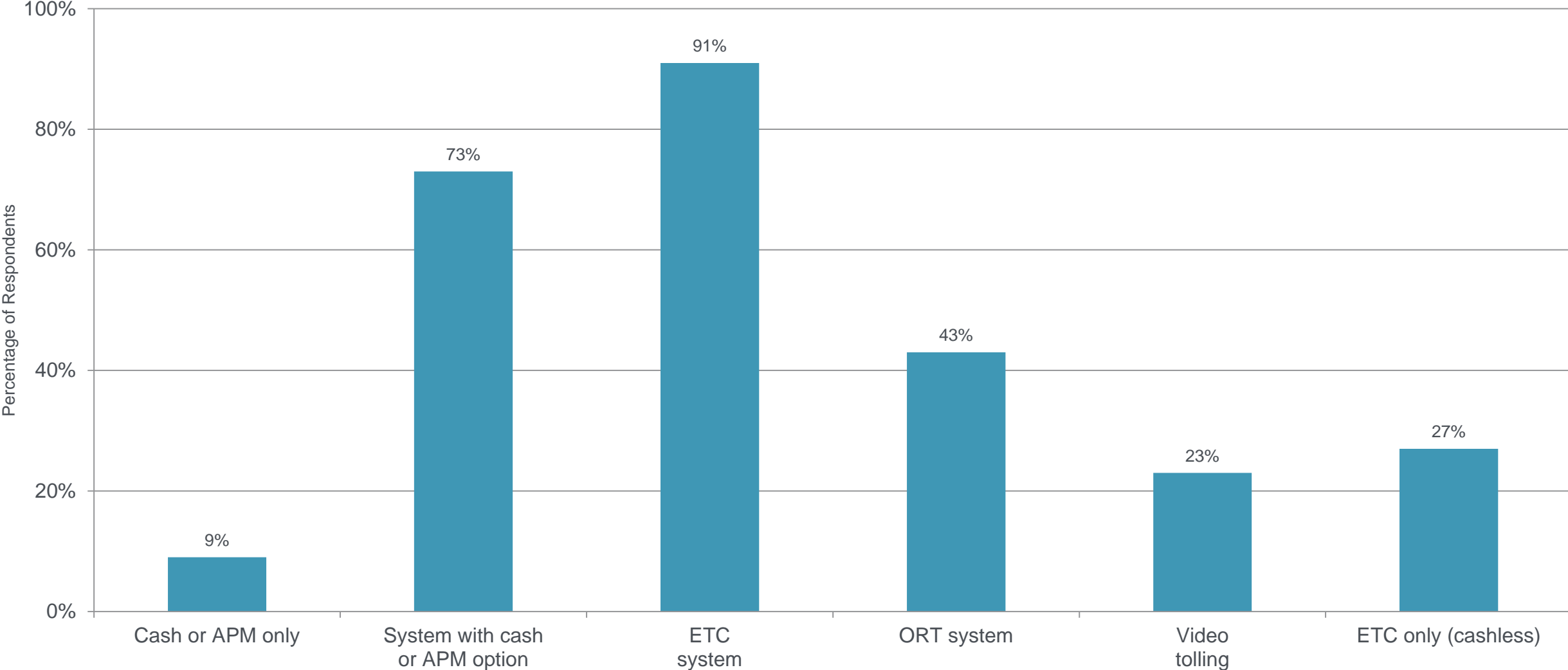


The Adoption of All Electronic Tolling has not been quick

AET Adoption			
Early Adopters		More Recent	
Norway	1991	E-470	2009
Hong Kong	1992	North Texas Tollway	2010
91 Express Lanes (US)	1995	Selmon Expressway	2010
Portugal	1995	Miami Dade Expwy	2010
407 ETR (Toronto)	1997	Florida Turnpike	2011
Singapore Congestion	1998	Central Texas Turnpike	2013
		Massachusetts Turnpike	2016

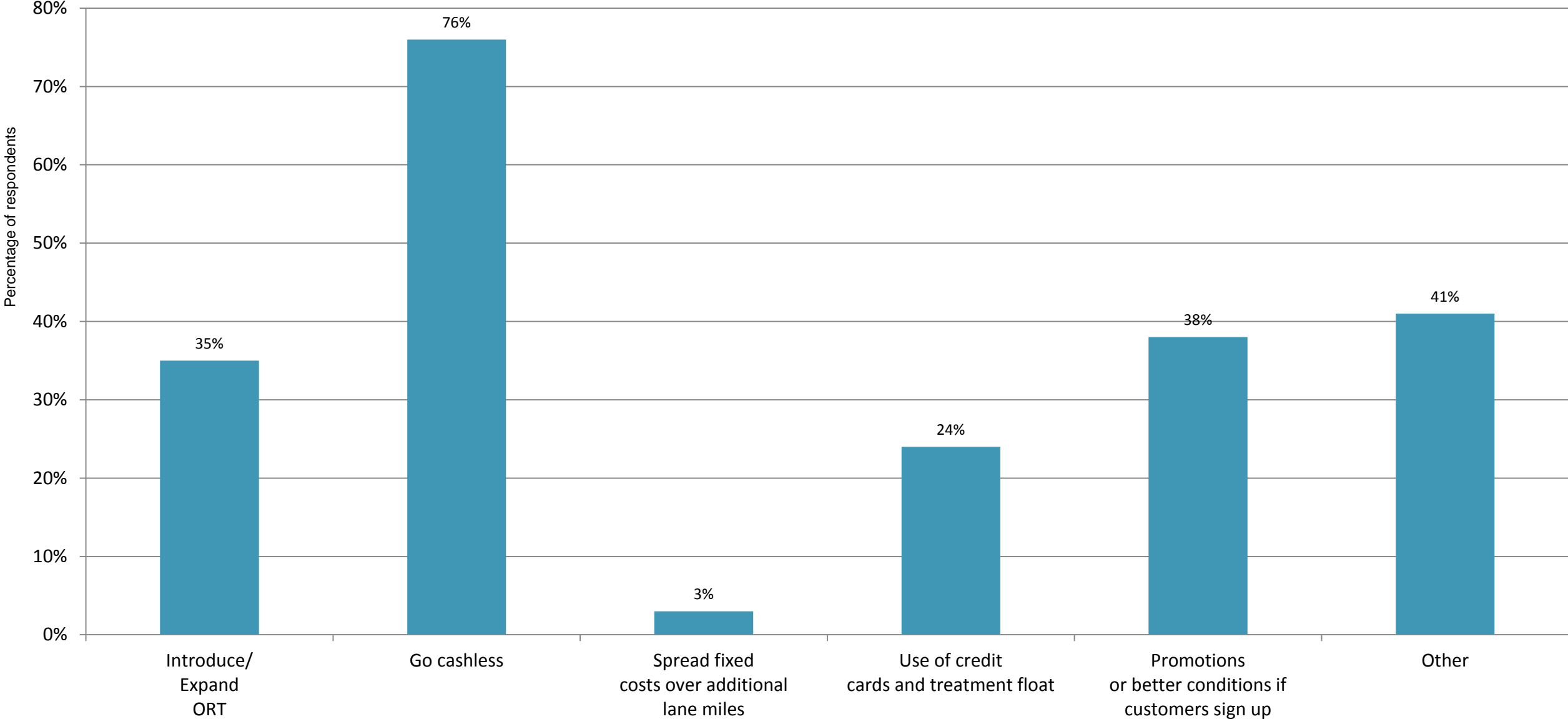
The Adoption of All Electronic Tolling has not been quick

What is/are the types of toll collection approaches currently used by your agency?



Most Toll Facilities have considered going cashless

What strategies has your agency considered implementing to make toll collection more cost-effective?



A Survey of Collection Strategies Documents the Obvious

	Total	Cash	OBU	Video
Highly efficient	Less than \$0.26	Less than 0.72	Less than \$0.17	Less than \$0.70
Average	\$0.43	\$0.85	\$0.29	\$0.97
Inefficient	More than \$0.59	More than \$1.00	More than \$0.34	More than \$1.15

Electronic toll collection facilitates toll rate indexing

Toll Roads That Index Rate Increases to Inflation

Entity Name	AET?	Senior Moody's Rating	Annual Indexed Rate Increases
Central Texas Regional Mobility Authority, TX	Yes	Baa2	Yes
Texas Transportation Commission - Central Texas Turnpike System, TX	Yes	A3	Yes
E-470 Public Highway Authority, CO	Yes	Baa1	Yes
Florida Department of Transportation Alligator Alley, FL	No	A1	Yes
Florida Department of Transportation, FL	Yes	Aa3	Yes
Harris County Toll Road Authority, TX	Some	Aa2	Yes
Miami Dade County Expressway Authority, FL	Yes	A2	Through FY 2020
North Texas Tollway Authority, TX	Yes	A1	Yes
Ohio Turnpike and Infrastructure Commission, OH	No	Aa3	Through 2023
Orange County Transportation Authority, CA	Yes	A1	Yes ⁽¹⁾
Pennsylvania State Turnpike Commission, PA	No	A1	Annual but not Indexed
Tampa-Hillsborough County Expressway Authority, FL	Yes	A3	Yes

1) Also congestion/volume based increases

Source: The issuer's published toll policies and websites.

MassDOT Operating Expense & Revenue Projections

AET vs. Current Toll Collection

Revenue & Operating Expense Comparison

Annual Revenue Sources		Current System	AET System (2017 Est) \$0.50 Surcharge	AET System (2017 Est) \$1 Surcharge
Toll Revenue Collected ¹		\$360.7M	\$364.3M	\$364.3M
Violation Fees Collected ²		\$14.0M	\$0	\$0
Leakage ³ (Uncollected Toll Revenue)		N/A	(-\$15.9M)	(-\$16.1M)
Diversion (Traffic Diverted Off Toll Facility)		N/A	(-\$10.6M)	(-\$13.8M)
Surcharge Revenue (Pay by Plate Fee)		N/A	\$22.2M	\$34.6M ⁴
Total Annual Revenues Collected		\$374.7M	\$360.0M	\$369.0M
Operational Cost Categories		Current System	AET System (2017 Est) \$0.50 Surcharge	AET System (2017 Est) \$1 Surcharge
Salary and Benefits of Toll Collectors and Cash Collection Service		\$34.4M	\$0	\$0
Processing Costs for E-ZPass and Pay-by-Plate	TransCore Backoffice O&M Cost	\$12.1M	\$19.0M ⁵	\$18.5M ⁴
Collection costs other than TransCore (i.e: credit card fees, postage)	MassDOT Customer Service Center Costs ⁶	\$4.4M	\$14.0M ⁵	\$13.5M ⁴
Equipment Maintenance Costs ⁷		\$5.5M	\$3.9M ⁸	\$3.9M ⁸
Estimated Annual Operational Cost		\$56.4M	\$36.9M	\$35.9M
Net Revenue		\$318.3M	\$323.1M	\$333.1M

1) Assumes 1% annual growth in revenue

2) With AET revenue from toll violations will go away

3) Based on Tobin Bridge experience and 2012 Cambridge Systematic analysis

4) Based on baseline 85% E-ZPass vs. 15% Pay By Plate market

5) Based on 82% EZ-Pass vs. 18% Pay-By-Plate market

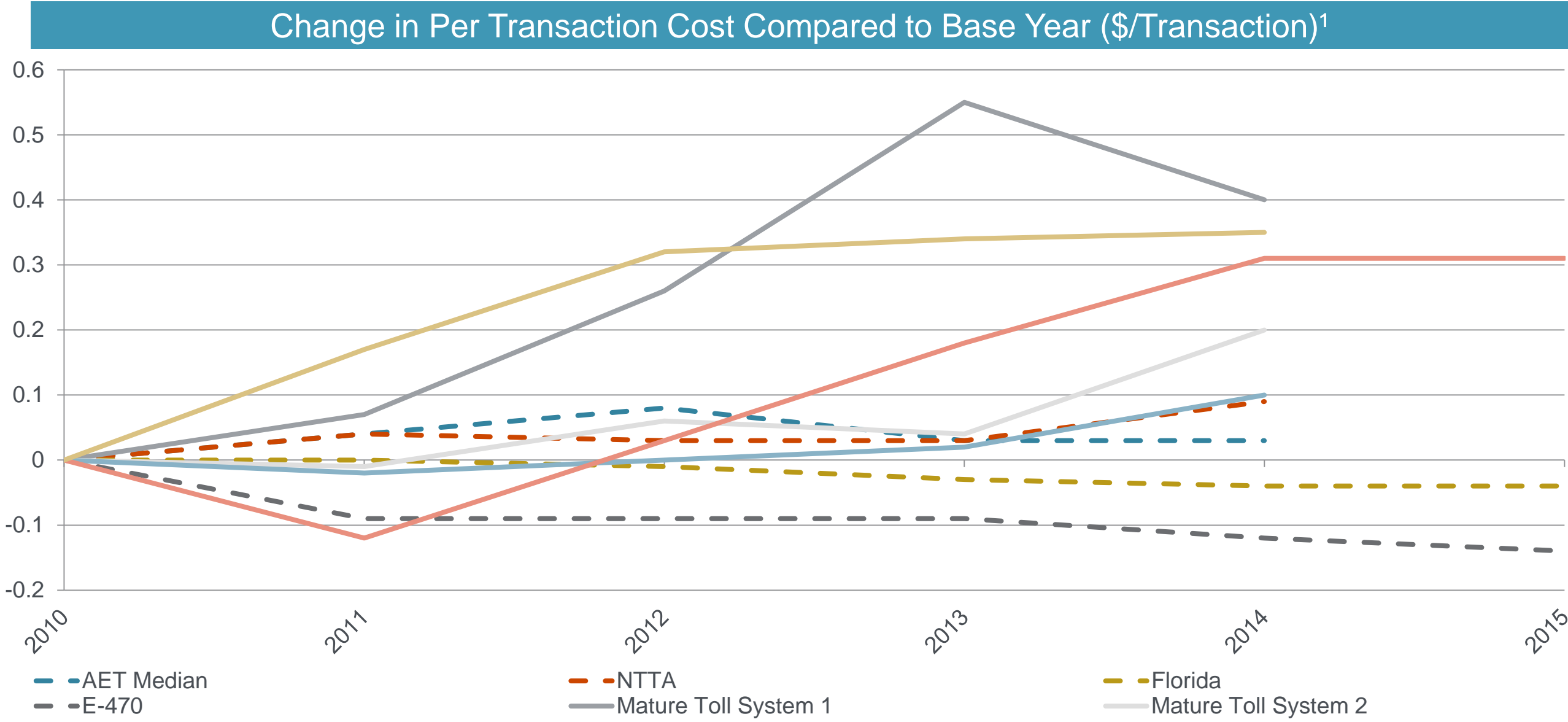
(note: E-Zpass usage rate increases as surcharge increases)

6) Costs incurred through Pay By Plate transactions outside the scope of AET contract (ie: credit card fees, postage, etc.)

7) Annual maintenance costs of equipment (current system under TransCore; AET maintenance performed by Raytheon)

8) Raytheon Equipment Maintenance Cost for the first year (rises by approximately 0.1M each subsequent year)

Recent experience suggests AET opex costs increase less than conventional tolling



1) Per transaction cost in 2010 used as base year for comparative purposes.
 2) Dashes indicate AET Systems

Pay by Plate Surcharges have not Established an Industry Standard

Pay By Plate Surcharges	
Toll Authority	Surcharge
E-470	25%
Tampa-Hillsborough	15-45%
Central Texas Turnpike	33%
Pennsylvania Turnpike	35%
North Texas Tollway	50%
Florida Turnpike	24-103%
TBTA	116%