

USVI Transportation Fuel Reduction Plan

Radclyffe Percy, VIEO
Caley Johnson, NREL



Credit: Don Buchanan, VI Energy Office



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Credit: Warren Gretz, NREL



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Purpose of Fuel Reduction Plan

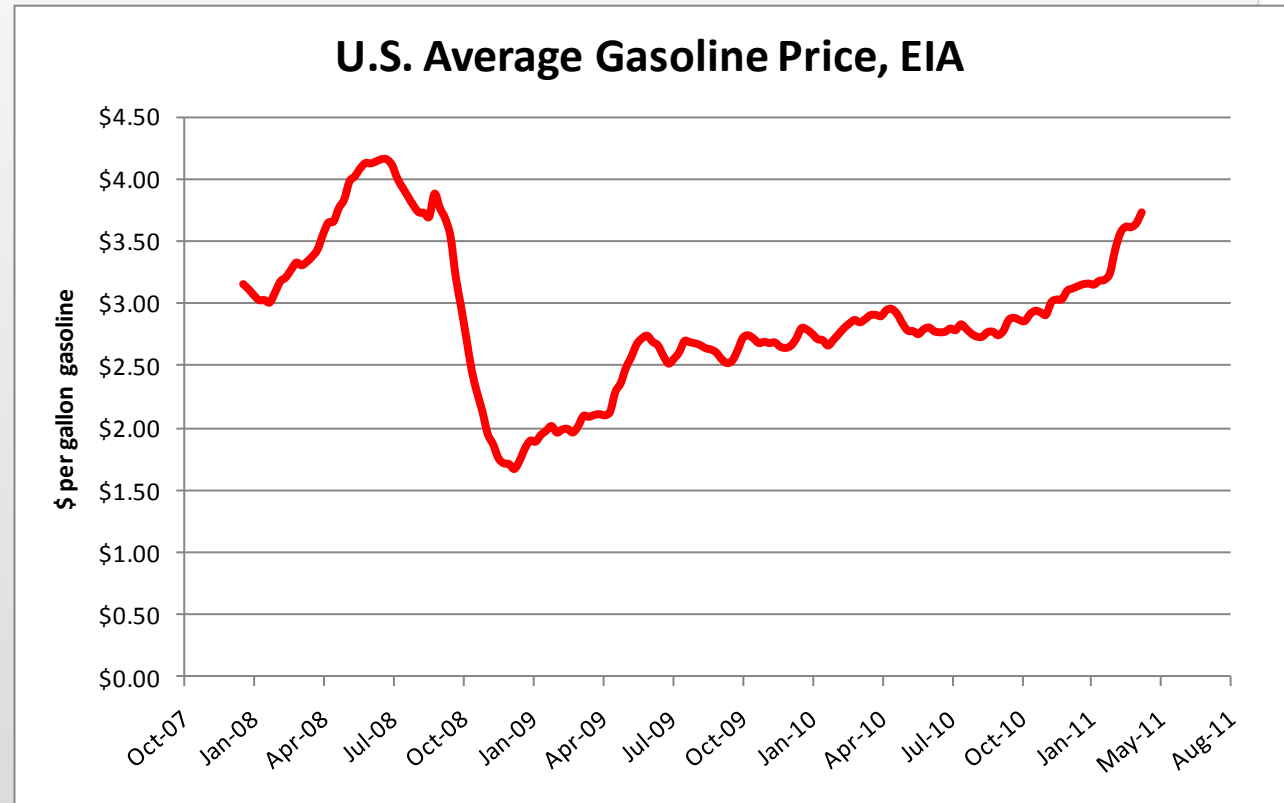
- Consolidate information
 - Data from BMV, DPW, IRB, Port Authority, and more
 - References to previous analyses and data sources
- Develop fleet profile so we know what we're working with
- Build on work done by 2030 Master Plan
 - Community meetings
- Chart path to 60% reduction
 - Funders need to see a cohesive plan
- Propose, compare, and prioritize projects

Plan Outline

- Introduction
- Baseline fuel use and transportation statistics
- USVI transportation characteristics
 - Infrastructure
 - Vehicles
- Wedge analysis
- Projects
 - Rating system (cost, petroleum reduction, timeframe, popularity, wedge, hurdles)
- Implementation plan/schedule

Introduction

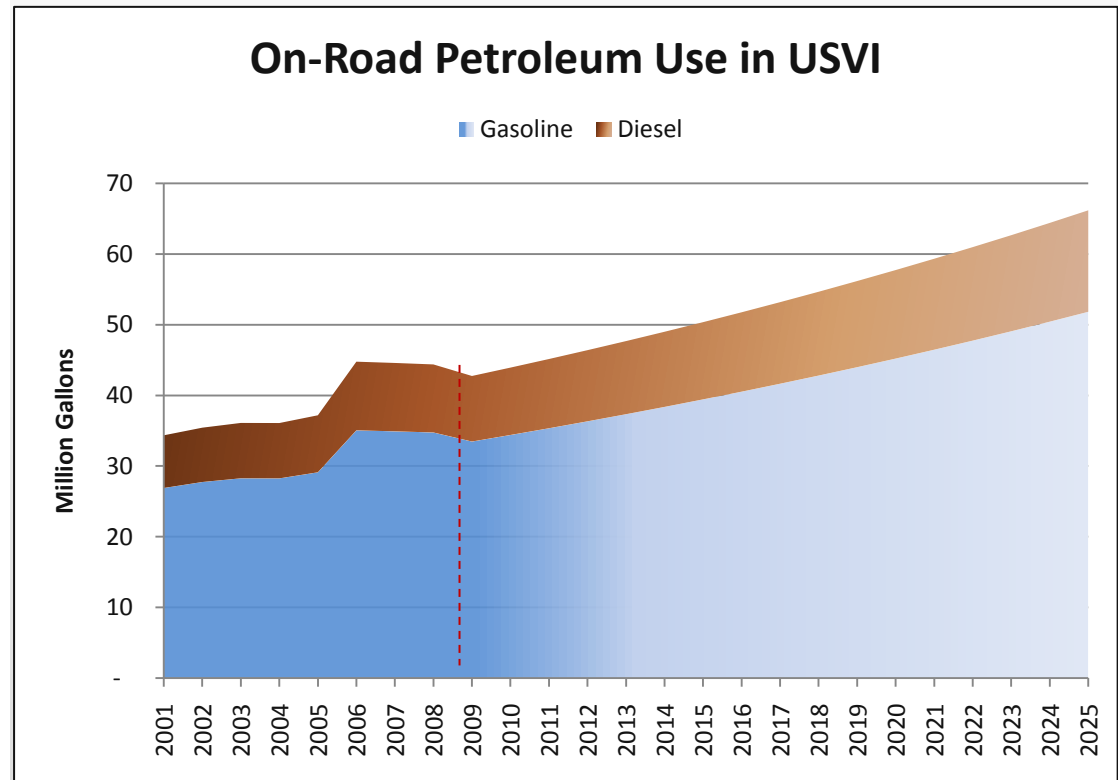
- Goal: 60% reduction below BAU by 2025
 - Context for goal: oil price spike and EDIN
- Ties to 2030 Master Plan
 - Builds on Goal #4
 - Assesses and includes projects from 2030 plan
- Call to action



Baseline Fuel Use

Sources and Assumptions

- Taxed gasoline from the Bureau of Internal Revenue
 - Diesel skewed by boats and generators
- Assumed on-road diesel use 28% of gasoline—which is the average ULSD throughout the U.S. East and Gulf Coasts
- Annual growth rate of 2.8% 2001–2009
- Data check – average LDV efficiency of 17.2 mpg
 - Average in U.S. (with smaller vehicles) is 20.4 mpg



USVI Transportation Vital Statistics

Metric	Number	Unit	Source
VMT of LDV in US	11,432	miles/year	Transportation Energy Data Book 29 2008
VMT of HDV in US	25,253	miles/year	Transportation Energy Data Book 29 2008
Each HDV travels 2.2 times as far as LDV	2.2		calculated
VMT of LDV in USVI	7,000	miles/year	USVI DPW
VMT of HDV in USVI	15,463	Miles/year	calculated
Percentage of all traffic that is HDV	7.5%		Traffic Data Collection Technical Report 2009
Percentage of all vehicles that are HDV	3.4%		calculated
Total vehicles registered in USVI	85,660	vehicles	USVI BMV 2008
Heavy duty vehicles in USVI	2,908	vehicles	calculated
Motorcycles in USVI	681	vehicles	USVI BMV 2009
Light duty vehicles in USVI	82,071	vehicles	calculated
Percent cars	38.6%		USVI Household Travel Survey
Percent light trucks	61.4%		USVI Household Travel Survey
Cars in USVI	31,679	vehicles	calculated
Light trucks in USVI	50,391	vehicles	calculated
Annual on-road gasoline use	33,470,575	gallons	USVI Bureau of Internal Revenue 2009, assuming exempt gasoline is used off-road
Diesel-to-gasoline ratio for U.S. East & Gulf	27.7%		EIA Petroleum Navigator
Annual diesel use	9,271,349	gallons	calculated
Light duty fuel economy	17.2	mpg	calculated, assuming all gas used in LDVs. US avg is 20.4 mpg
Heavy duty fuel economy	4.9	mpg	calculated, assuming all diesel used in HDVs. U.S. avg. is 5.9 mpg
Average vehicle age	9	years	USVI Household Travel Survey
Annual scrappage rate	5.6%	% per year	Calculated. U.S. avg. was also 5.6 when median car was 9 yrs.

USVI Transportation Characteristics

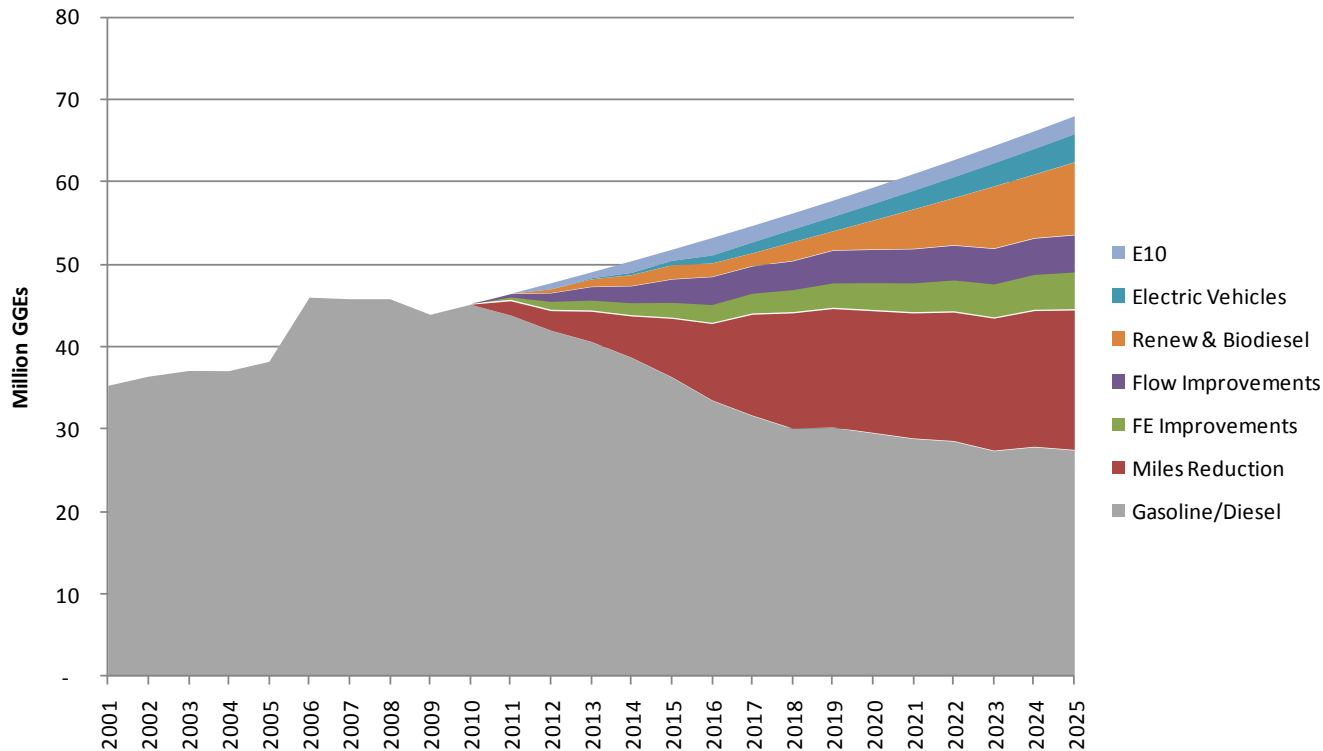
- Large, inefficient vehicles
 - Huge taxis
 - Very few motorcycles
- Narrow roads
- Restricted parking
- Drive cycle that stops or slows frequently
- Shortage of sidewalks and paths
- Shortage of data
- Boats are an option
- Island differences
 - St. Thomas: more hills
 - St. Croix: more potholes and washouts



Credit: Adam Warren, NREL

Wedge Analysis

USVI Transportation Fuel Use Reductions



Discuss:

- Assumptions
- Feasibility
- Prioritization

Currently just road transportation

Omitted air and marine because beyond our control

2025 Wedge Assumptions

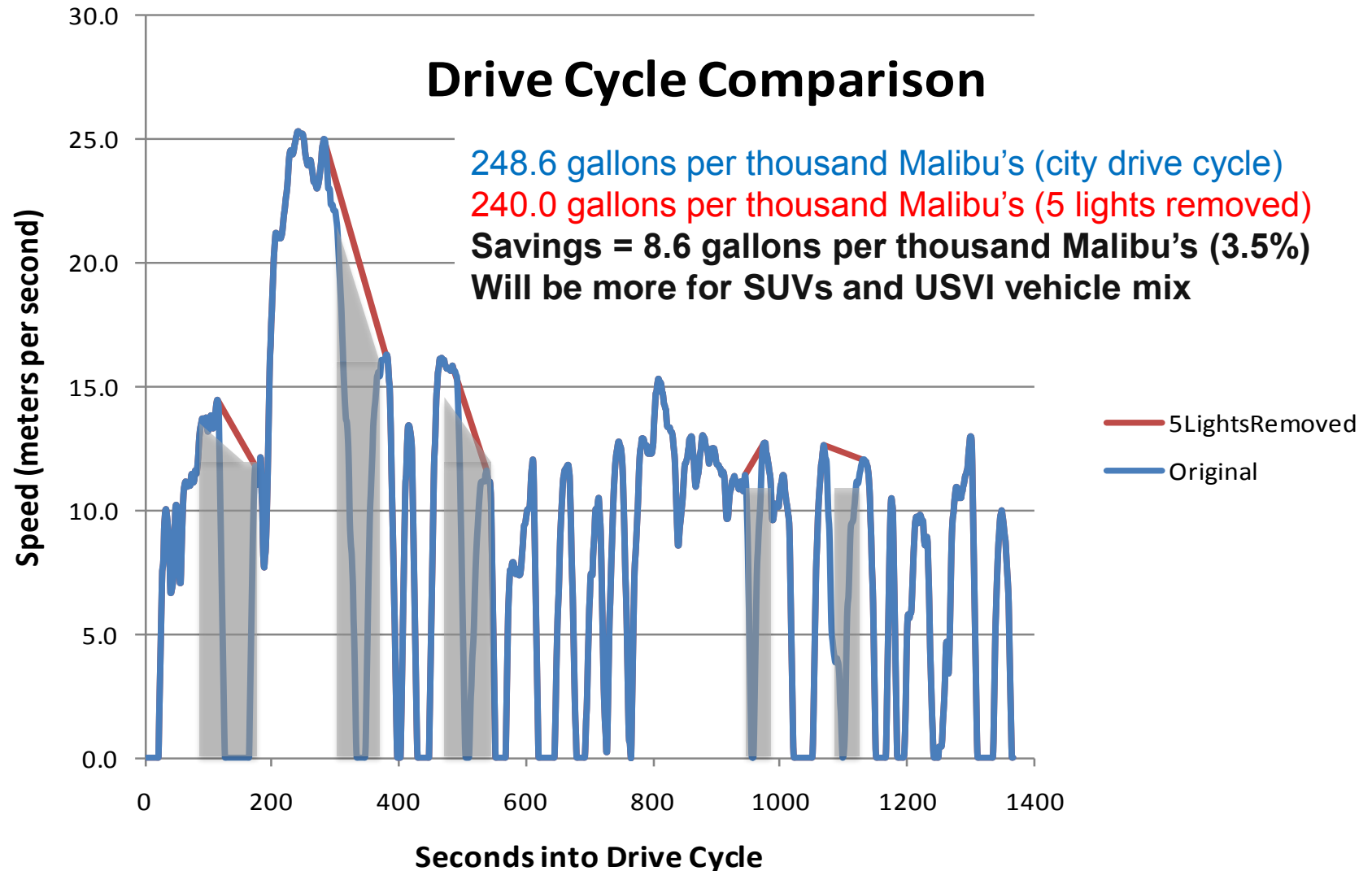
- VMT Reduction: 1 in 4 vehicle trips will be eliminated
- Fuel economy: USVI vehicle purchases will be 3 mpg below CAFE requirements
- Traffic flow improvements: 30% of road distance is switched from city- to highway-style driving
- 75% of diesel will be replaced with renewable or biodiesel
- 15% of vehicles will be electric
- 80% of gasoline will be replaced with E10

Estimating Fuel Reduction from Traffic Flow Improvement Projects

- USVI is cutting edge
- Future Automotive Systems Tool (FAST)
- Input vehicle parameters and pre-/post-project drive cycle
- Get drive cycle from geotrackers
 - Current default: Oahu drive cycle
- Output: pre- and post- project fuel use

Estimating Fuel Reduction from Traffic Flow Improvement

Drive Cycle Comparison



Project Prioritization

- Four main factors
 - Cost
 - Taking both up-front and lifecycle costs into consideration
 - Petroleum reduction
 - Ideally combine first two into \$/gal reduced metric
 - Timeframe (to point at which reductions occur)
 - Popularity
 - Feasibility/hurdles
- Currently simple categories, trying to replace with numbers

Project Prioritization

Project	Cost	Petroleum Reduction	Time-frame	Popularity	Wedge	Hurdles
Geotrackers to increase mass transit use	Low	High	Short	High	VMT Reduction	DPW participation
Purchase-price adjustments to encourage more efficient vehicles	Low	High	Medium	Low	Fuel Economy	Enactment and Enforcement
Government to meet Act 7075	Low	High	Medium	Low	Fuel Economy	DP&P participation
Ride-sharing Website	Low	Medium	Short	High	VMT Reduction	?
Telecommuting/teleconferences	Low	Medium	Short	Medium	VMT Reduction	Trusting employees
Mandate that crashes be removed from roads	Low	Medium	Medium	Medium	Traffic Flow	Enactment and Enforcement
Education campaign for alternative transportation	Low	Low	Medium	Medium	VMT Reduction	?
Education campaign for vehicle size reduction	Low	Low	Medium	Medium	Fuel Economy	Large-car culture
E10 from Geonet	Medium	High	Long	Low	E10	Need to increase profitability
Park&Rides to encourage carpools, bus, and ferry	Medium	Medium	Short	High	VMT Reduction	DPW participation
Synchronize signals	Medium	Medium	Short	High	Traffic Flow	\$
Pull-offs for buses/taxis	Medium	Medium	Short	High	Traffic Flow	\$
Maintenance facility for hybrids	Medium	Medium	Medium	High	Fuel Economy	Sufficient HEV population
Improve and automate road repair system	Medium	Medium	Medium	High	Traffic Flow	\$
Left-hand turn lanes	Medium	Medium	Medium	High	Traffic Flow	\$
Sidewalks and paths	Medium	Low	Medium	High	VMT Reduction	\$
Waste grease biodiesel project	Medium	Low	Medium	Medium	Renewable/Biodiesel	None so far
Water taxis	High	High	Medium	High	VMT Reduction	Taxi coalition
Renewable diesel in Hovensa refinery	High	High	Long	Low	Renewable/Biodiesel	Source of veg oil
WAPA trial fleet of EVs	High	Medium	Long	High	Electric Vehicles	WAPA participation
Government trial fleet of EVs	High	Medium	Long	Medium	Electric Vehicles	DP&P participation
Rental cars/hotel partnership EV project	High	Medium	Long	Medium	Electric Vehicles	Car maintenance facility
Roundabouts	High	Low	Medium	Medium	Traffic Flow	\$

Project Groundwork

- Webinars and telecommuting
- Bus geotrackers
- Vehicle purchase price policies
- Waste grease to biodiesel
- E10 from Geonet
- Improve data tracking



Source: Utah Biodiesel Supply

Webinars and Telecommuting

- Webinars/teleconferences
 - Lead by example
 - Huge potential cost savings for islands
 - Obstacles
 - Reduced personal touch
 - Technical issues
- Telecommuting
 - Obstacle: trust
 - First jobs to convert will be deliverable-based



Bus Geotracker

- Initial fleet of 12 deemed best
 - Large buses that come by infrequently means that they are very important to catch
- Found Caribbean distributor (GeoOrbis) and received quote
 - Up-front costs: \$1,200/bus; \$6,000/route
 - Monthly costs: \$100/bus



RTD/Boulder Transit

Choose another transit system...

Select your route/direction/stop to obtain GPS-based arrival times:

Route:

Direction:

Stop:

No HOP service at this stop when severe snow conditions exist.

Tracked vehicles for route HOP around town arriving in:

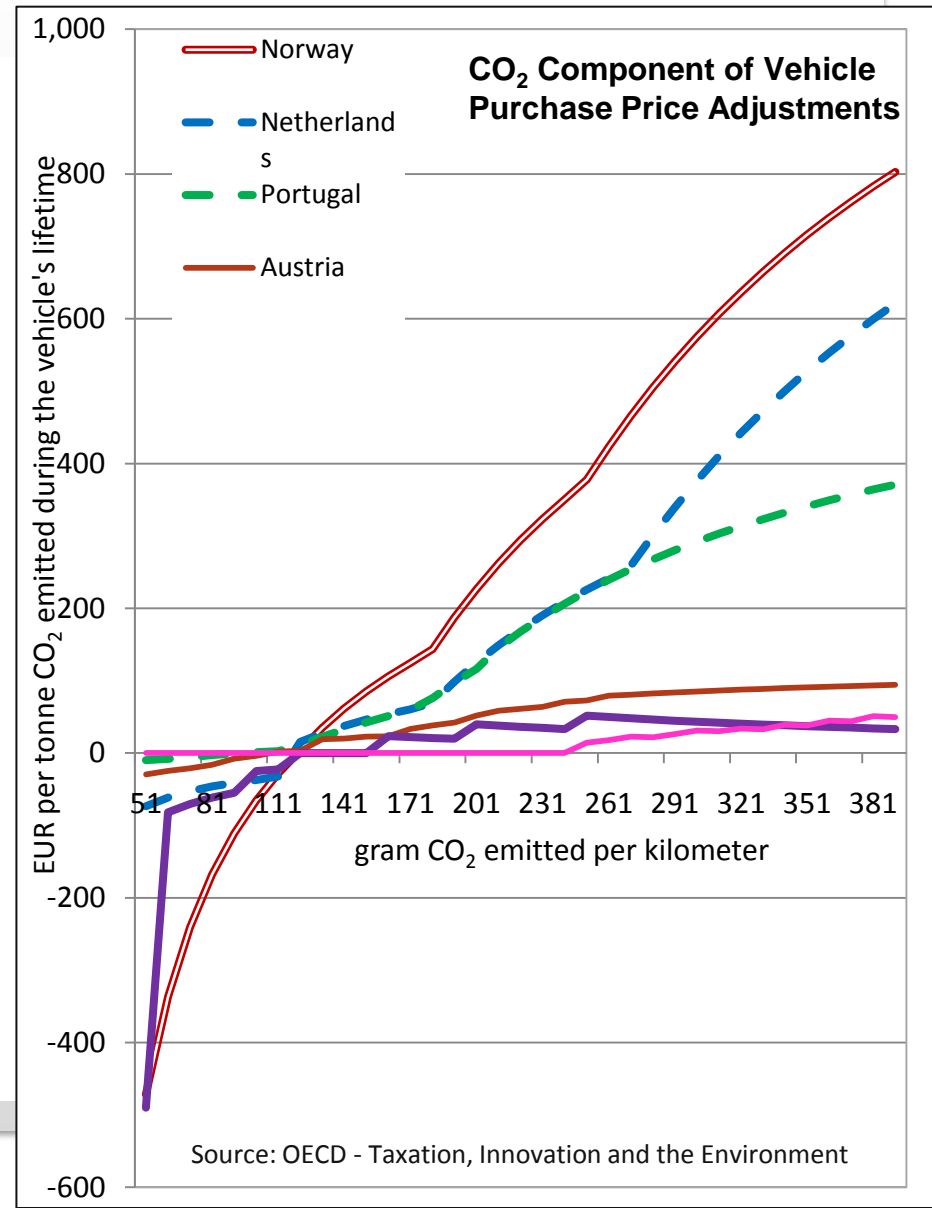
- 2** minutes
- 15** minutes
- 36** minutes

Valid as of 1:55 PM Monday, April 4

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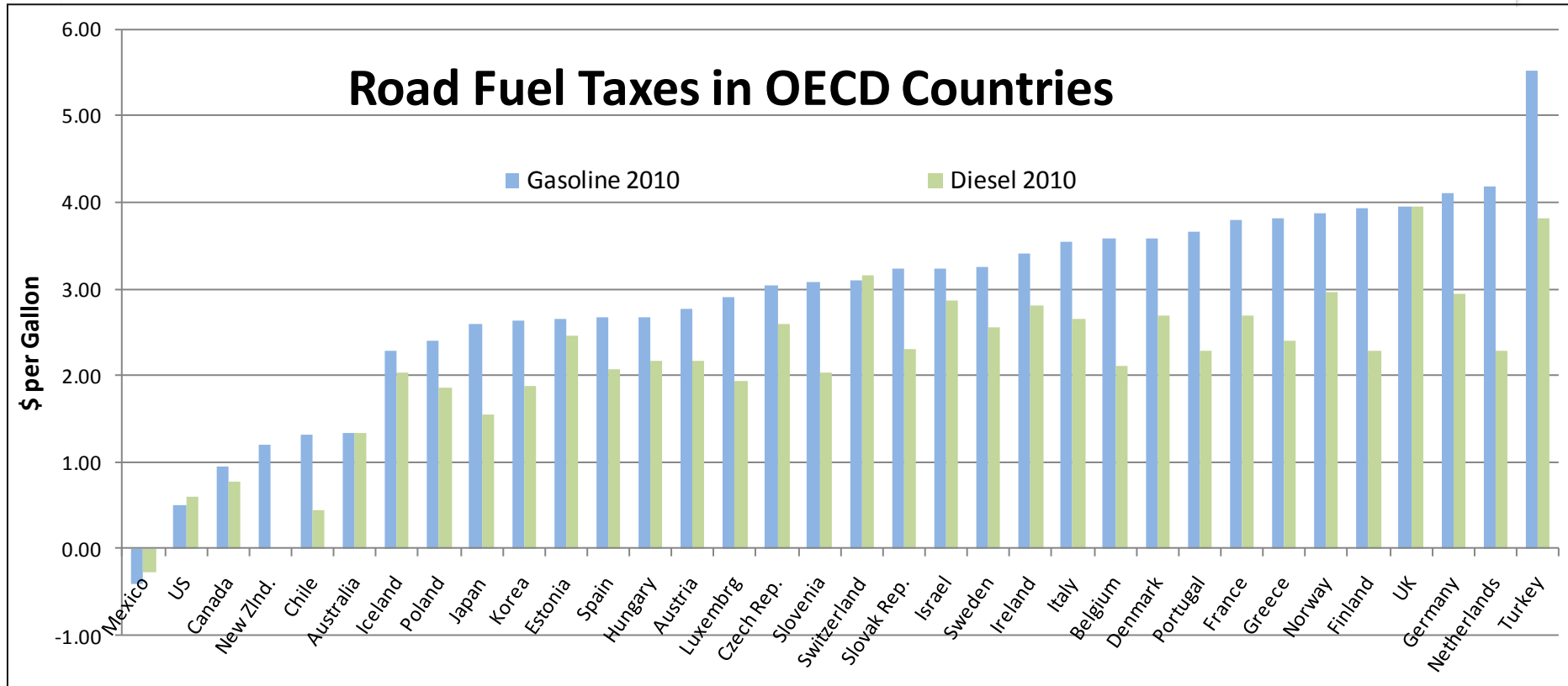
Vehicle Purchase Price Adjustments

- Policy brief for senate
- Outline policies being implemented in other countries/states
- Target fuel use via vehicle weight, engine power, fuel economy, CO₂ emissions
- Positive attributes are transparency and consistent pressure for efficiency
- Possible role models are Norway, Netherlands, Portugal, Austria, France



Included in Senate Brief

- Reminder: road fuel tax is the simplest way to reduce fuel use and could provide much-needed funds
- Most developed economies have higher fuel taxes than the U.S.



Waste Grease to Biodiesel

- Ritz Carlton and other hotels have offered their grease and have offered to pay for government vehicle conversion
- Determined that biodiesel project is better than straight vegetable oil (SVO)
- Similar school project in Delaware is available for advice
- Need DP&P to identify good vehicles to use biodiesel



Courtesy of Robert Broadrup Tatnall School, Delaware



Courtesy of Utah Biodiesel Supply

Water Transport

- Taxi coalition is understandably in opposition
- Taxi survey includes questions about what would reduce that opposition
- Coalition head is a member of the working group



Courtesy of Don Buchanan, VIEO

E10

- Spoke to Geonet CEO
- 4M gallon/year market not enough to justify infrastructure investment
 - Minimal infrastructure required
 - Looking into economics of E10 for Hovensa



Credit: NREL PIX/13531

Improve Data Tracking

- Help BMV store mileage data (that they already ask for) in a central database
- Need to streamline data requests from BMV and BIR
- Work with BIR to differentiate on-road diesel consumption vs. off-road
- Taxi survey is getting a better picture of taxi fuel use and options for fuel reduction
- Need to expand and repeat traffic counts and household transportation surveys

Conclusions

- USVI transportation fuel use patterns
- Call to put better tracking system in place with easier access to data
- Discuss how specific projects will make the wedge analysis achievable
- Discuss key players and what is needed from them

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