



Modeling of Gliders in MOVES

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Background

- Glider vehicles*
 - Vehicles with old powertrain (engine, transmission and/or rear axle) combined with a new chassis and cab assembly
 - Most of them are Class 8 heavy-duty vehicles
 - Typically use remanufactured engines from Model Year 2001 or older
- Current public version of MOVES does not account for gliders



Planned Changes: Modeling Gliders in MOVES

- All gliders presumed to be tractor-trailers (combination trucks) running on diesel
- Defined a new regulatory class (ID: 49) for gliders within *source types* 61 & 62
 - Gliders' exhaust THC/CO/NOx/PM emission rates are set to be equivalent to MY2000 Heavy-Heavy-Duty fleet
 - Decision based on a comparison of MOVES rates vs. EPA's glider testing data
 - Vehicle characteristics (aero/rolling resistance/APU/brake & tire PM rates) assumed to be the same as new (non-glider) HHD vehicle fleet
- Glider sales (population at age 0) estimated based on the production data provided by manufacturers*
 - Aggregated/rounded numbers are used to derive the glider fractions in default DB

Model Year	<=2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018+ [^]
# of gliders	0	500	500	1000	3000	4000	5000	8000	12000	7000	8000	1500



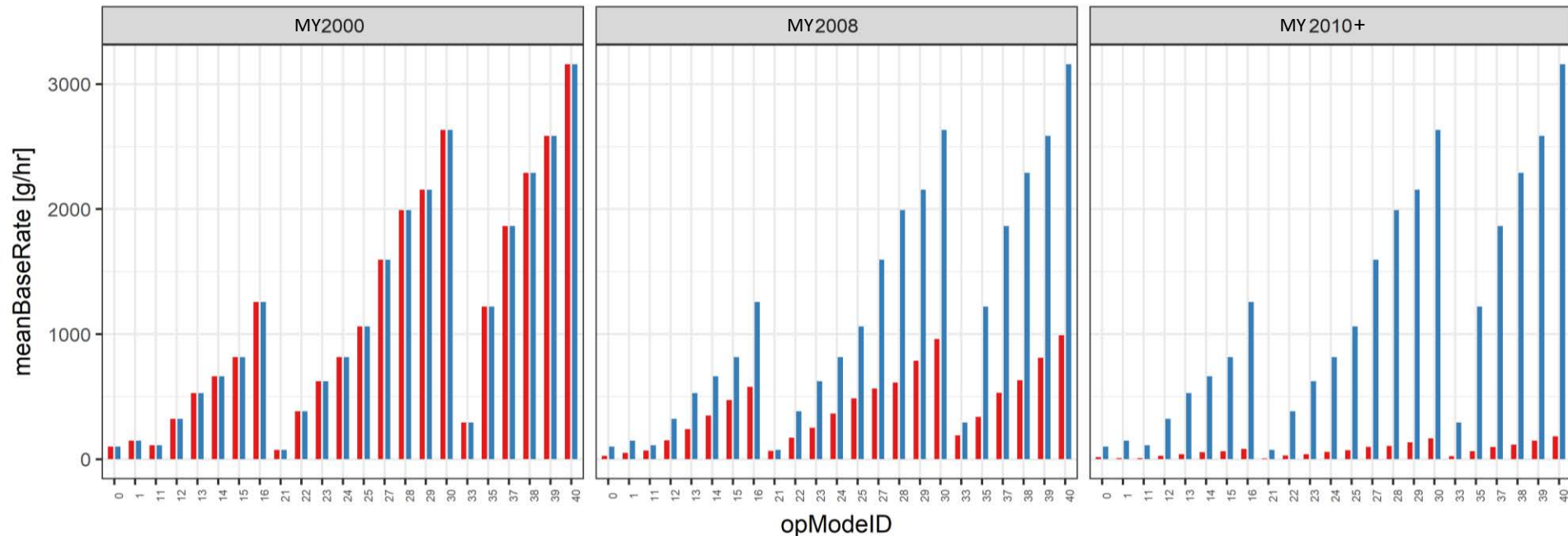
* CBI. Redacted version at <https://www.regulations.gov/document?D=EPA-HQ-OAR-2014-0827-2379>

[^] 2018+ numbers are estimates assuming that the glider provisions in HD GHG Phase 2 rule remain in place

MOVES Rate Example

Left bar	HHD (regClass=47) rates
Right bar	Gliders (regClass=49) rates

- **NO_x Exhaust Emission Rates by Operating Mode and Model Year^{1,2}**



¹ Age 0-3 group shown in the example.

² MY2010+ HHD rates shown here do NOT incorporate planned changes based on HDIUT (see today's presentation).



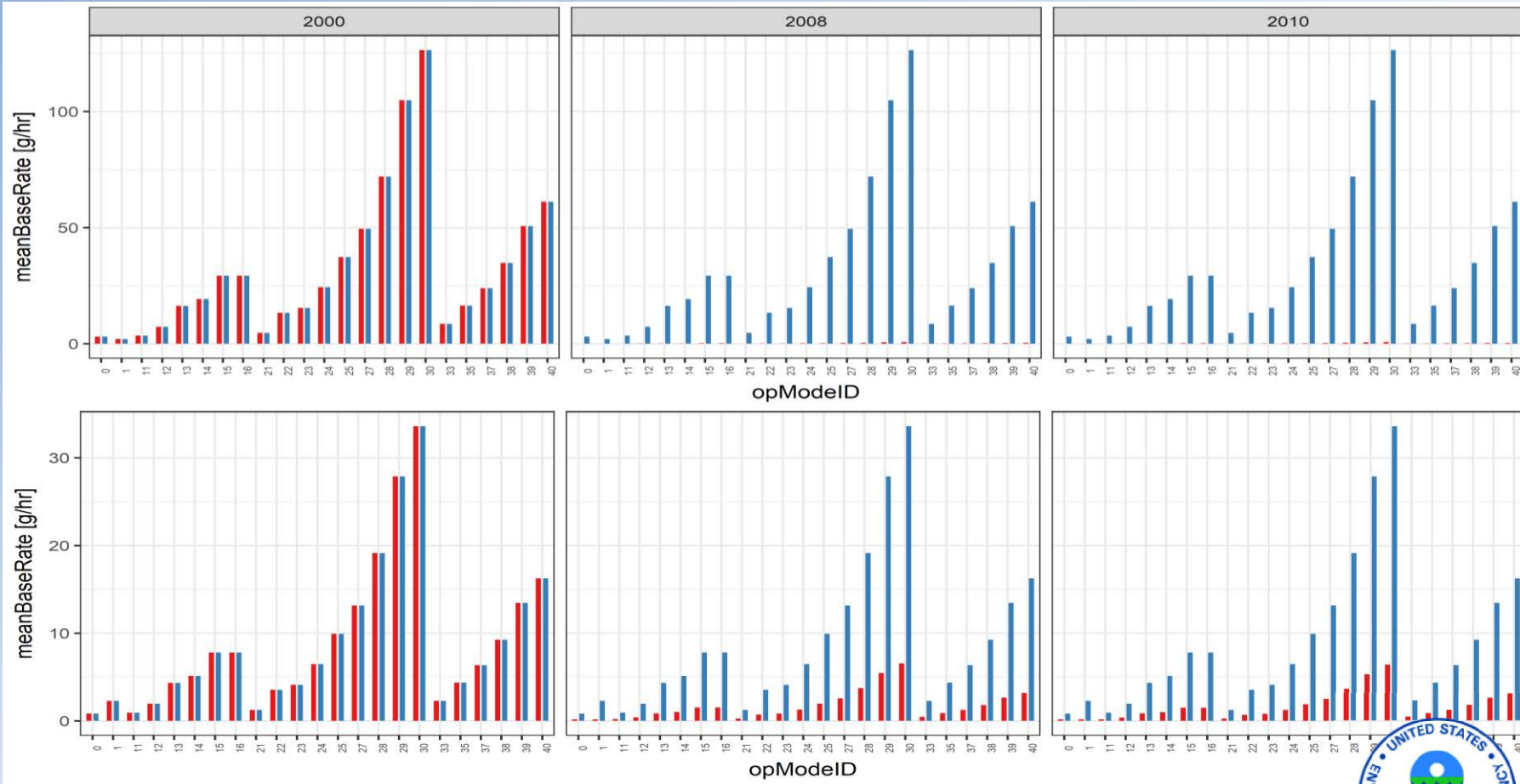
MOVES Rate Example

Left bar	HHD (regClass=47) rates
Right bar	Gliders (regClass=49) rates

- PM (EC/nonEC) Exhaust Emission Rates by Operating Mode and Model Year^{1,2}

ECPM

nonECPM



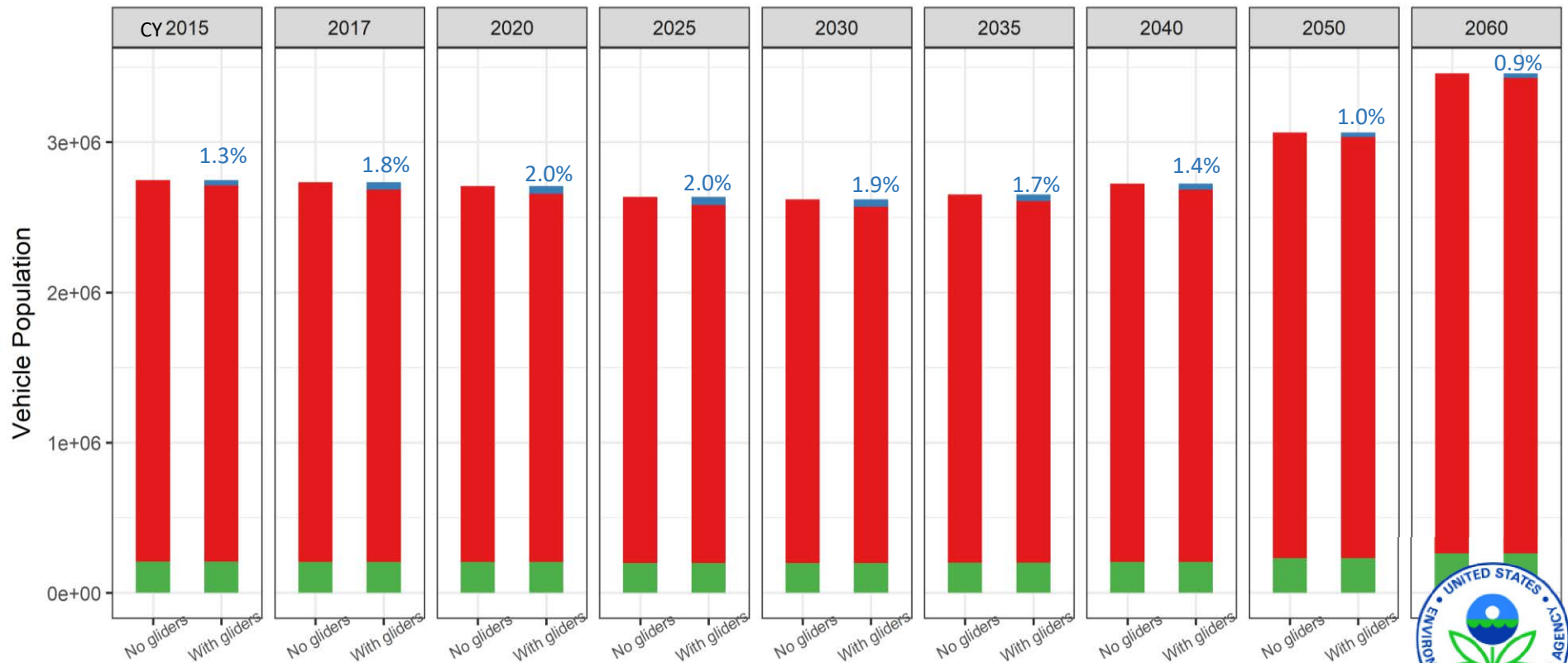
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Diesel Combination Truck Populations (By Calendar Year)

	MHD (regClass=46)
	HHD (regClass=47)
	Gliders (regClass=49)

- Total population conserved before and after adding gliders
- Glider fractions $\leq 2\%$ for all calendar years
- Default regClass fractions are specified in *MOVES SampleVehiclePopulation* table



Summary

- Added capabilities to model gliders in a future version of MOVES
 - Gliders defined as a new regClass (49) for diesel combination trucks
 - National scale regClass splits among 46/47/49 in MOVES DB
 - County scale runs will use national splits
- Relative contribution from gliders to emissions inventory dependent on:
 - Planned MOVES updates for HD emission rates, population, and activity
 - Potential reconsideration of the glider rule

