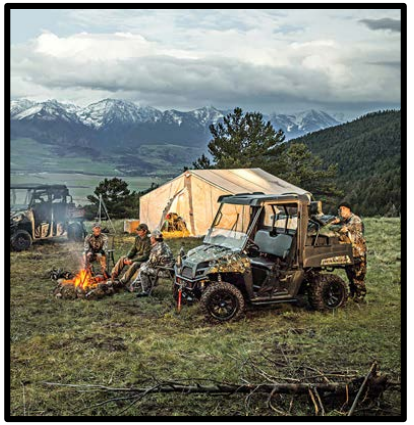
INFORMATIONAL UPDATE ON THE RED STICKER OFF-HIGHWAY RECREATIONAL VEHICLE (OHV) PROGRAM

JUNE 22, 2017



California Environmental Protection Agency
Air Resources Board

OHV Regulatory History

OFF-HIGHWAY MOTORCYCLE (OHMC)

ALL-TERRAIN VEHICLE (ATV)

1994: CARB adopts 1st exhaust standards

1998: CARB creates Red Sticker program

2006: U.S. EPA adopts exhaust and evaporative emissions standards defines competition

2013: CARB adopts evaporative standards; Board directs staff to conduct Red Sticker assessment

Current Control of California OHV Emissions

Green Sticker meet 1994 exhaust standards

Red Sticker no engine controls; subject to riding restrictions only

Exhaust (Operation)

Green Sticker meet 2013 evaporative standards

Red Sticker excluded from all evaporative controls

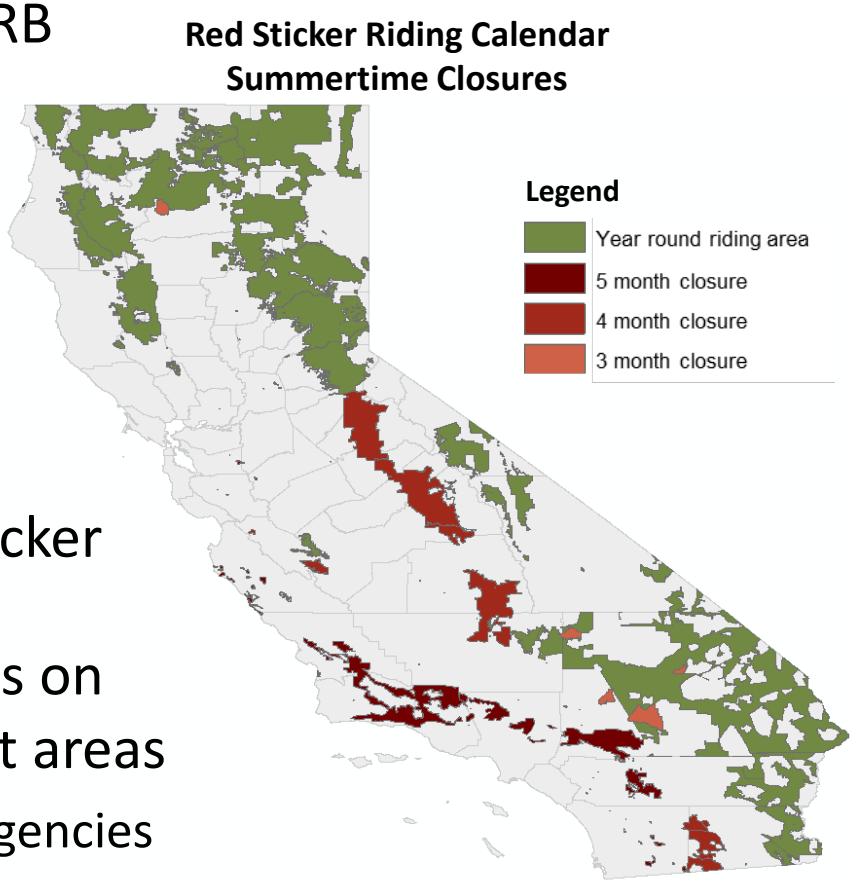
Running Loss (Operation)

Hot Soak (Immediately After Operation)

Diurnal (Storage)

Red Sticker OHV Program Characteristics

- All-terrain vehicles (ATV) and off-highway motorcycles (OHMC) certified by CARB as emissions non-compliant
  - No emissions data provided
  - No warranty requirements
  - Receive red registration sticker
- Nearly 190,000 of California's estimated 1 million OHVs are Red Sticker
- Subject to seasonal usage restrictions on public lands in ozone non-attainment areas
  - Enforced by public land management agencies
  - Excludes private land



Intent of Red Sticker Program

ORIGINAL PURPOSE OF PROGRAM

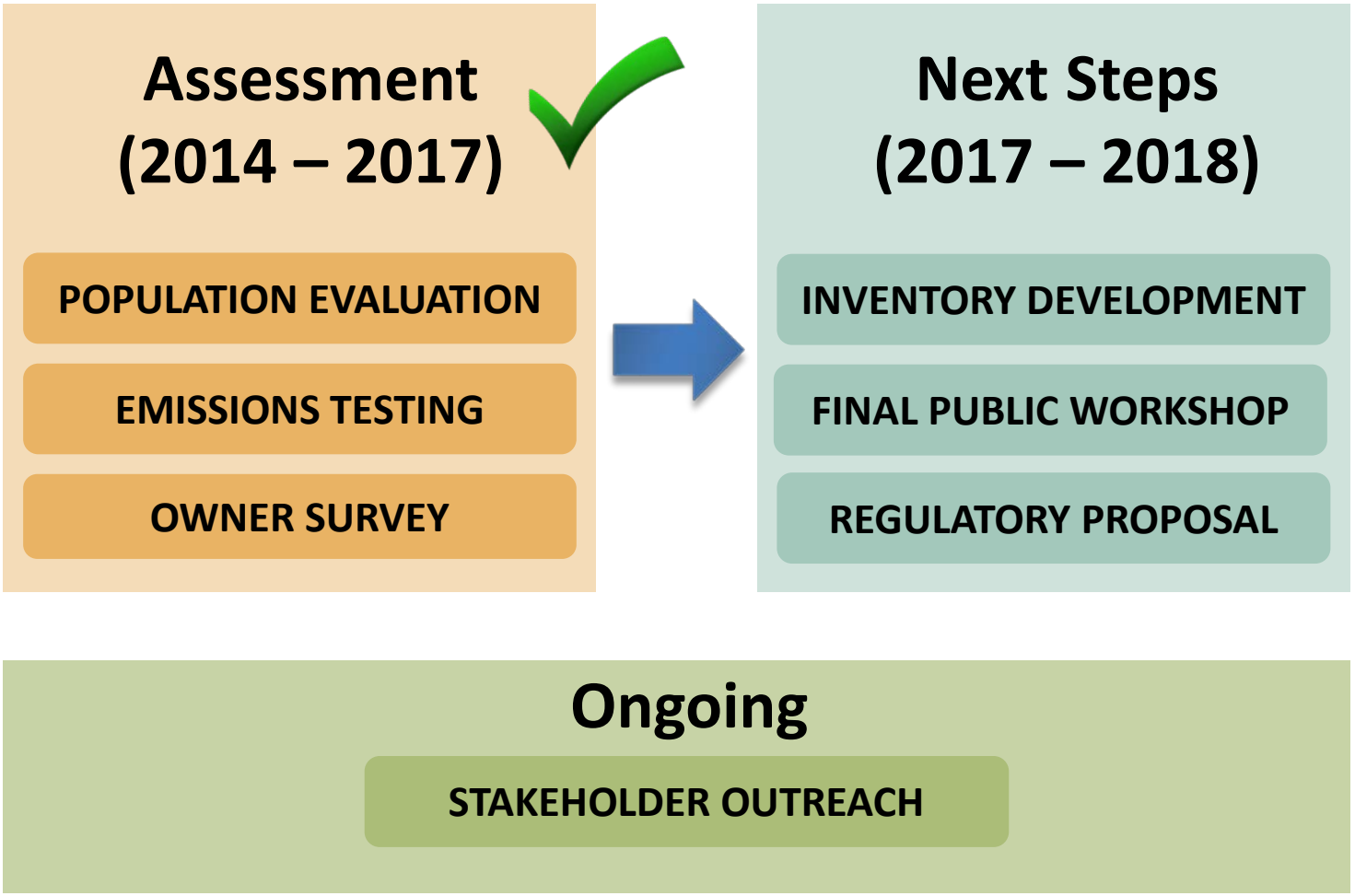
Delay 1998 exhaust standards to ensure OHV availability

Ease transition to cleaner engine technology

Limit summertime exhaust emissions from OHVs in ozone non-attainment areas

Allows riders to practice for “competitive” events on public land

Red Sticker Assessment and Next Steps



Stakeholder Outreach To Date

- Hosted three public workshops
- Held two stakeholder technical working group meetings
- Presented updates at five public State Park Commission Hearings
- Attended three annual Hangtown MX motocross races

Population Evaluation

- Developed vehicle identification number (VIN) decoder for OHVs
  - Allows analysis of Department of Motor Vehicle (DMV) registration records
  - Improves population estimates and understanding of vehicle attributes
  - Useful tool for multiple state agencies
- Evaluated manufacturer certification data
  - Analyzed trends in Green and Red Sticker model certifications over time

Emissions Testing

- Conducted exhaust and evaporative emissions testing
  - 2- and 4-stroke OHMCs of common displacement ranges
  - 20 new and in-use OHMCs selected based on DMV data

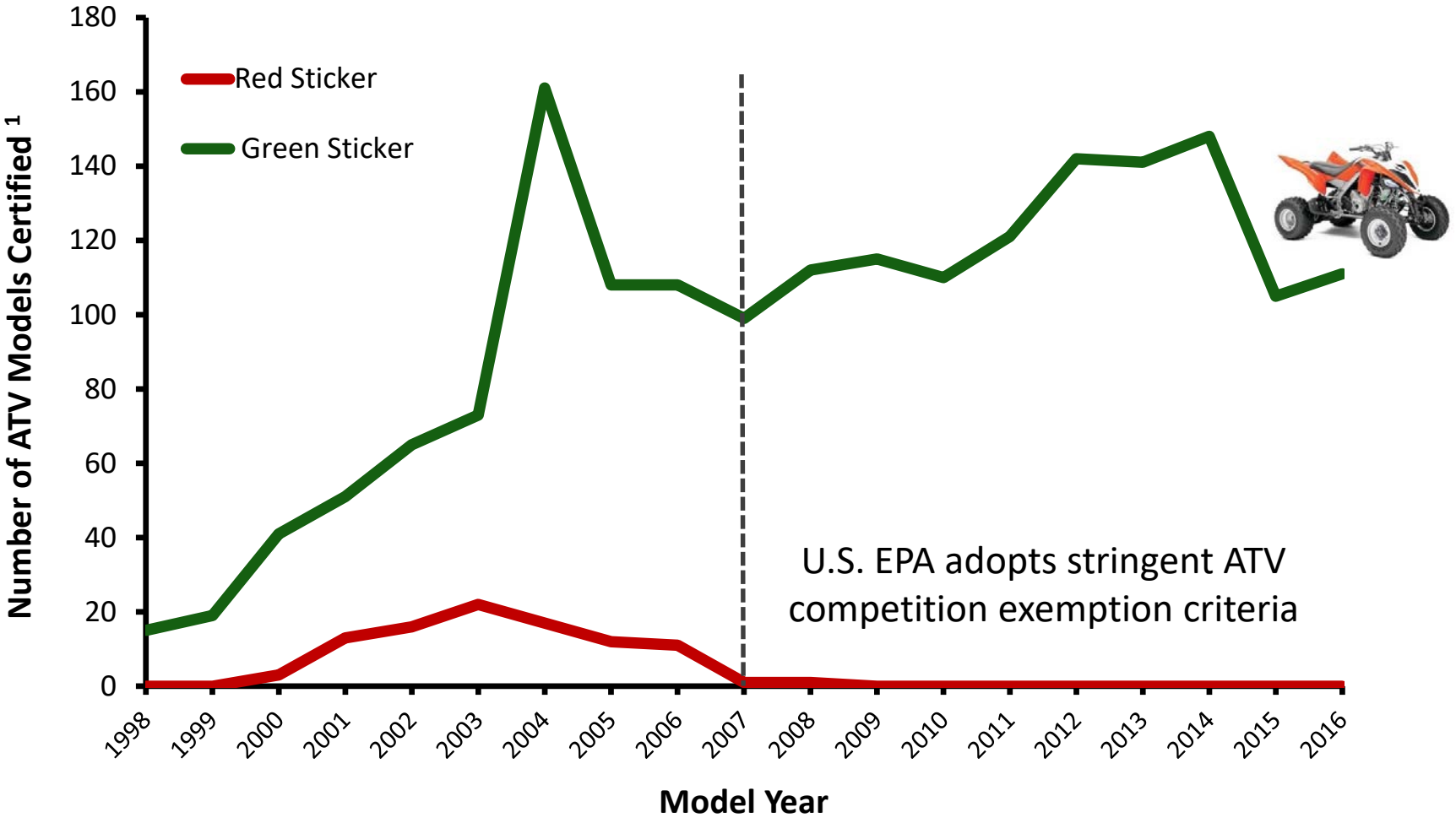
Motorcycle / ATV Dynamometer (Exhaust)

Sealed Housing for Evaporative Determination (SHED)

Owner Survey

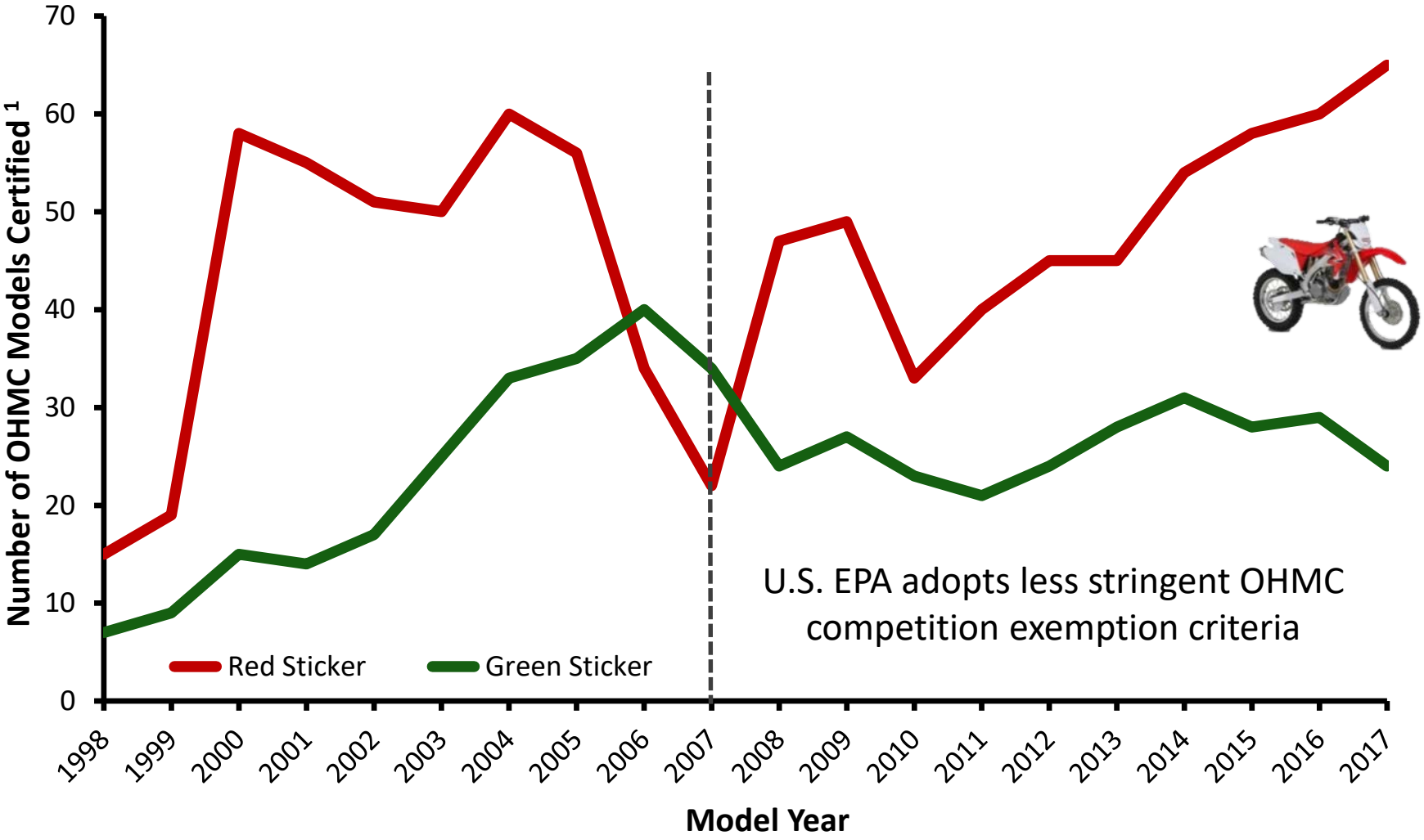
- Conducted statewide OHMC owner survey
- Online survey hosted by UC Davis
- Nearly 3,000 respondents
- State Parks provided 2,274 day use passes as incentive
- Questions developed with extensive input from industry

ATV Model Certifications Since 1998



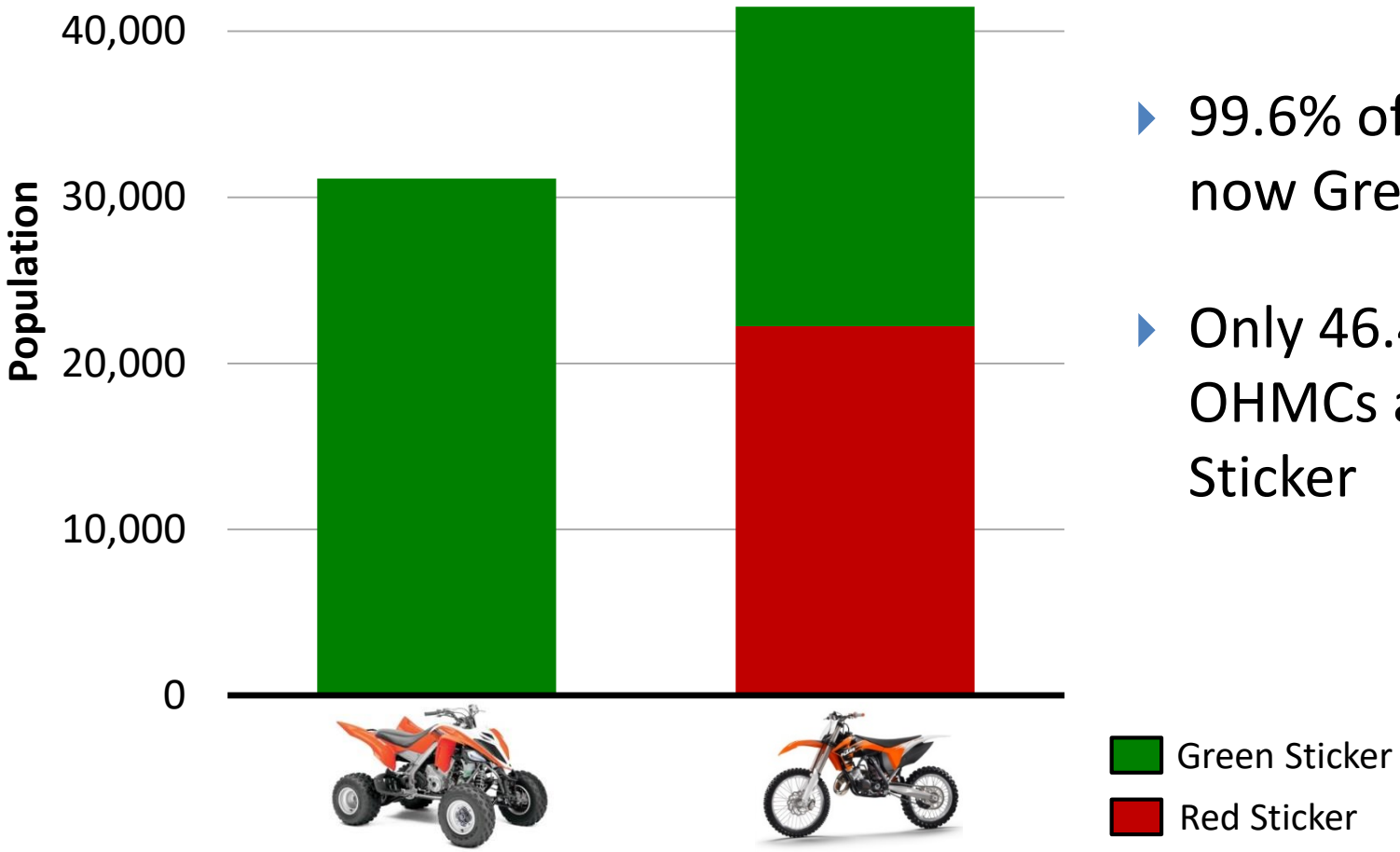
[1] *# of models certified by top 5 ATV manufacturers*

OHMC Model Certifications Since 1998



[1] *# of models certified by top 5 OHMC manufacturers*

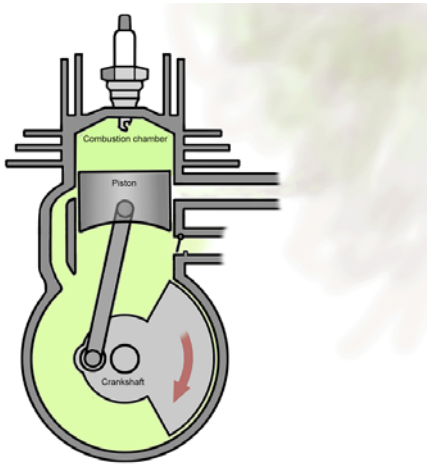
Green and Red Sticker Registration Type (MY 2012-2016)



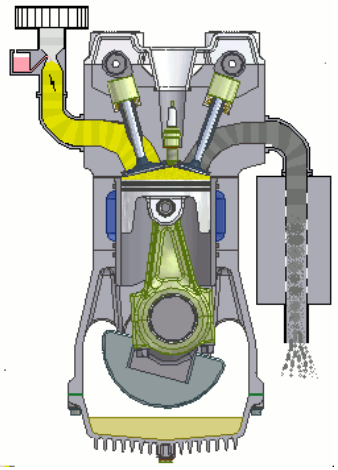
- 99.6% of ATVs are now Green Sticker
- Only 46.4% of OHMCs are Green Sticker

[1]*Source: 2015 DMV database*

Engine Technology Then and Now



2-Stroke Engine

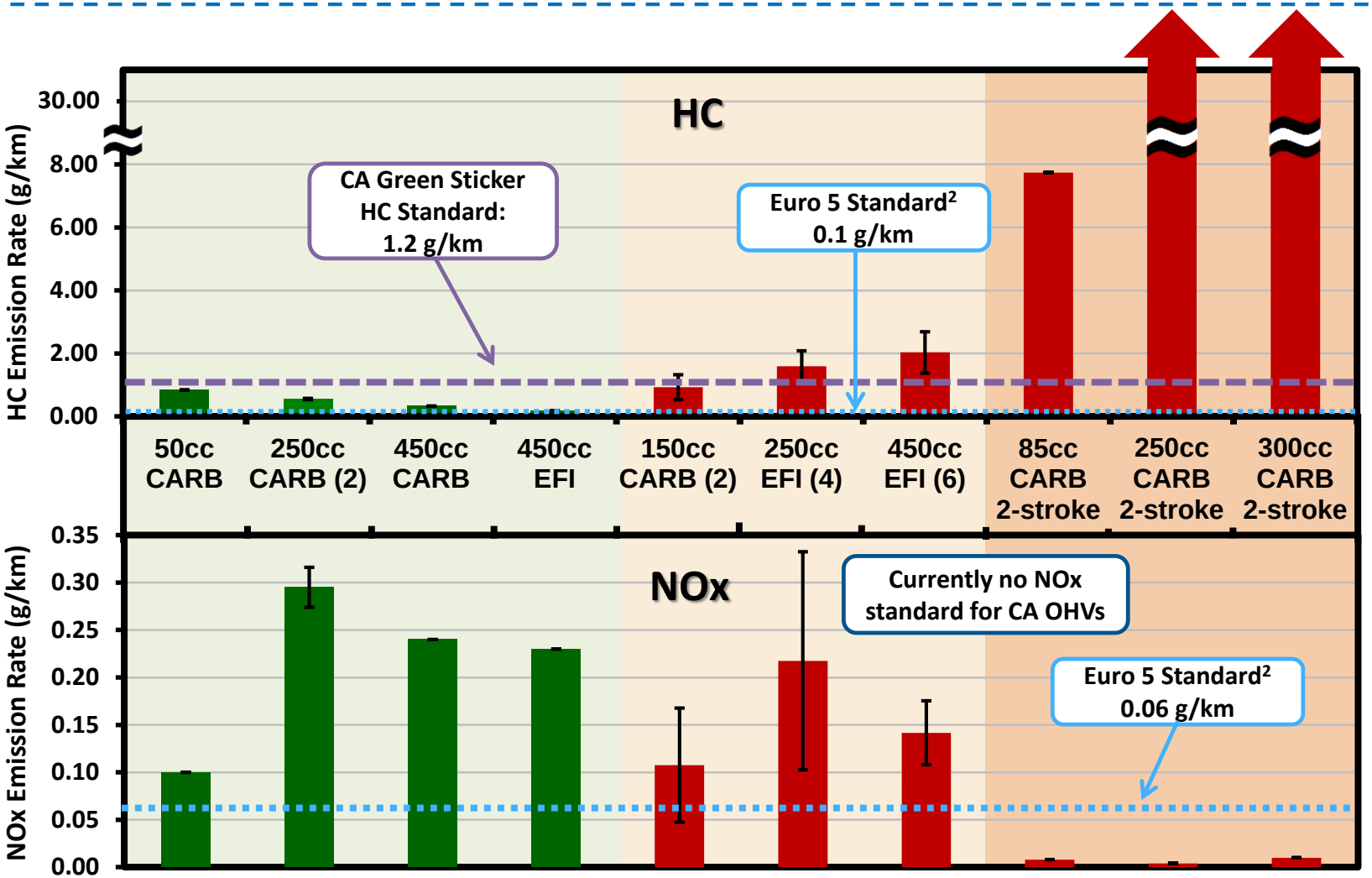


4-Stroke Engine

- 1998: 60% of OHMCs and ATVs had 2-stroke engines[1]
- 2012-2016: Approximately 15% of OHMCs and <1% of ATVs had 2-stroke engines[2]

[1] *Source: 1994 OHV Initial Statement of Reasons*
[2] *Source: 2015 DMV Database*

OHMC Exhaust Emissions Testing Results[1]



[1]*Source: Testing conducted by CARB staff at Haagen-Smit Laboratory (2014-2016)*

[2]*European on- and off-highway motorcycle standard*

2-Stroke OHMC Exhaust Emissions

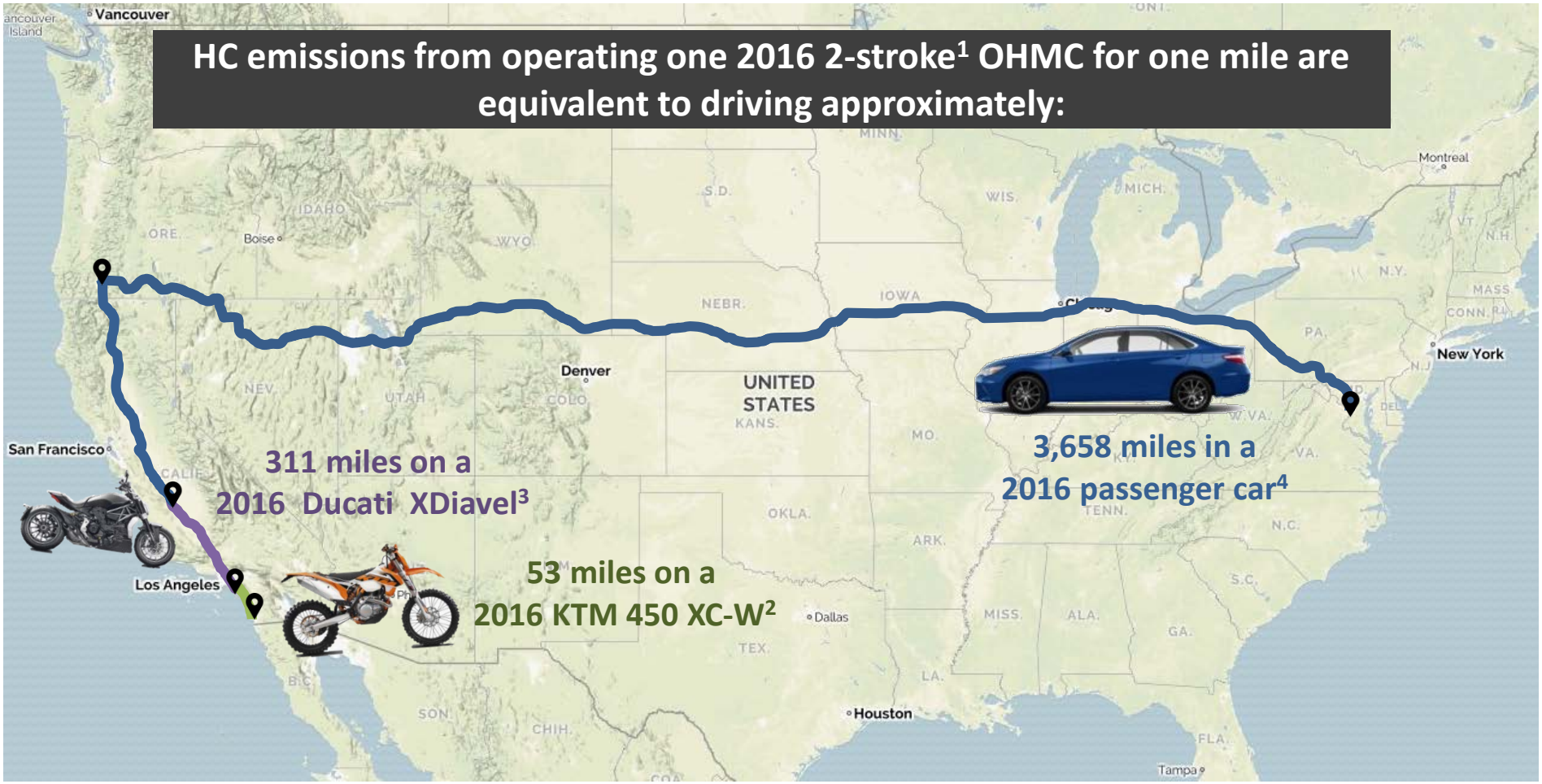
- Difficult to test 2-stroke OHMCs because they are high emitting
- Comparison of 2-stroke OHMC test data:

Source	HC Exhaust Emissions
2016 CARB test results[1]	> 30 g/km
2010 U.S. EPA emissions factor[2]	33.5 g/km
2010 Southwest Research test results[3]	25.7g/km – 26.2g/km
2000 CARB emissions factor[4] (RV2013 and OFFROAD2007)	21.3 g/km

Contamination of CARB emissions lab sample train

[1] Excludes 85 cc 2-stroke OHMC test result of 8 g/km
[2] Source: 2010 U.S. EPA Exhaust Emissions Factors for Nonroad Engine Modeling
[3] Source: Broad Emissions Testing Support for In-Use Vehicles and Engines
[4] Source: Emissions Estimation Methodology for Off-Highway Recreation Vehicles

Comparative Exhaust Emission Rates



[1] *Source: CARB RV2013 emissions factor (34.2 g/mi HC)*
[2] *Source: 2016 KTM 450XC-W Certification (0.64 g/mi HC)*
[3] *Source: 2016 Ducati XDiavel Certification (0.11 g/mi HC)*
[4] *Source :2014 CARB EMFAC light-duty passenger vehicle emissions (0.009 g/mi HC)*

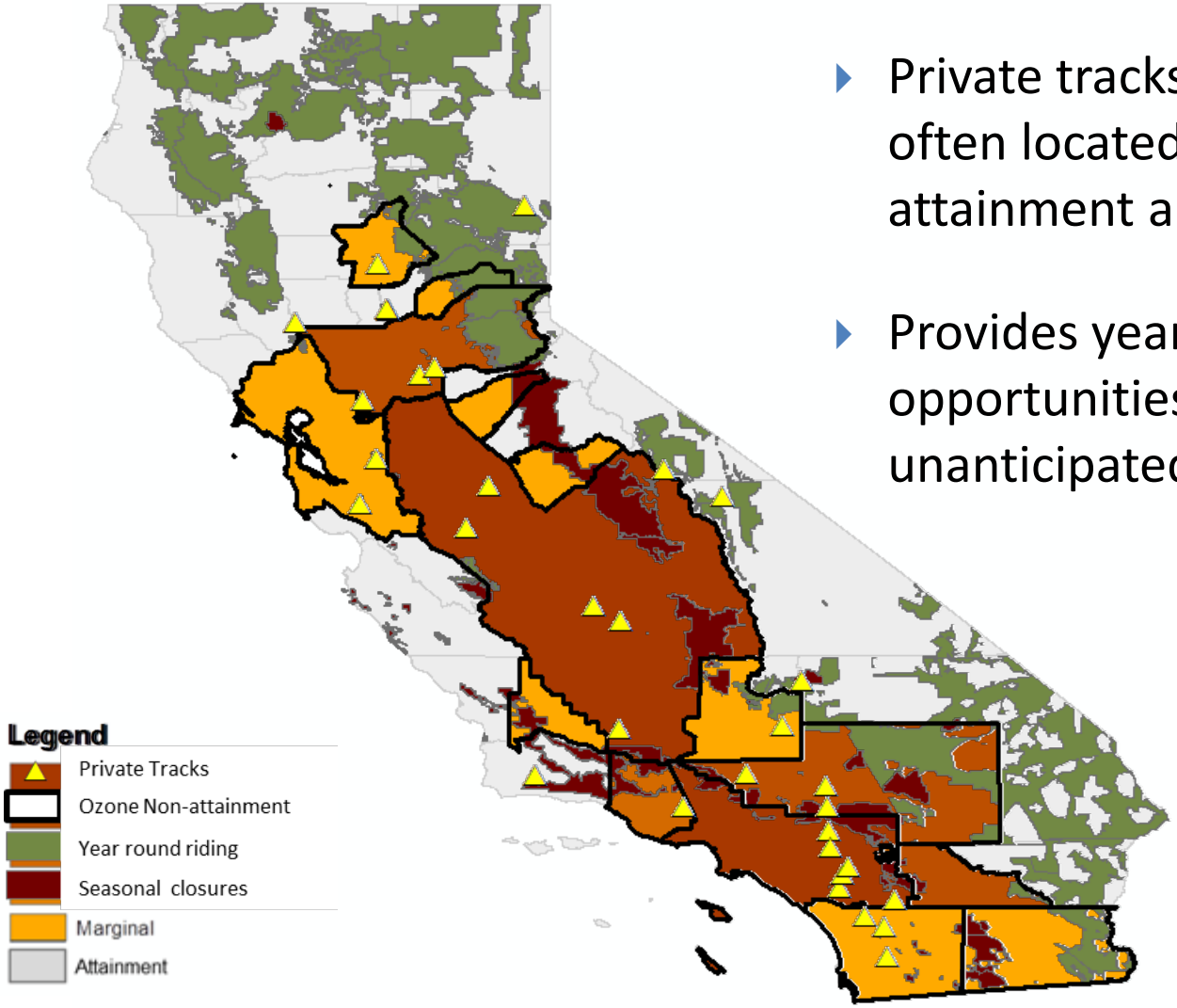
Red Sticker OHMC Operation

- Red Sticker program developed to limit exhaust emissions during the summer
- 75% of Red Sticker owners registered in ozone non-attainment areas ride during the summer
  - 54% operate on private land during the summer[1]
  - 43% travel further to ride
  - 25% operate on unenforced public land[1]

- 93% of Red Sticker operation on private land occurs in ozone non-attainment areas

[1] *Source: CARB 2016 OHMC Owner Survey*

OHMC Riding Areas



- Private tracks and property are often located within ozone non-attainment areas
- Provides year round riding opportunities but results in unanticipated air quality impacts

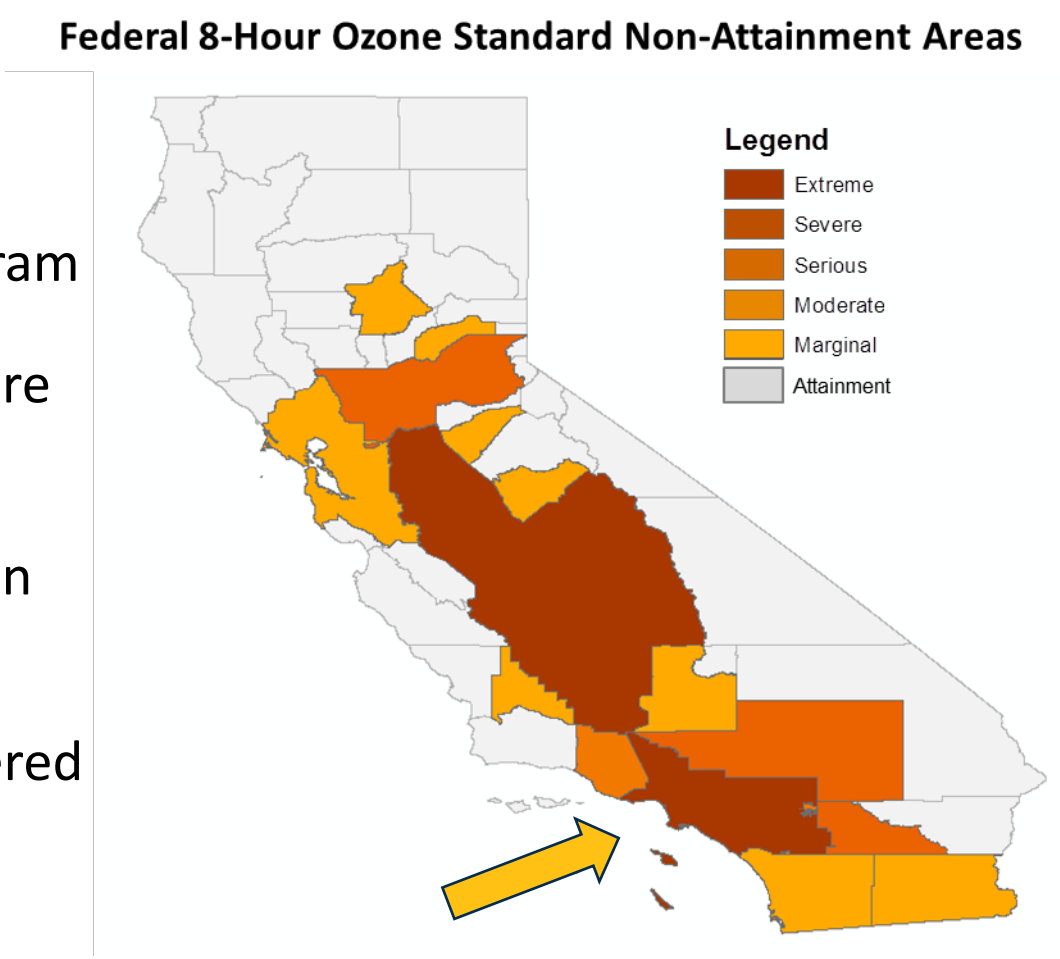
Recreational Use of Competition OHMCs

- Almost all Red Sticker OHMCs are U.S. EPA competition exempt
- Outside California:
  - To be used solely for competition purposes
  - Cannot be used for recreation
- In California:
  - 90% of Red Sticker OHMCs are primarily used for recreation[1]
  - 74% of Red Sticker owners never race[1]
  - Racing accounts for 6% of total Red Sticker hours operated[1]
  - Practice accounts for 7% of total Red Sticker hours operated[1]
- Red Sticker program results in recreational use of U.S. EPA competition exempt OHVs

[1] *Source: CARB 2016 OHMC Owner Survey*

Red Sticker OHMC Storage Emissions

- Evaporative emissions not controlled by Red Sticker program
- 95% of OHMCs are stored where registered[1]
- 90% of OHMCs are registered in non-attainment areas[2]
- Over 1/3 of OHMCs are registered in South Coast



[1] *Source: CARB 2016 OHMC Owner Survey*
[2] *Source: 2013 DMV Database*

Red Sticker Assessment Findings

ORIGINAL PURPOSE OF PROGRAM	ASSESSMENT FINDINGS
Delay 1998 exhaust standards to ensure OHV availability	Over 3 times as many Green Sticker models available today than in 1998
Ease transition to cleaner technology	Technology has developed, but transition to Green Sticker has not occurred as anticipated
Limit summertime exhaust emissions from OHVs in ozone non-attainment areas	Red Sticker OHVs are operated in ozone non-attainment areas during the summer
Allow riders to practice for “competitive” events on public land	Red Sticker OHMCs are predominately competition vehicles used for recreation

Red Sticker Program no Longer Works as Intended

- Does not provide expected emissions benefits
  - Year round Red Sticker OHV operation results in uncontrolled exhaust emissions
  - Serves as a loophole for manufacturers to avoid meeting new Green Sticker evaporative standards
- Inconsistent with federal competition exemption
- Problematic for other State agencies
  - Enforcement challenges
  - Registration difficulties

Staff Recommendation: Three-Step Process

Step I: Sunset Red Sticker Program

- ✓ Establish date to end the sale of Red Sticker OHVs
- ✓ Establish date to end riding restrictions

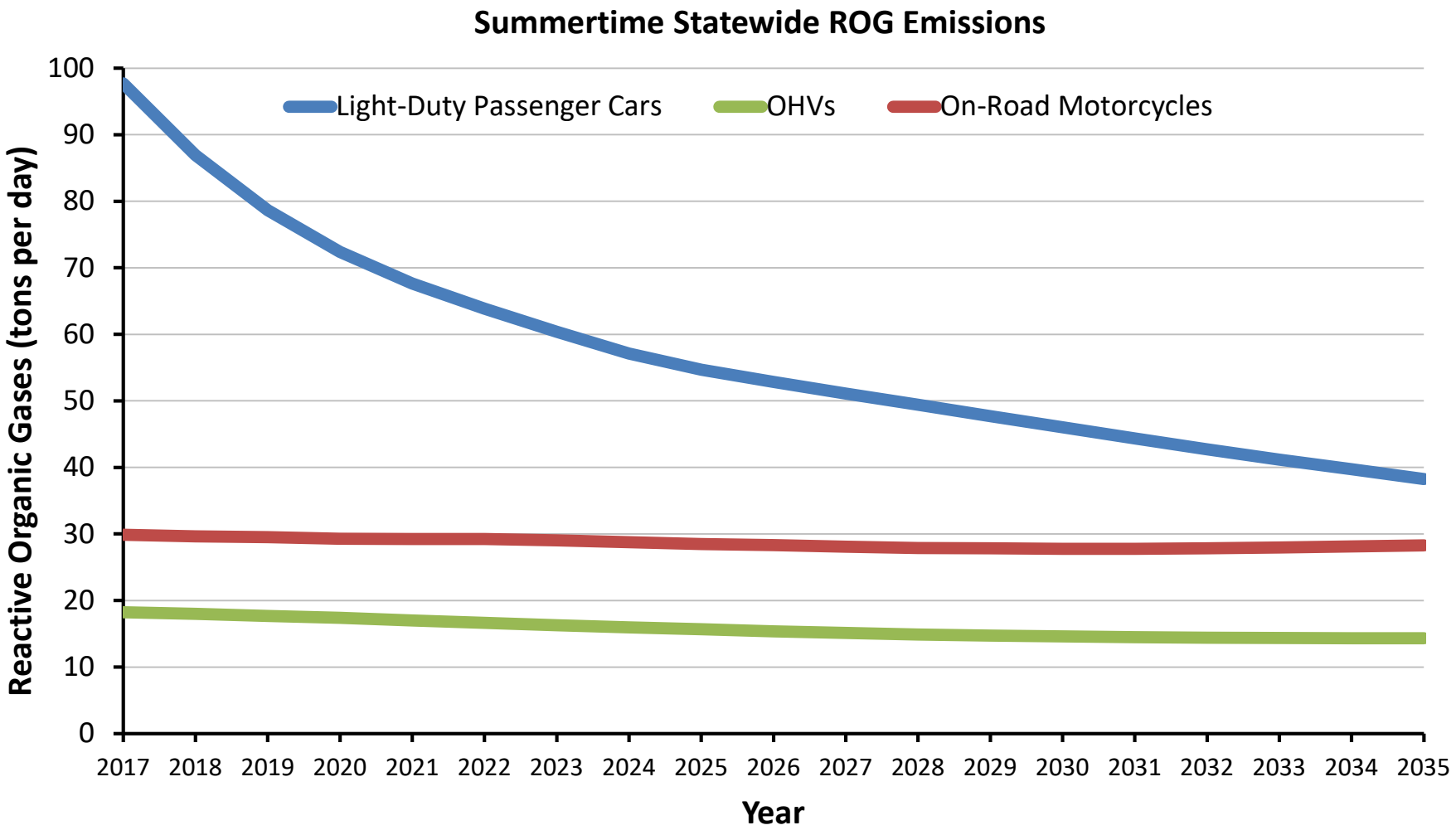
Step II: Clarify Racing Exemption

- ✓ Define competition
- ✓ Protect exemption for true racing purposes

Step III: Adopt New Emissions Standards

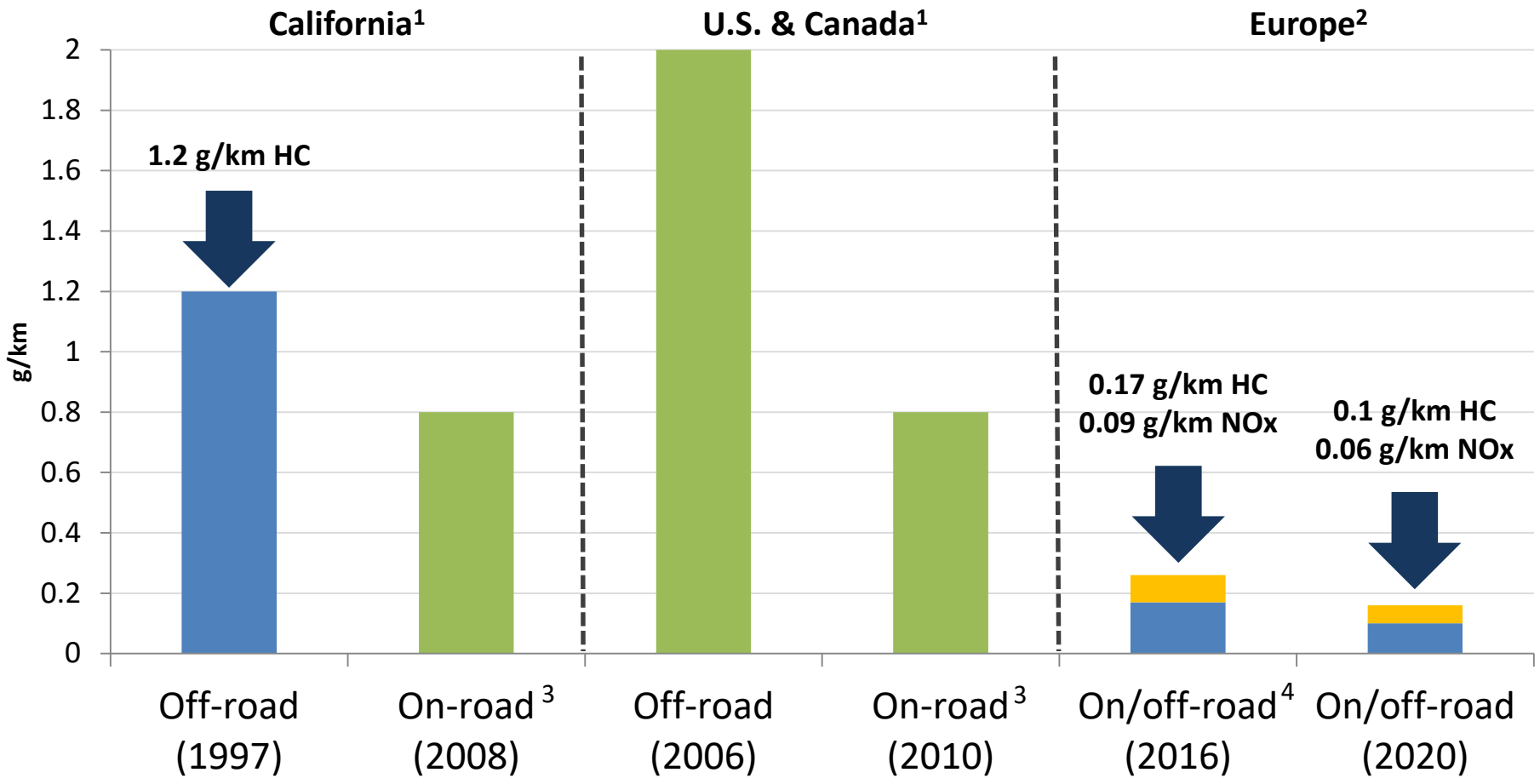
- ✓ Transition to cleaner engine technologies
- ✓ Incentivize zero emission technologies

Increasing Significance of OHV Emissions



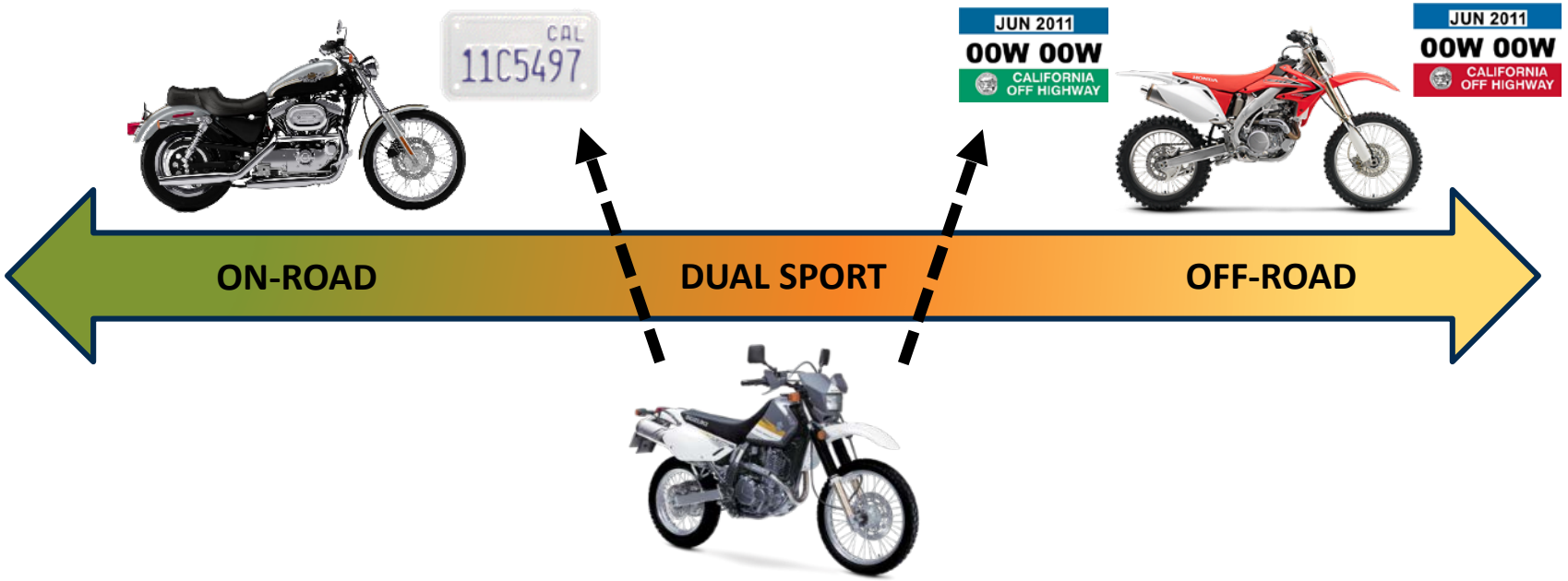
[1] *Source: CARB CEPAM - 2016 SIP Standard Emission Tool*

Comparison of Global Motorcycle Exhaust Standards



[1] *Federal Test Procedure*
[2] *World Motorcycle Test Cycle*
[3] *Applies to engines ≥ 280 cc*
[4] *Applies to vehicles with top speeds ≥81 mph*

Opportunity for Holistic California Motorcycle Standards



- On-and off-road motorcycles are increasingly similar
- Meet identical emissions standards in Europe

Emerging Zero Emissions Technology

On-Road Motorcycles

Zero Dual Sport (DS)[1]

Mahindra Electric Scooter[1]

Harley Davidson Livewire

OHVs

KTM Freeride E

Polaris Ranger EV

Alta Redshift MX[1]

[1] *Manufactured in California*

Next Steps

- Update emissions inventory
- Work with stakeholders to develop regulatory solution
- Return to Board with regulatory proposals:
  - Early 2018: Sunset Red Sticker program (propose sunset dates)
  - 2018: Clarify competition definition
  - 2021: Adopt significantly lower emissions standards
    - On-road motorcycles (exhaust and evaporative)
    - Off-highway recreational vehicles (exhaust)