehicles
- Follow the strategic plan and demonstrate Metro as leading the nation by implementing innovative technologies through the purchase of state-of-the-art high capacity vehicles

ATVC Hybrid Project Summary

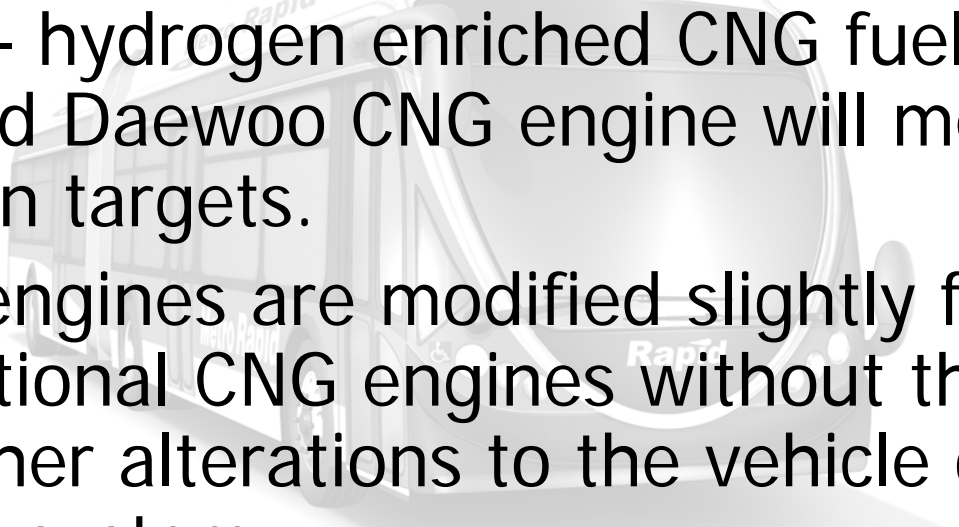
- In January, 2004 ATVC Board authorized the solicitation for up to 5 hybrid articulated vehicles.
- March 2004, letters of interest sent to both NABI and New Flyer seeking proposals.
- NABI declined to participate in a hybrid project.
- August 2004, New Flyer sent letter of interest and would submit formal proposal in the near future.
- December 2004, New Flyer submitted formal proposal with a 60 day evaluation limit.

ATVC Hybrid Project Summary

- Seek authorization from ATVC and Metro boards to enter into negotiated contract with New Flyer for the purchase of 2-3 articulated hybrid vehicles.
- FY05 expenditures estimated at \$675,000 including \$135,000* in local match funds.

*Part of \$2 mil transferred to ATVC by MTA Board action in May 2000

HCNG Engine Technology

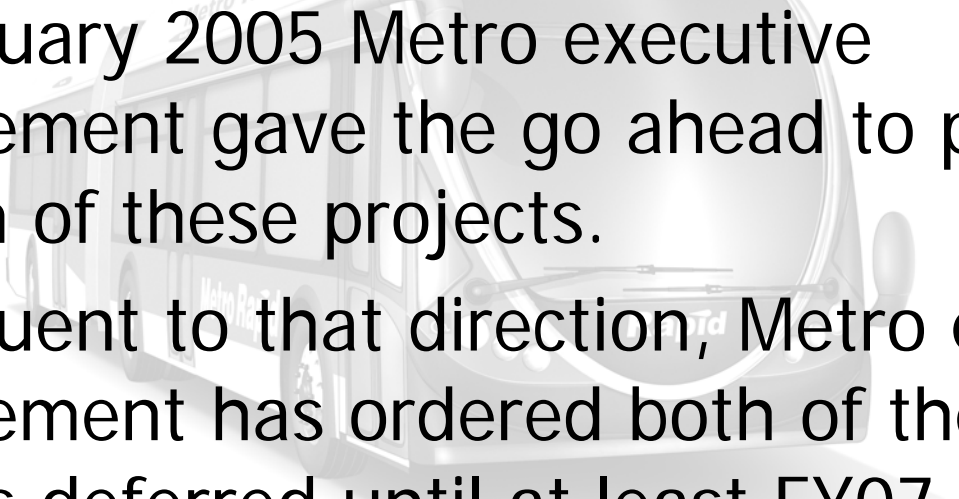
- HCNG – hydrogen enriched CNG fuel and modified Daewoo CNG engine will meet 2007 emission targets.
 - HCNG engines are modified slightly from conventional CNG engines without the need for further alterations to the vehicle or fuel storage system.
- 

HCNG Engine Technology

Next Steps

- Obtained executive management approval to solicit Collier Technologies for proposal of two engine HCNG test program using existing Metro CNG vehicles.
- Received Collier Technologies proposal.
- Seek authorization from ATVC and Metro Boards to enter into negotiated contract.
- Evaluate Daewoo CNG engines as a possible candidate to replace Detroit Diesel engines during mid life overhaul.

Latest Status

- 
- In February 2005 Metro executive management gave the go ahead to proceed on both of these projects.
 - Subsequent to that direction, Metro executive management has ordered both of these projects deferred until at least FY07 due to Metro budget constraints.

Recommendations

- ATVC Board to review Metro FY06 funding priorities, and provide direction on implementing projects sponsored through the ATVC.
- Proceed with executing contract with New Flyer articulated gasoline hybrid vehicles.
- Work with Collier Technologies and partners in receiving a proposal to retrofit up to 2 existing Metro buses, and fueling station modifications for the operation of HCNG vehicles, and up to 2 Metro vehicles to evaluate the Daewoo CNG engine as a replacement engine candidate.