

Advanced Small Transit Vehicle Market Study

Del Peterson
Associate Research Fellow
Small Urban & Rural Transit Center
North Dakota State University

CTAA Expo
May 23rd, 2007



Outline

- Current Market Conditions
- Current Market Issues
- Vehicle Technologies
- Cost Analysis

Current Market Conditions

What is a Small Transit Vehicle?

Less Than 30 Feet in Length

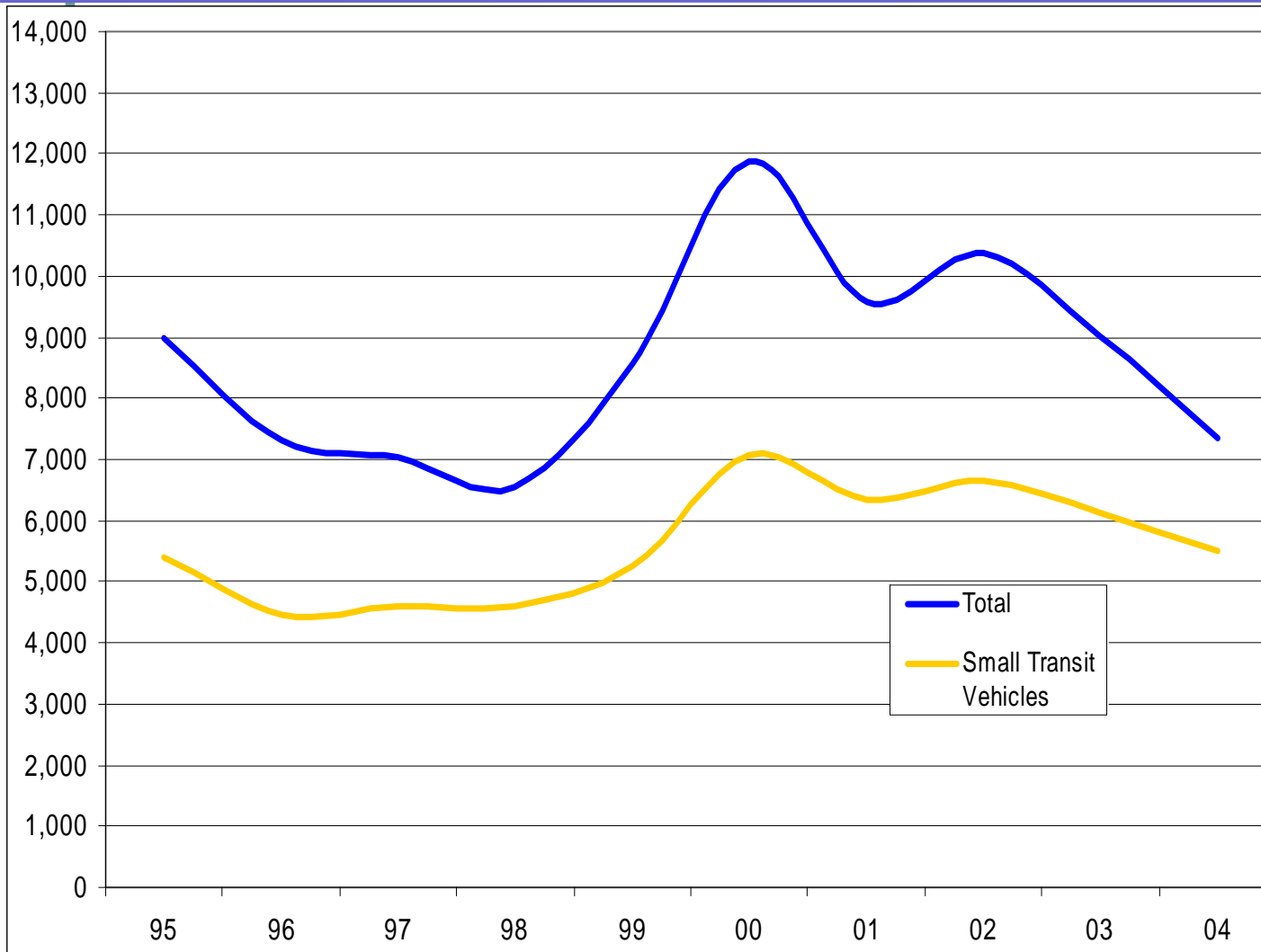


Market Segment Variations

Small Vehicle Market Segment	Average Price	Average Length	Average Number of Seats	Capital Cost per seat
Vans	\$ 32,773	17 Feet	12	\$2731
Cutaways	\$ 64,596	23 Feet	17	\$3800
Small Buses	\$180,853	27 Feet	25	\$7234

(APTA 2005)

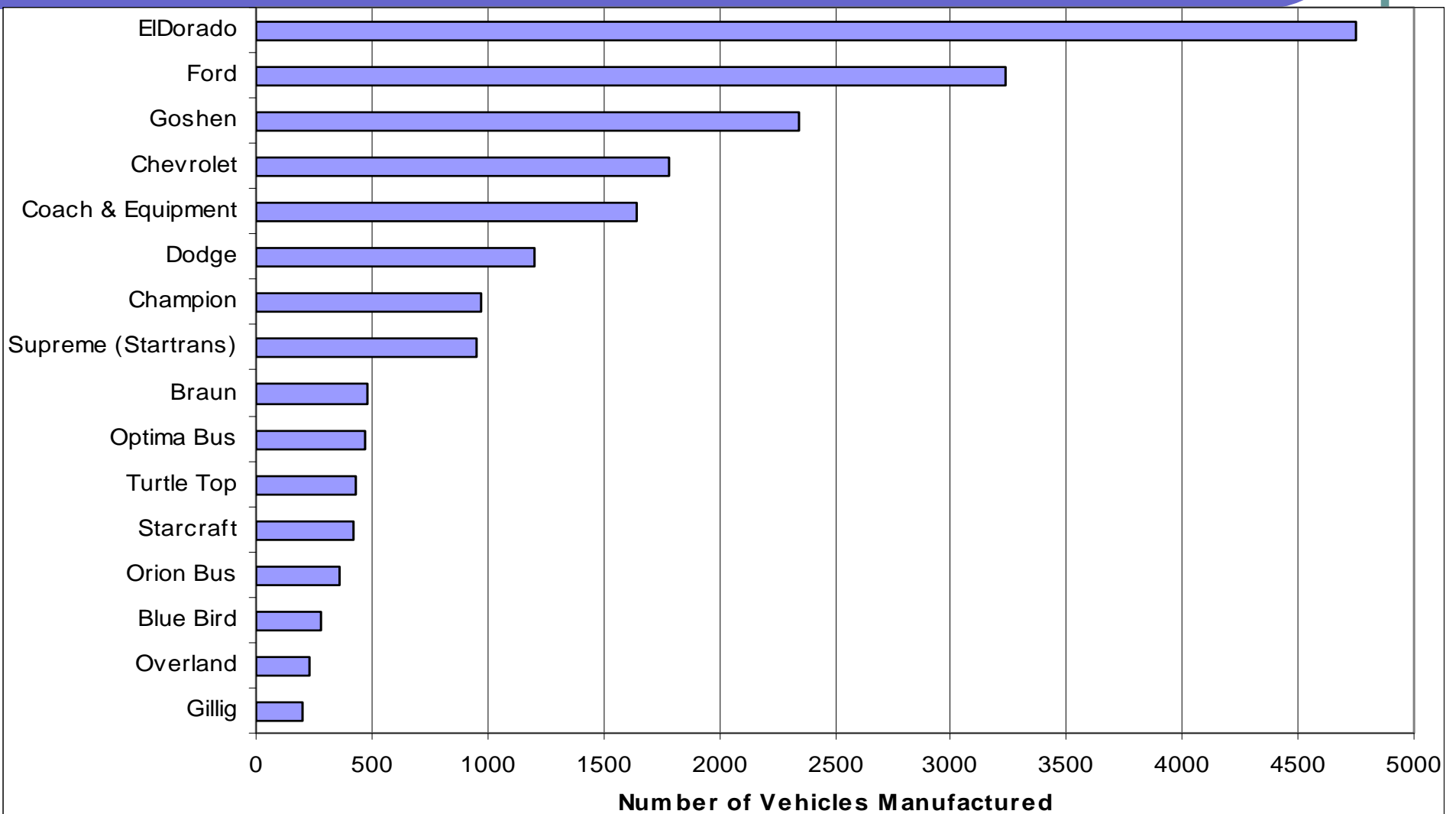
FTA Funded Vehicle Purchases



Year	% of Total
95	59.9%
96	60.8%
97	65.3%
98	70.1%
99	61.5%
00	59.5%
01	66.1%
02	64.2%
03	68.0%
04	75.0%
10-year Ave.	64.6%

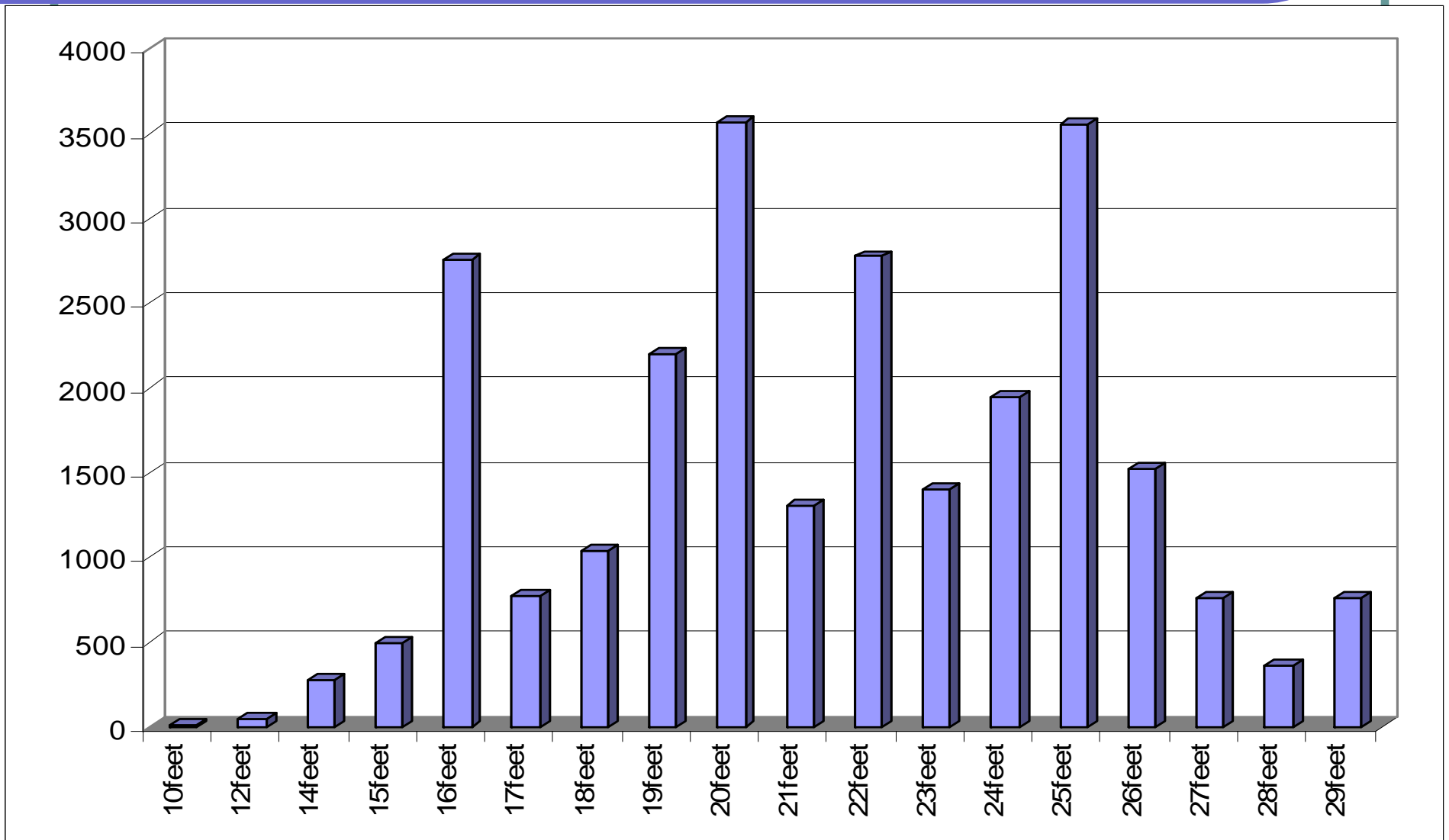
(FTA 2006)

Small Transit Vehicle Manufacturers



(APTA 2005)

Length of Small Transit Vehicles



(APTA 2005)

Current Market Issues

- Need to move away from “low bid mentality” and focus on quality, needs

“The common law of business balance prohibits paying a little and getting a lot... it cannot be done. There is hardly anything in the world that some man cannot make a little worse and sell for a little cheaper, and the people who consider price only, are this man's lawful prey”

John Ruskin (1860)

Vehicle Technologies

- Fuels
 - Gasoline: established and common
 - Diesel: established and common
 - Natural Gas (CNG): established for 40' transit vehicles, infrastructure in place
- Propulsion
 - Hybrid-Electric: commercialized in 40' transit vehicles, first models being available for body-on-chassis vehicles
 - Fuel Cell: still in R&D, commercialization expected around 2020
- Accessibility
 - Low-floor: established for 40' transit vehicles, some models available in cutaway/chassis market

Vehicle Technologies

- Intelligent Transportation Systems (ITS)
 - Available/"off-the-shelf" (focused on 40' market):
 - Computer Assisted Dispatch (CAD)
 - Global Positioning System (GPS)
 - Automatic Vehicle Location (AVL)
 - Automatic Passenger Counters (APC)
 - Traffic Signal Priority (TSP)
 - Electronic Fare Collection
 - WiFi (Wireless Internet Access)

Vehicle Technologies

- ITS Costs

Technology/Equipment	Avg. Capital Cost	Estimated O&M Cost per year
CAD Terminal	\$400	\$108
GPS	\$1,250	\$24
TSP	\$1,650	\$7
Security (CCTV + Emergency Button)	\$4,600	\$180
Electronic Farebox	\$850	\$45
APC	\$5,625	\$3
Navigation	\$2,400	-
Radio	\$185	\$9

Vehicle Technologies

- **Small Vehicles**

- **Purpose Built Transit Vans**

- Ford Transit, Dodge Sprinter, etc.
- Commercially Available



- **Ebus**

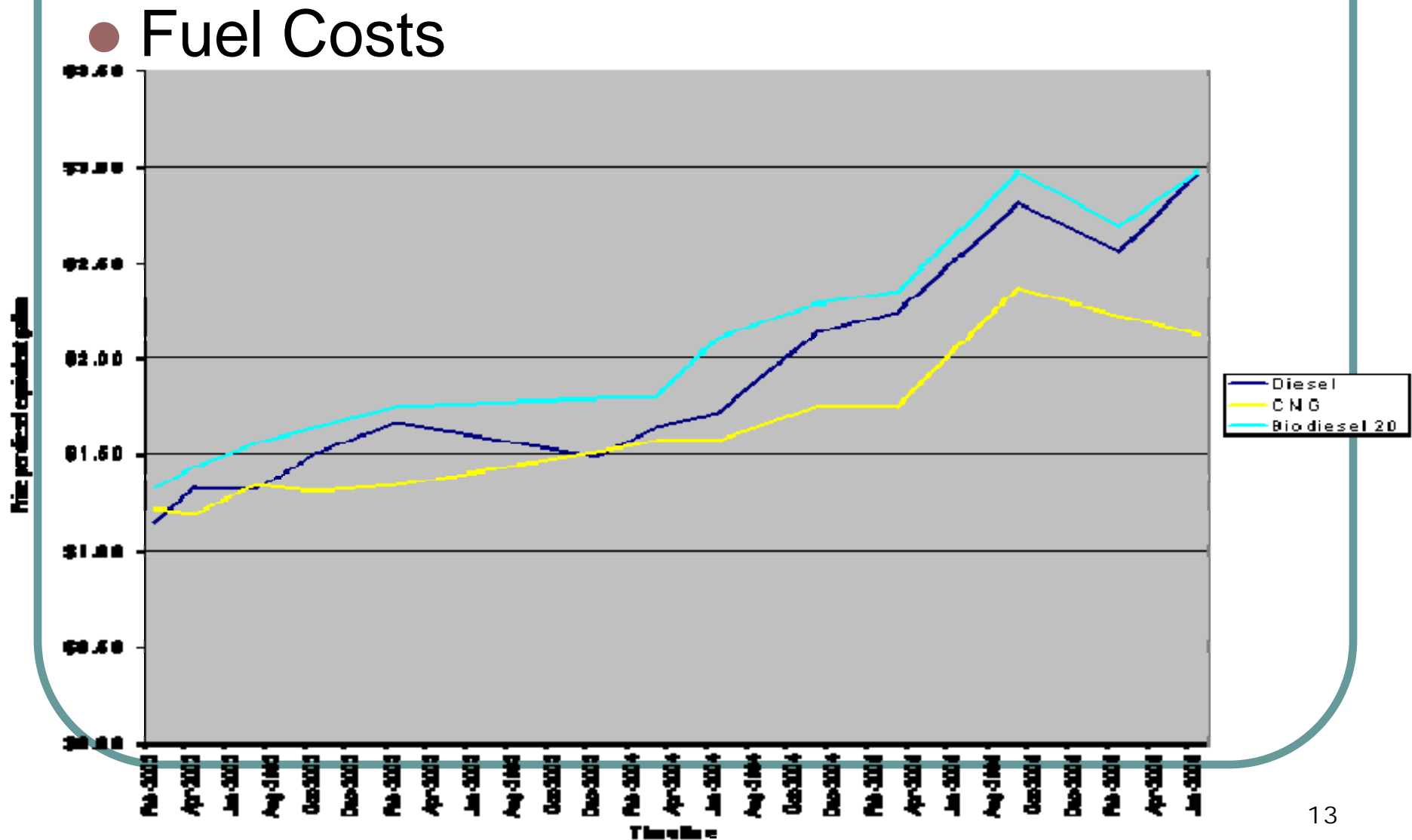
- 22' Electric/Fuel Cell Electric Low-Floor Vehicles
- Commercially Available

- **Brevi Bus**

- 19-25' Low-Floor Flexible Seating Vehicle
- In Development/Prototype Testing



Cost Analysis



Cost Analysis

Fuel	Avg. Cost per Gallon
Gasoline	\$2.22
Diesel	\$2.62
CNG*	\$1.77
E85	\$2.11
Propane	\$2.33
B20	\$2.66
B2-B5	\$2.75
B99-B100	\$3.31

Cost Analysis

- Estimated Cost for 25-30 foot Body-on-Chassis Vehicle

Vehicle Type	Estimated Cost
Standard floor gasoline/diesel	\$65,000
Hybrid-Electric	\$100,000+
Low-Floor	\$150,000+
Fuel Cell	\$1.5 M +

Cost Analysis

Cost Item	Total Costs		Cost to Connecticut	
	Conventional Bus	Hybrid Bus	Conventional Bus	Hybrid Bus
Purchase Cost	\$320,000	\$500,000	\$64,000	\$100,000
Engine Rebuild	50,000	25,000	50,000	25,000
Transmission Rebuild	30,000	10,000	30,000	10,000
Battery Replacement	0	20,000	0	20,000
Fuel	171,429	156,522	171,429	156,522
Brake Maintenance	18,000	12,000	18,000	12,000
Diesel Particulate Filter Maintenance	12,000	6,000	12,000	6,000
Other Normal Miscellaneous Maintenance	150,000	150,000	150,000	150,000
Totals	\$751,429	\$879,522	\$495,492	\$479,522

Connecticut Academy of Science and Engineering (2005)