USDA United States Department of Agriculture





Air Quality Success Stories

May 23, 2018

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Carly Heron – OR NRCS District Conservationist
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Greg Johnson – NRCS AQAC Team Leader
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Goals for Today

- Highlight examples of the great work being done by NRCS for air quality nationally
- Get you thinking about how your state may be able to address the air quality resource concerns
- Discuss how the NRCS National Air Quality Initiative may be able to help you

NRCS AQ Resource Concerns

- Emissions of Particulate Matter (PM) and PM Precursors
- Emissions of Ozone Precursors
- Objectionable Odors
- Emissions of Greenhouse Gases
- Emissions of Airborne Reactive Nitrogen

NRCS Conservation Practices

- Conservation practices are not control technologies, but can include application of control technologies
- Nearly 170 existing, official conservation practice standards
  - About 50 have a specific AQ-related purpose
- Five practices specific for air quality:
  - Air Filtration and Scrubbing (CPS 371)
  - Combustion System Improvement (CPS 372)
  - Dust Control on Unpaved Roads and Surfaces (CPS 373)
  - Dust Control from Animal Activity on Open Lot Surfaces (CPS 375)
  - Field Operations Emissions Reduction (CPS 376)

Delaware Air Quality Story

Delaware Air Quality Story

Delaware Air Quality Story

Delaware Air Quality Story

Air Quality Concerns

- Ammonia Emissions from Poultry
- Odors
- Particulate Matter from Poultry House Exhaust Fans
- Oxides of Nitrogen from Diesel Engines used to Pump Irrigation Water

Delaware Air Quality Story

Air Quality Practices

- Vegetative Environmental Buffers (VEBs)
- Amendments for Treatment of Agricultural Waste
- Diesel Engine Replacement

Delaware Air Quality Story

Vegetative Environmental Buffers

Delaware Air Quality Story

Amendments for Treatment of Agricultural Waste

Delaware Air Quality Story

Replacing Diesel Engines

Installing Certified Diesel or Electric Engines to Replace Old Diesel Engines

Delaware Air Quality Story

NAQI Funds

FY 15 - Practices	Amount	Funds Obligated
Diesel Engine Replacement	4 Each	$25,573
Hedgerow Planting	860 Feet	$3,350
Amendments for the Treatment of Agricultural Waste	341 Animal Units	$40,854

FY 16 - Practices	Amount	Funds Obligated
Diesel Engine Replacement	1 Each	$15,961
Hedgerow Planting	460 Feet	$1,246
Amendments for the Treatment of Agricultural Waste	2,065 Animal Units	$97,357

Contracts: DE obligated 14 contracts for a total or $184,341

Oregon Air Quality Successes

Cleaner Air in Hood River County

-Funded by CIG for the “burn boss” Air Curtain Burner project

-Funded by NAQI for incentives to reduce open pile burning and to eliminate use of diesel burning smudge pots for frost control in orchards.

CIG

- Brought together Hood River County, Mt Adams Resource Stewards, and the Columbia Gorge Fruit Growers to purchase the burn box and facilitate the project with the idea to gather information for the potential of a future biocampus with a wood burner of a larger scale for the whole county.
- Organized and coordinated a group of 20 local growers to agree to participate in using the burn box and provide records of the amount of material that was burned, how many hours of labor was involved, and what pros and cons they found to using the box.

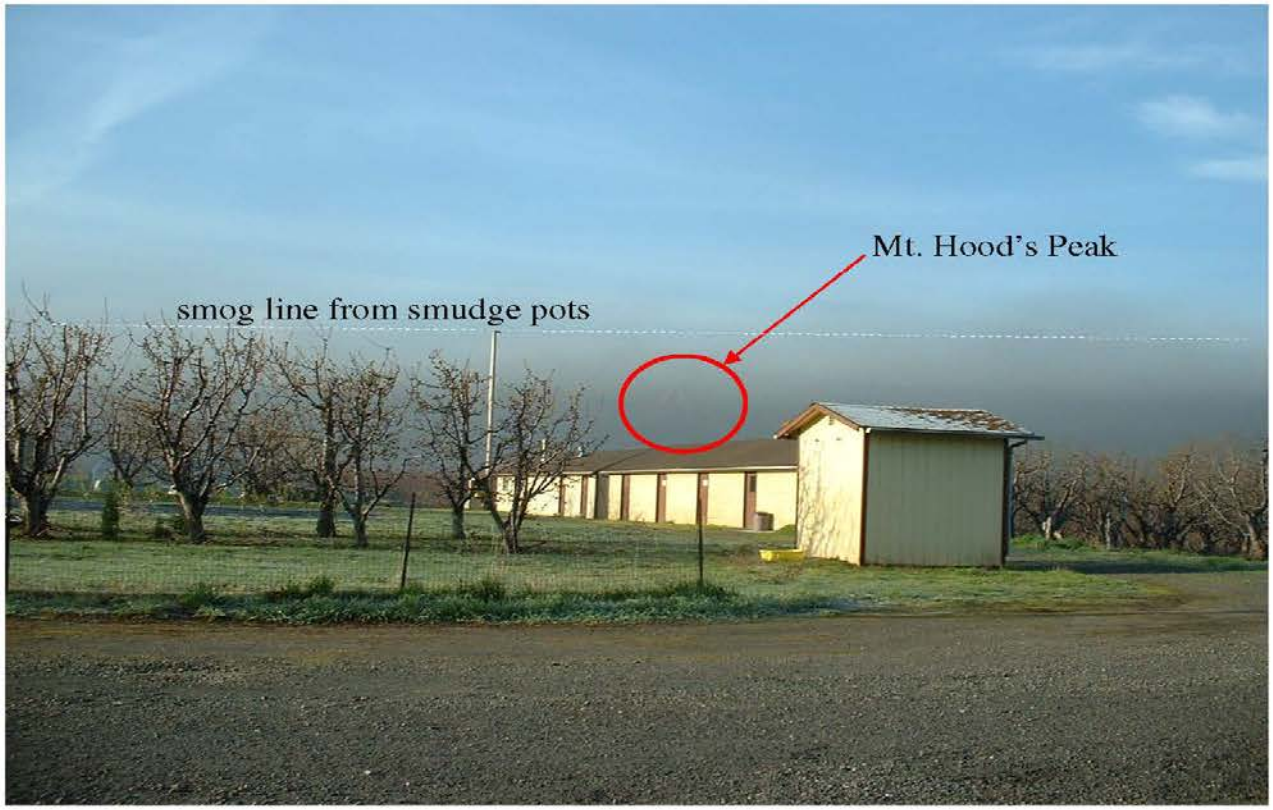
Burn Boss

Photo courtesy of Greg Johnson

Smudge Pots

- Commonly use diesel burning smudge pots for frost protection in orchards
- Contributes PM 2.5 and PM 10 to the air with each frost episode during a growing season
- Used Conservation Implementation Strategy to focus NAQI EQIP funds on incentive to remove or convert them for a cleaner option
- CIS was available to growers 2015-2018

Visible Effects



Oregon Smudge Pot Efforts

- Over the four year period, it is expected that we will have obligated a total of 39 contracts for 372 combustion system improvement (smudge pot removal)
- A total of 2.5 million dollars of the NAQI funds will have been obligated to facilitate this program

Photo documentation provided by the participant of destruction of the smudge pots

Smudge Pot Successes

- Rough calculations:
- Around 350 irrigated orchards in the Hood River County
- Over the four year period the NAQI funds were available, we had 39 applications/contracts
- Assume each orchard contributes ~8 tons PM/yr= 312 tons PM/year reduced

Outcomes

- Because of the collaborative work done by the different groups in Hood River County and with the support of Oregon NRCS these projects were a success and have led the way to other states trying some similar projects.
- There are also now National Payment Scenarios for the air curtain burner (under Practice 384) and for Smudge Pot Removal (under Practice 372) thanks to National support.

Breathing easier for everyone

USDA United States Department of Agriculture

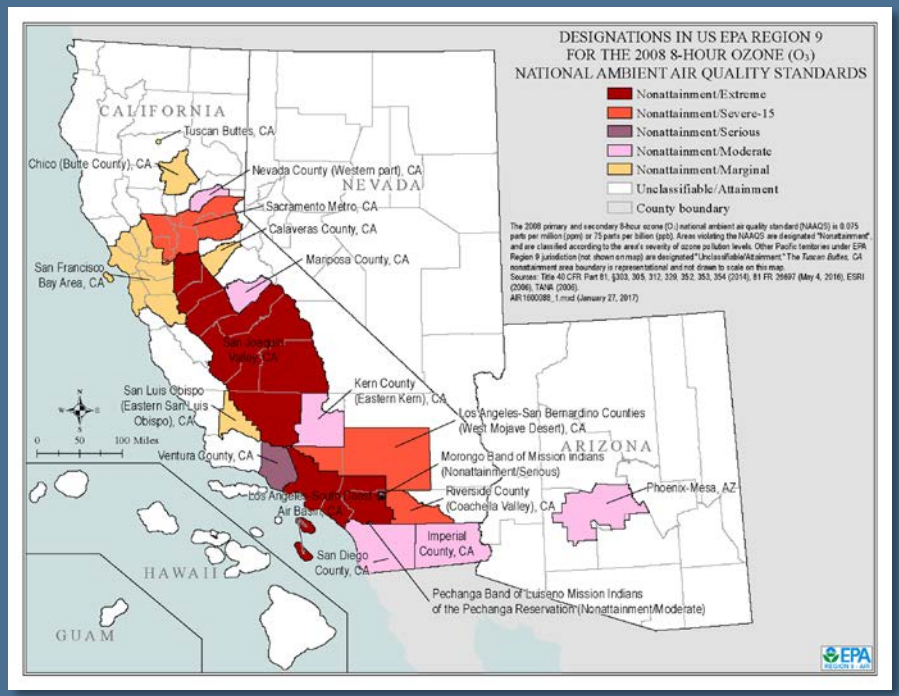
California Air Quality Success Stories

Ted Strauss
Air Quality Resource Conservationist
USDA NRCS-California
May 23, 2018

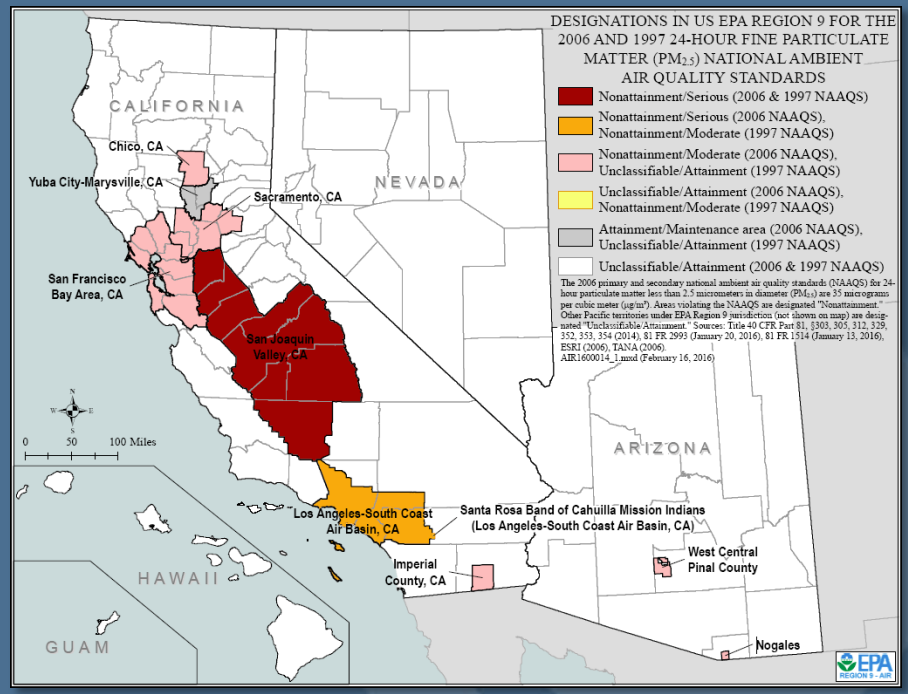
USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

California Air Quality Challenges

2008 8-Hour Ozone NAAQS (0.075 ppm)

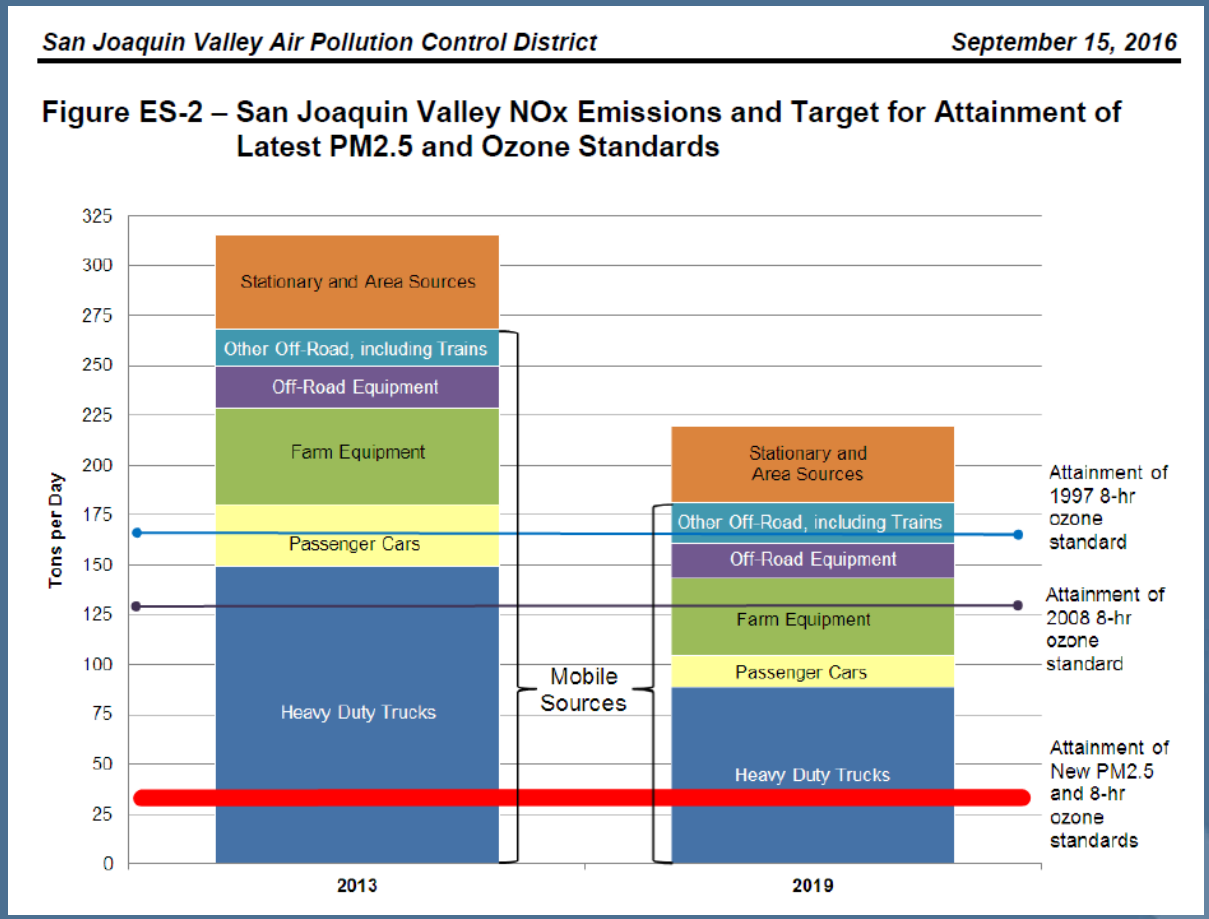


2006 & 1997 24-Hour PM2.5 NAAQS (35 ug/m^3 & 65 ug/m^3)



Source: EPA-Region 9: https://www3.epa.gov/region9/air/maps/

California Air Quality Challenges (cont.)



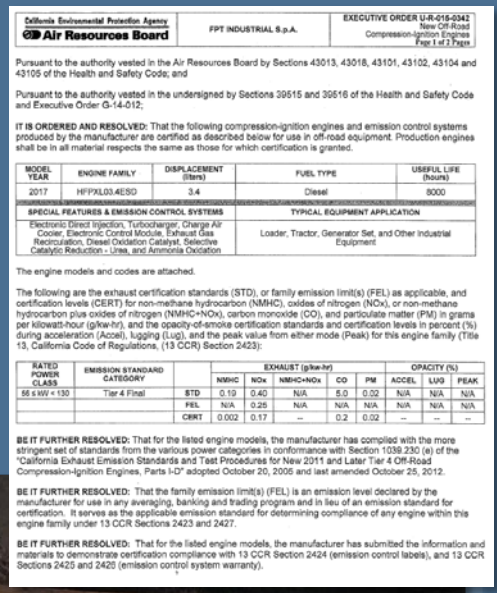
Source: San Joaquin Valley Air Pollution Control District http://www.valleyair.org/Air_Quality_Plans/PM25Plans2016.htm

AQ Success in the San Joaquin Valley EQIP Projects from 2003-2017

Practice Treatment	Life (years)	Units		Estimated Reductions (Tons - Pollutant)	
372: Pump Engine Repowers	10	568	Units	11,256 Tons	NOx
372: Mobile Nonroad Ag Equipment	10	2,934	Units	30,432 Tons	NOx
329, 345: Residue & Tillage Mgt.	1	241,367	Acres	2,534 Tons	PM10
373: Unpaved Roads & Surfaces	1	104,491,200	Square Feet	7,234 Tons	PM10
376: Reduced Field-Pass Entries	1	14,175	Acres	114 Tons	PM10
376: “Low-Dust” Nut Harvesters	1	30,890	Acres	364 Tons	PM10
380: Windbreaks at AFO’s	15	14,420	Lineal Feet	78 Tons	PM10
384: Chipping Orchard Pruning	1	165,460	Acres	579 Tons	PM10
384: Chipping Orchard Removals	1	9,127	Acres	1,068 Tons	PM10
500: Treated Wood Wastes	1	7,421	Acres	39 Tons	PM10
595: Precision Spray Application	1	12,161	Acres	4 Tons	VOC

Represents $177.8 million in EQIP investments within the SJV

Diesel-powered Nonroad Mobile Ag Equipment



California Environmental Protection Agency
Air Resources Board

FPT INDUSTRIAL S.p.A.

EXECUTIVE ORDER U-R-018-0342
New Off-Road Compression-Ignition Engines
Page 1 of 2 Pages

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2017	HFPXL03.4ESD	3.4	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Electronic Direct Injection, Turbocharger, Charge Air Cooler, Electronic Control Module, Exhaust Gas Recirculation, Diesel Oxidation Catalyst, Selective Catalytic Reduction - Urea, and Ammonia Oxidation	Loader, Tractor, Generator Set, and Other Industrial Equipment

The engine models and codes are attached.

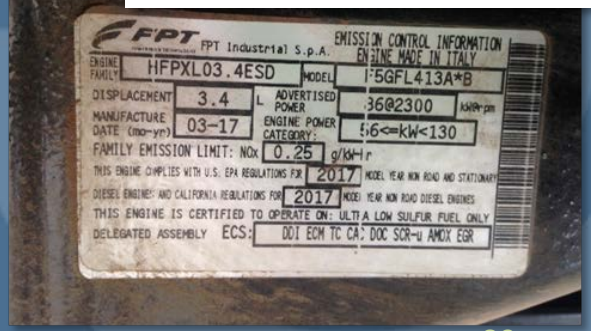
The following are the exhaust certification standards (STD), or family emission limit(s) (FEL) as applicable, and certification levels (CERT) for non-methane hydrocarbon (NMHC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr) NMHC	NOx	NMHC+NOx	CO	PM	OPACITY (%) ACCEL	LUG	PEAK
56 ≤ kW < 130	Tier 4 Final	STD	0.19	0.40	N/A	5.0	0.02	N/A	N/A	N/A
		FEL	N/A	0.25	N/A	N/A	N/A	N/A	N/A	N/A
		CERT	0.002	0.17	--	0.2	0.02	--	--	--

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has complied with the more stringent set of standards from the various power categories in conformance with Section 1039.230 (e) of the "California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Parts I-D" adopted October 20, 2005 and last amended October 25, 2012.

BE IT FURTHER RESOLVED: That the family emission limit(s) (FEL) is an emission level declared by the manufacturer for use in any averaging, banking and trading program and in lieu of an emission standard for certification. It serves as the applicable emission standard for determining compliance of any engine within this engine family under 13 CCR Sections 2423 and 2427.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).



"State Strategy for California's 2007 State Implementation Plan" (SIP)

- California Air Resources Board (ARB) attainment planning
  - Demonstrates attainment of the 1997 8-hour Ozone NAAQS (0.08 ppm)
  - Goal of 5-10 tons/day NOx reductions by 2017 from diesel-powered nonroad mobile ag equipment operating within the San Joaquin Valley
  - ARB recognizes incentive opportunities from state and federal sources
  - ARB to develop a Farm Equipment regulation by 2014
- Initiated discussions on whether voluntary incentive-based emission reductions could become SIP creditable
  - Might delay or avoid adoption of new prohibitory rules
- Voluntary incentive-based programs had not received SIP credit for protecting air quality under the Clean Air Act

Statements of Principles *(2010, 2012, and 2014)*

- Agreements between EPA, ARB, San Joaquin Valley Air Pollution Control District (SJVAPCD), and NRCS
- Defines the principles for incentive-based emissions reductions to become SIP creditable...

Ed Burton, CA State Conservationist-Retired

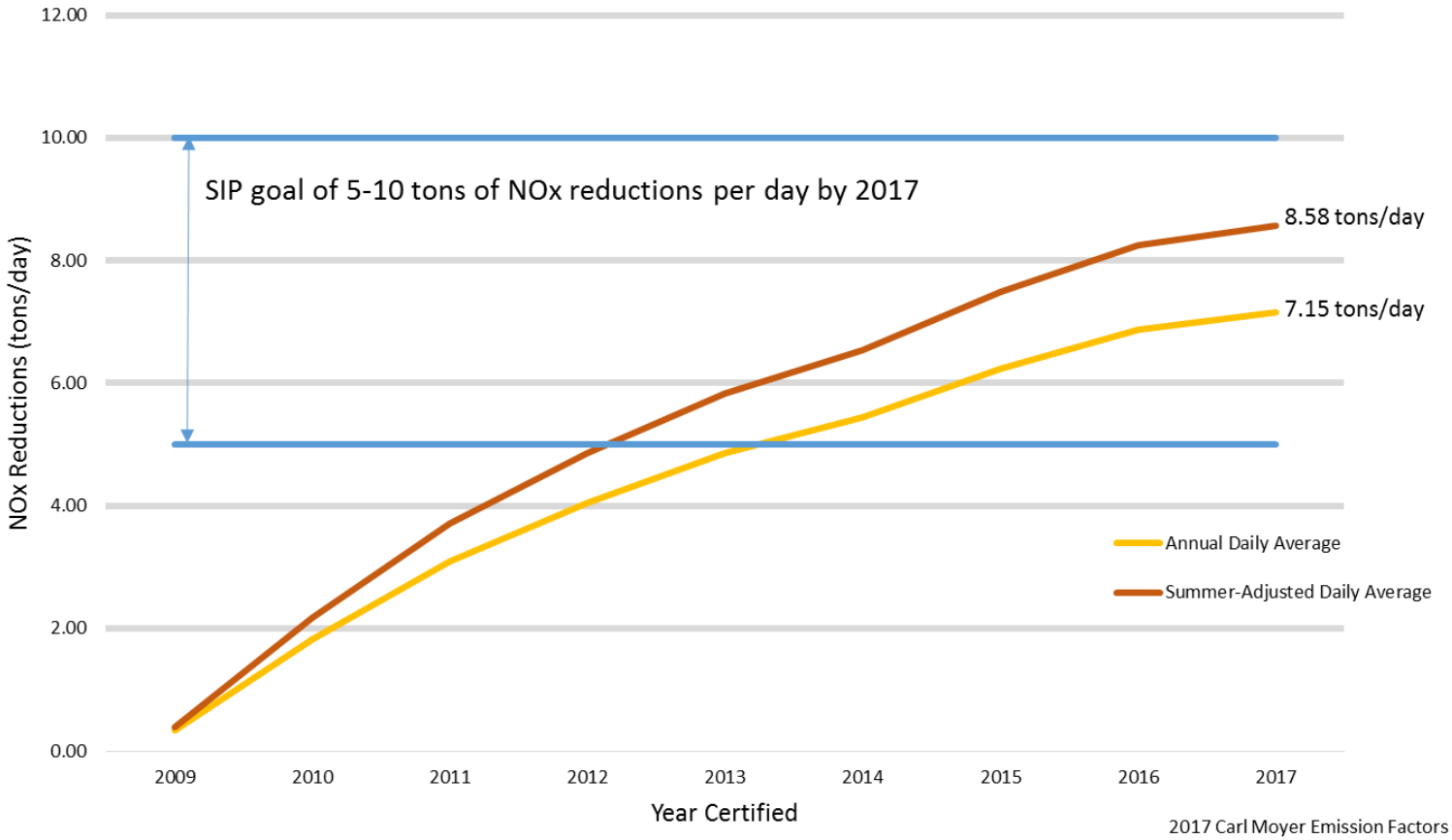
...Surplus, Quantifiable, Enforceable, and Permanent

- NRCS submits emissions reports to EPA and SJVAPCD annually by March 31st
- To date, voluntary improvements have avoided regulatory measures

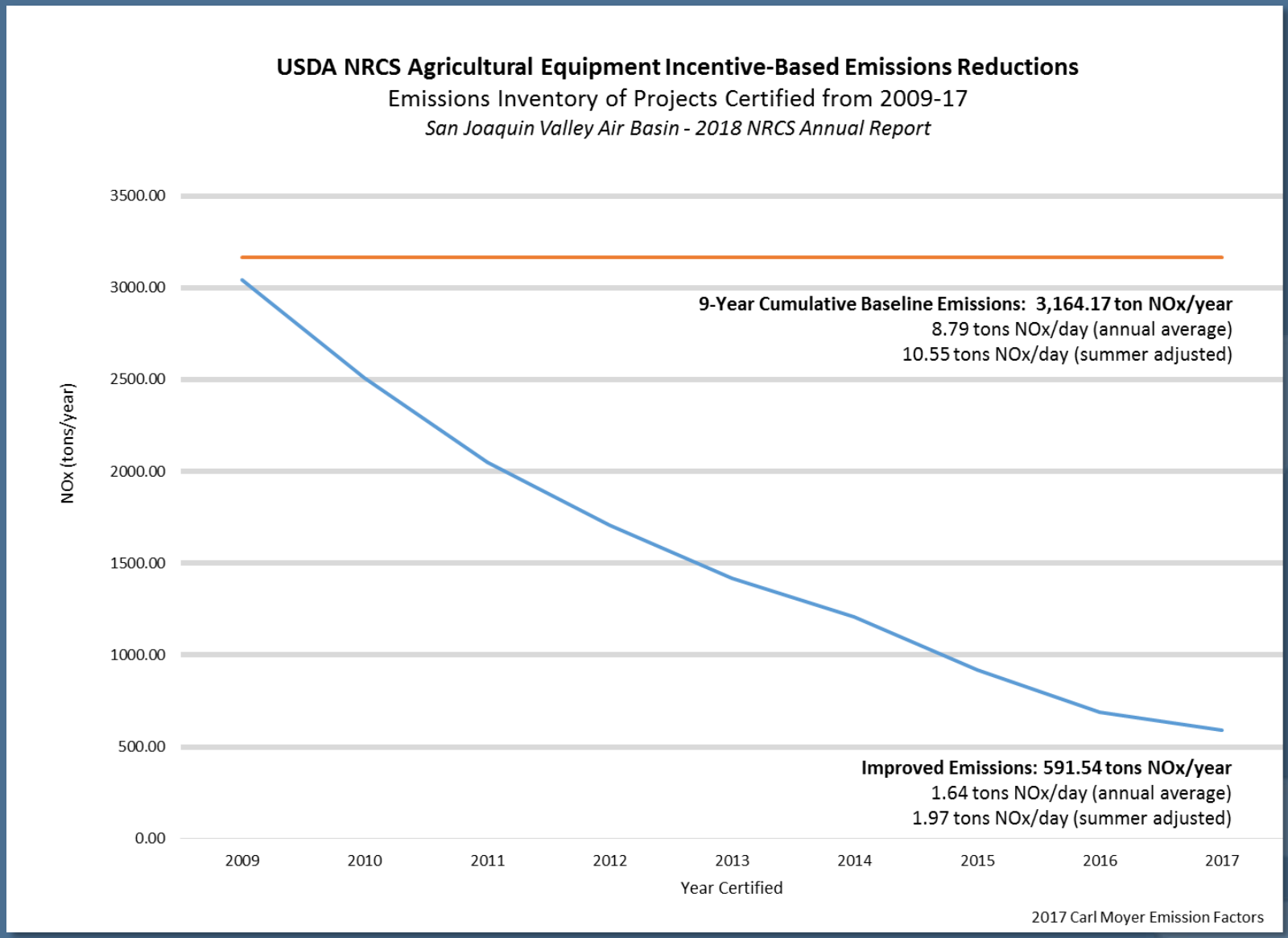
USDA NRCS Agricultural Equipment Incentive-Based Emissions Reductions

NOx Reductions of EQIP Projects Certified from 2009 to 2017

San Joaquin Valley Air Basin - 2018 NRCS Annual Report



2017 Carl Moyer Emission Factors


USDA NRCS Agricultural Equipment Incentive-Based Emissions Reductions
Emissions Inventory of Projects Certified from 2009-17
San Joaquin Valley Air Basin - 2018 NRCS Annual Report
NOx (tons/year)
3500.00
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
9-Year Cumulative Baseline Emissions: 3,164.17 ton NOx/year
8.79 tons NOx/day (annual average)
10.55 tons NOx/day (summer adjusted)
Improved Emissions: 591.54 tons NOx/year
1.64 tons NOx/day (annual average)
1.97 tons NOx/day (summer adjusted)
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year Certified
2017 Carl Moyer Emission Factors

EQIP-NAQI Estimated NOx Reductions*

Nonroad Mobile Diesel-Powered Agricultural Equipment California Nonattainment Areas (FY2009-17)

NAQI Fiscal Year	No. of Projects	EQIP Investments (millions)	Annual NOx (tons/year)	Annual Daily Average NOx (tons/day)	Summertime Daily Average NOx (tons/day)	NOx Equivalent of Removing Motor Vehicles (pre-2004 LEV)
2009	329	$17.1	432	1.20	1.44	130,691
2010	470	$24.4	599	1.66	2.00	181,180
2011	369	$22.4	534	1.48	1.78	161,536
2012	358	$19.8	450	1.25	1.50	136,105
2013	363	$16.5	339	0.94	1.13	102,508
2014	468	$18.7	346	0.96	1.15	104,682
2015	450	$16.7	321	0.89	1.07	96,942
2016	373	$12.7	234	0.65	0.78	70,610
2017	495	$20.2	309	0.86	1.03	93,535
Totals	**3,675**	**$168.5**	**3,564**	**9.90**	**11.88**	**1,077,789**

**as of April 27, 2018*

Our NAQI Success Story

- Producers are utilizing the cleanest emissions-certified equipment available
- NAQI has brought many producers to our offices who have never sought NRCS assistance before
- Our partnerships identified the mechanisms for voluntary improvements to be creditable for meeting Clean Air Act objectives
- Avoided new regulations to date
- Voluntary measures continue to improve air quality

Additional Resources

- NRCS-CA Air Quality Webpage: https://www.nrcs.usda.gov/wps/portal/nrcs/main/ca/air/
- NRCS-CA Air Quality Fact Sheets: https://www.nrcs.usda.gov/wps/portal/nrcs/main/ca/air/quality/
- NRCS-CA "Farmers Engine-erring Clean Air" Video (March 2015) https://www.youtube.com/watch?v=GZlQipEbxWM
- NRCS-CA Success Stories – 2015 Air Quality Accomplishments https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ca/newsroom/stories/?cid=nrcs144p2_064184
- NRCS-CA AQ Tech Note 3 – SIP Creditability from Voluntary Incentive-Based Emissions Reductions https://efotg.sc.egov.usda.gov/references/public/CA/TN-AQ-03_CPS372_SIP_Creditability.pdf
- NRCS-CA AQ Tech Note 4 – Estimating Emissions for SIP Reporting https://efotg.sc.egov.usda.gov/references/public/CA/TN-AQ-04_CPS-372_Estimating_Emissions-SIP_Reporting.pdf
- SJVAPCD Rule 9610, Manuel of Procedures http://www.valleyair.org/MOP/mop9610_idx.htm
- ARB Off-Road Certification Database: https://www.arb.ca.gov/msprog/offroad/cert/cert.php
- 2007 State Strategy, ARB Resolution 07-28, Attachment B https://www.arb.ca.gov/planning/sip/2007sip/07-28_attachment_b.pdf

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USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

National Air Quality Initiative (NAQI)

- Introduced in the 2008 Farm Bill
  - $35 million per year
  - Originally targeted only to nonattainment areas
- Reauthorized in the 2014 Farm Bill
  - $25 to $35 million per year
  - Open to all areas
  - NRCS state offices apply for funds to address various agricultural air quality issues
- Proposed in the new Farm Bill: $37.5 million/yr for 2019-2023

National Air Quality Initiative (NAQI)

- Seven states are utilizing the NAQI in FY18:
  - AZ, CA, CO, OK, OR, TX and WA
- $31 million has been allocated to these 7 states, incl. $21 million to CA. In some cases, additional air quality EQIP funds were added to NAQI funds
- Currently 213 contracts issued in FY18 as of March 2018
- 713 applications for NAQI projects in FY18 as of March 2018
- Primary practices include:
  - Combustion System Improvement (372)
  - Irrigation Water Management (449)
  - Dust Control on Unpaved Roads and Surfaces (373)
  - Field Operations Emissions Reduction (376)
  - Nutrient Management (590)
  - Residue and Tillage Management, No-Till (329)

Questions?

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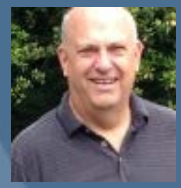

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