Department of the Environment

Building Energy Efficiency and Renewable Energy Programs Into the Clean Air Planning Process

Taking Credit for Nontraditional Programs

Tad Aburn - Air Director, MDE
March 25, 2013 – ACEEE Symposium – Washington, DC

Topics

- A little background on air quality in Maryland
- The challenges in building a clean air plan
  - Also called the “SIP” or State Implementation Plan
    - The role of air pollution “transport”
    - The lack of any remaining “low hanging fruit”
- Maryland’s efforts on linking our energy efficiency and renewable energy (EE/RE) efforts to the air quality planning process

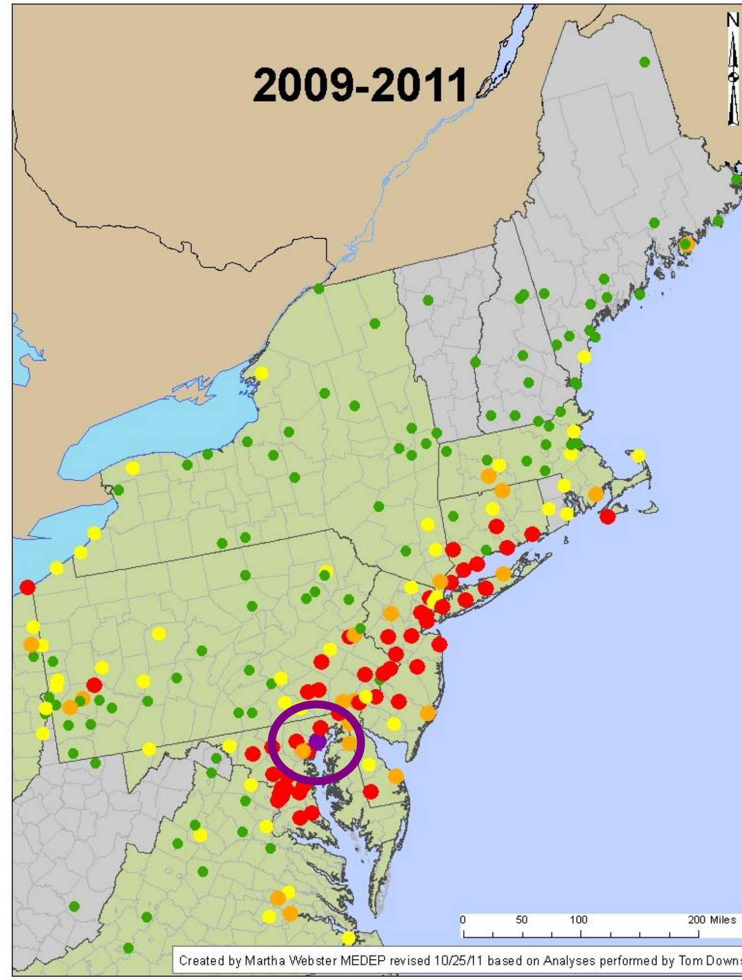
Air Quality Issues in Maryland

- Ground level Ozone and Transport
- Fine Particulate
- The new SO2, NO2 and lead standards
- Air quality contributions to the Chesapeake Bay
- A State required greenhouse gas SIP
- Multi-Pollutant Planning, Environmental Justice and more
- EE/RE efforts can help with all of these problems

MARYLAND

Baltimore – The Last Purple Dot

- Our biggest problem is ozone
- Still struggling with the old, 85 ppb ozone standard
- Only area in the east designated by EPA as a “moderate” nonattainment area for the 75 ppb standard

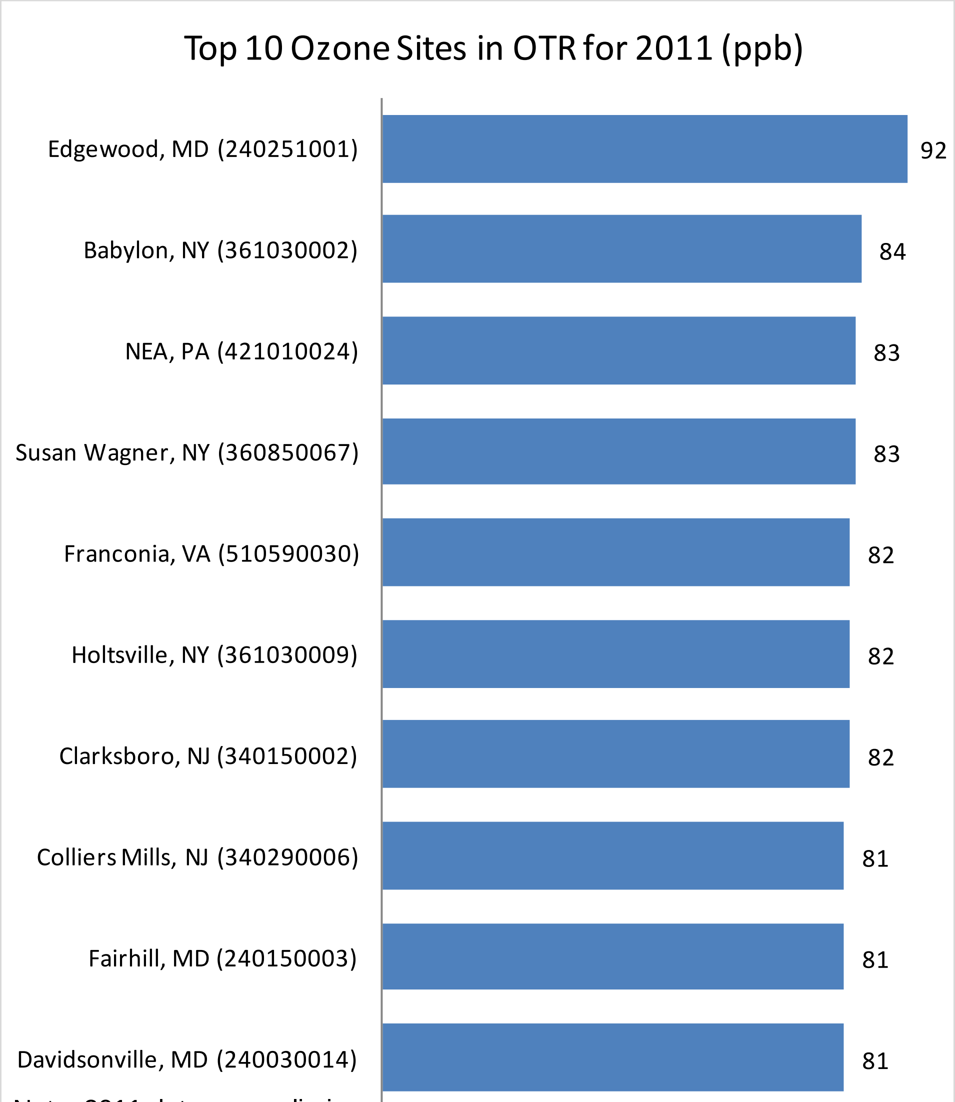


- <71
- 71-73
- 74-75
- 76-85 (mar)
- >85 (mod)

Parts per Billion (ppb)

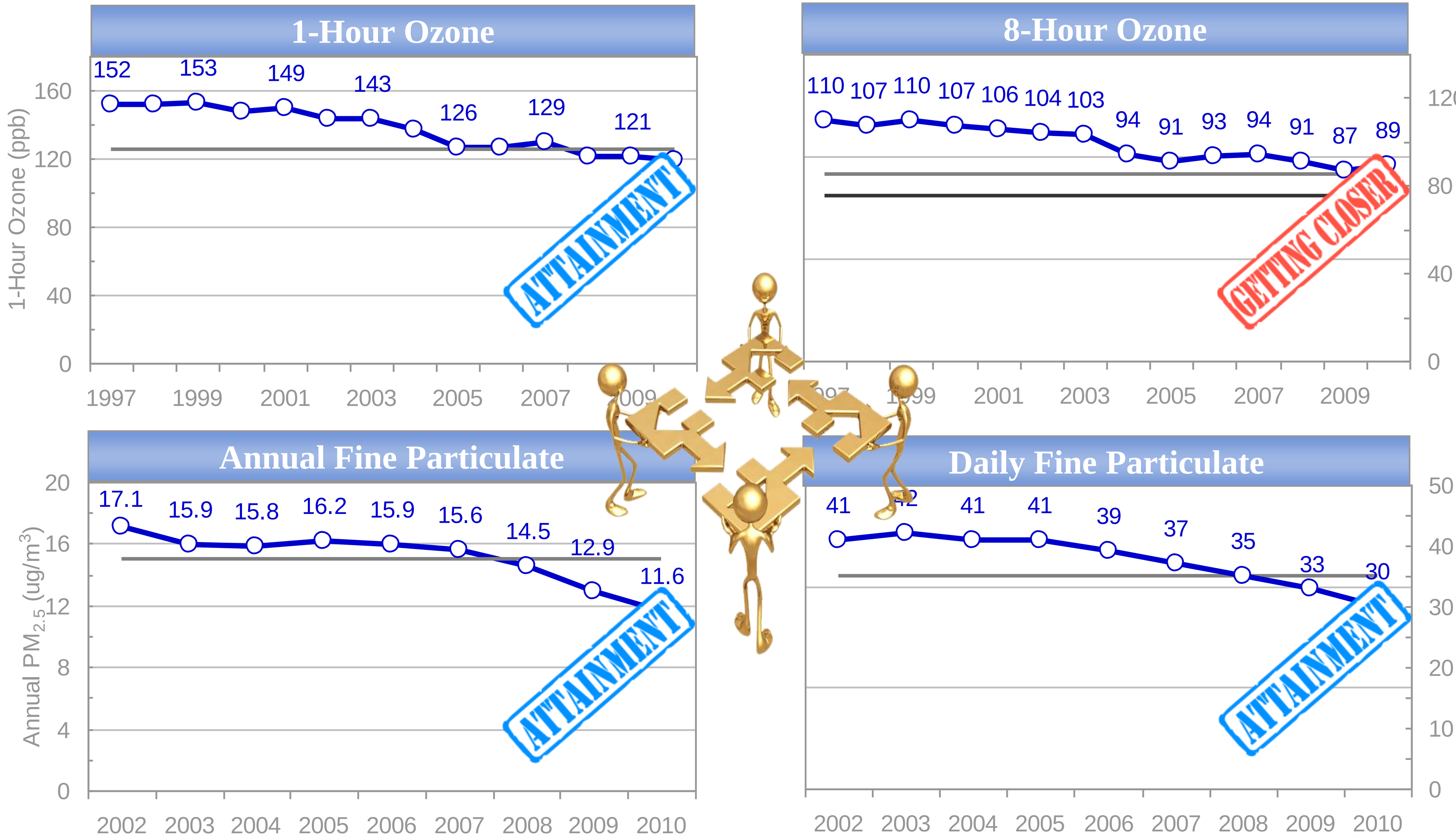
States with Nonattainment Monitors

The Top 10 – or Maybe the Bottom 10 - List



Note: 2011 data are preliminary.

Progress in Cleaning Maryland's Air

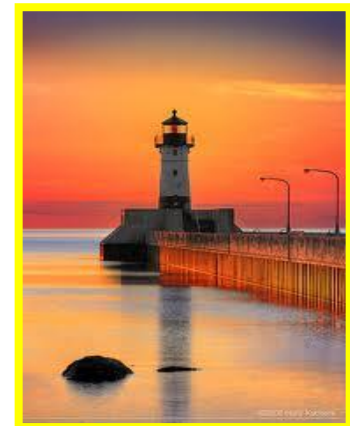


What Have We Learned from All of This?

MARYLAND

So What Else Can MD Do?

- MDE has worked with the University of Maryland for 20+ years to study where our air pollution problem comes from
- It's not all that complicated
  - Just very, very difficult
- Two basic pieces
  - Maryland emissions
  - Emissions in upwind states
  - On many bad days sources in upwind states are responsible for 70% to 90% of our problems
  - This piece - "air pollution transport" - is our #1 priority



So is Maryland Still Pushing Local Controls?

- Yes – For example, the Maryland Health Air Act
  - It's a $2.6 Billion power plant control program
  - Single sources in upwind states now emit more NOx than all of MDs sources combined
- We are also a California Car State
  - Toughest car standards allowed by law
- New local rules on everything we can find
  - Cement kilns to perfume
  - Even pushing crazy – nontraditional - stuff
    - Voluntary programs, outreach programs, incentive programs, out-of the box transportation initiatives … and so on
- This is where our efforts on getting EE/RE programs into our clean air planning process fit
  - It's one of the crazy – nontraditional – approaches we're pushing to further clean the air

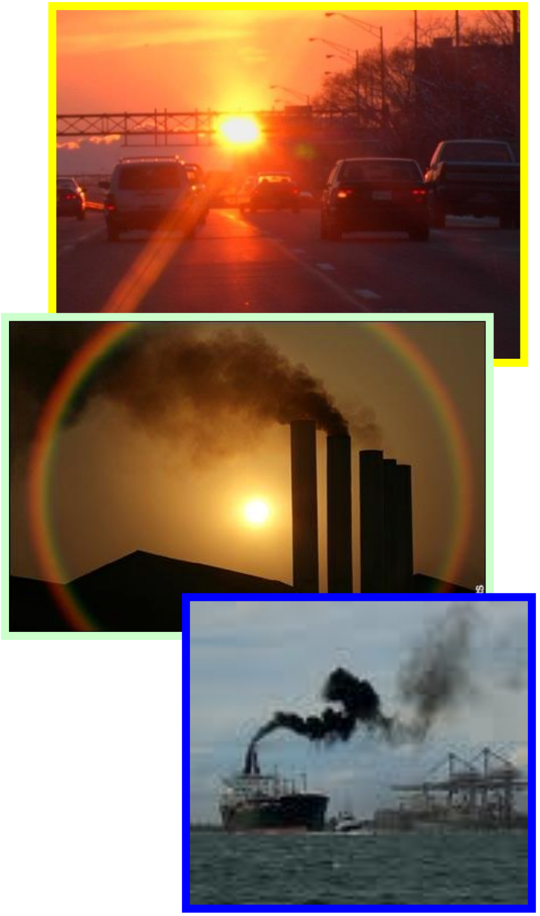
Multi-Pollutant Planning

- Maryland is working on a "multi-pollutant" air quality planning process
  - We are including the benefits from our EE/RE initiatives as part of this multi-pollutant process
- Unfortunately, the laws do not drive multi-pollutant planning
  - They have more of a single pollutant focus
- Our approach
  - Use the single pollutant mandates – but always look at the multi-pollutant benefits as you go
    - 2010 – Our old ozone SIP
    - 2012 – Our State driven Greenhouse Gas (GHG) Emission Reduction Act Plan
    - 2015 – Our next SIP for ozone
    - 2017 and beyond – New SIPs for ozone and PM

MARYLAND

So What Have We Done?

- Driven primarily by or State 2012 GHG requirements and the 2015 ozone SIP
- We've worked with NESCAUM (Northeast States for Coordinated Air Use Management) to build an analytical framework that allows us to:
  - Quantify the emission reductions of multiple pollutants for a broad suite of EE/RE efforts
  - Model the reductions in ozone, fine particulate and other pollutants
  - Estimate the public health benefits associated with those reductions, and
  - Quantify the economic benefits and costs
- University of Maryland (air quality modeling) and Towson University (economic modeling) are also part of the team doing this work



The Programs We Have Analyzed

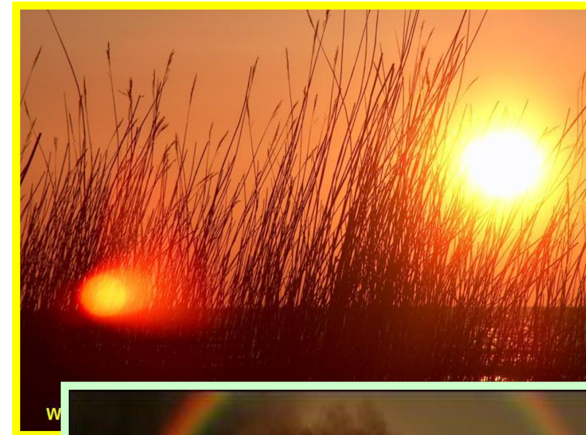
- At this time, we have focused on a package of our highest priority EE/RE initiatives in Maryland
  - The Regional Greenhouse Gas Initiative (RGGI)
  - The EmPOWER Maryland program
  - The Maryland Renewable Portfolio Standards (RPS) program
  - The Maryland Clean Cars program
  - Electric vehicle initiatives
  - Smart growth initiatives
  - Green building initiatives

The Framework

- Kudos to NESCAUM
  - Maryland is building off of work originated by our partners in the Northeast
  - The workhorse
    - NE-MARKAL model – an energy model that we now use to analyze the energy implications and emission reductions from a suite of selected EE/RE programs
  - Linked models
    - The photochemical – “air quality” model (CMAQ)
    - An economic model (REMI)
    - A cost-benefit model (BenMAP)

Our Current Results - A Few Examples

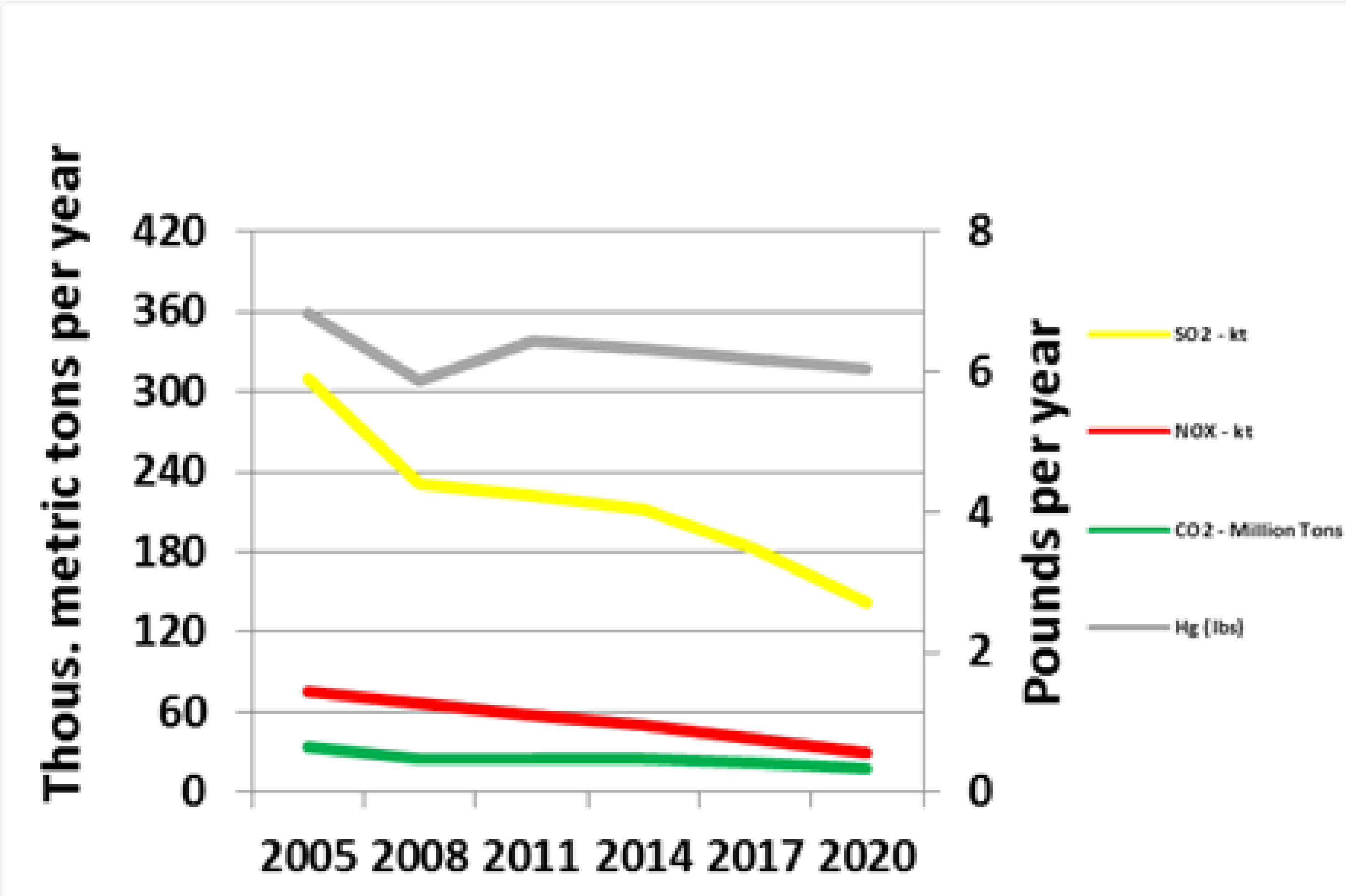
- Still very much a “work-in-progress”
  - Still road-testing MARKAL - results are really for demonstration and discussion purposes only
- Right now driven by the ozone, fine particle and mercury “co-benefits” from our GHG emission reduction efforts
- As the 2015 ozone SIP approaches, it will evolve to the energy, PM, mercury and other co-benefits from our ozone plan



MARYLAND

Power Sector Emission Reductions

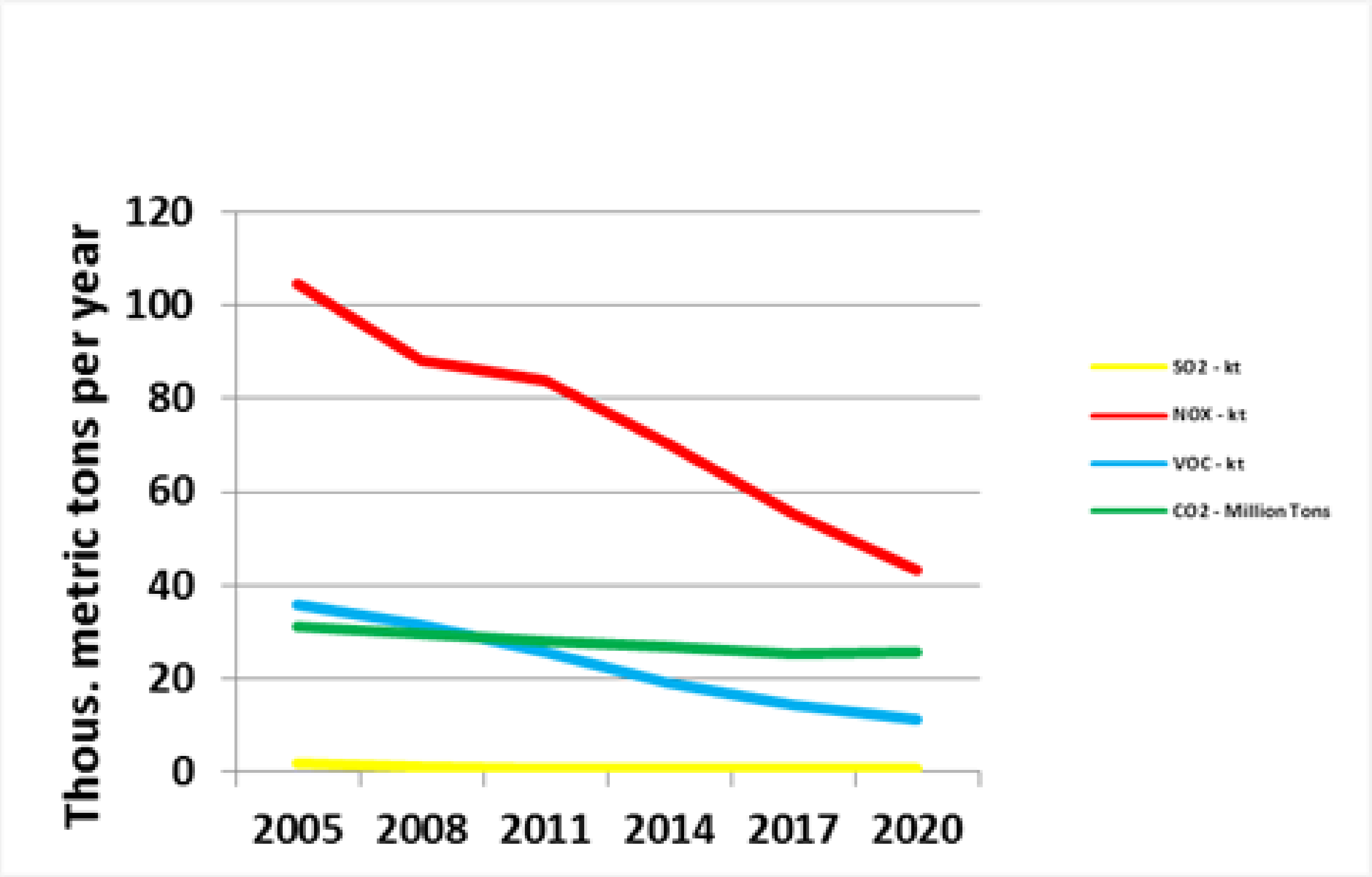
… from EE/RE Efforts



Very Preliminary Results – For Demonstration and Discussion Purposes Only

Transportation Sector Emission Reductions

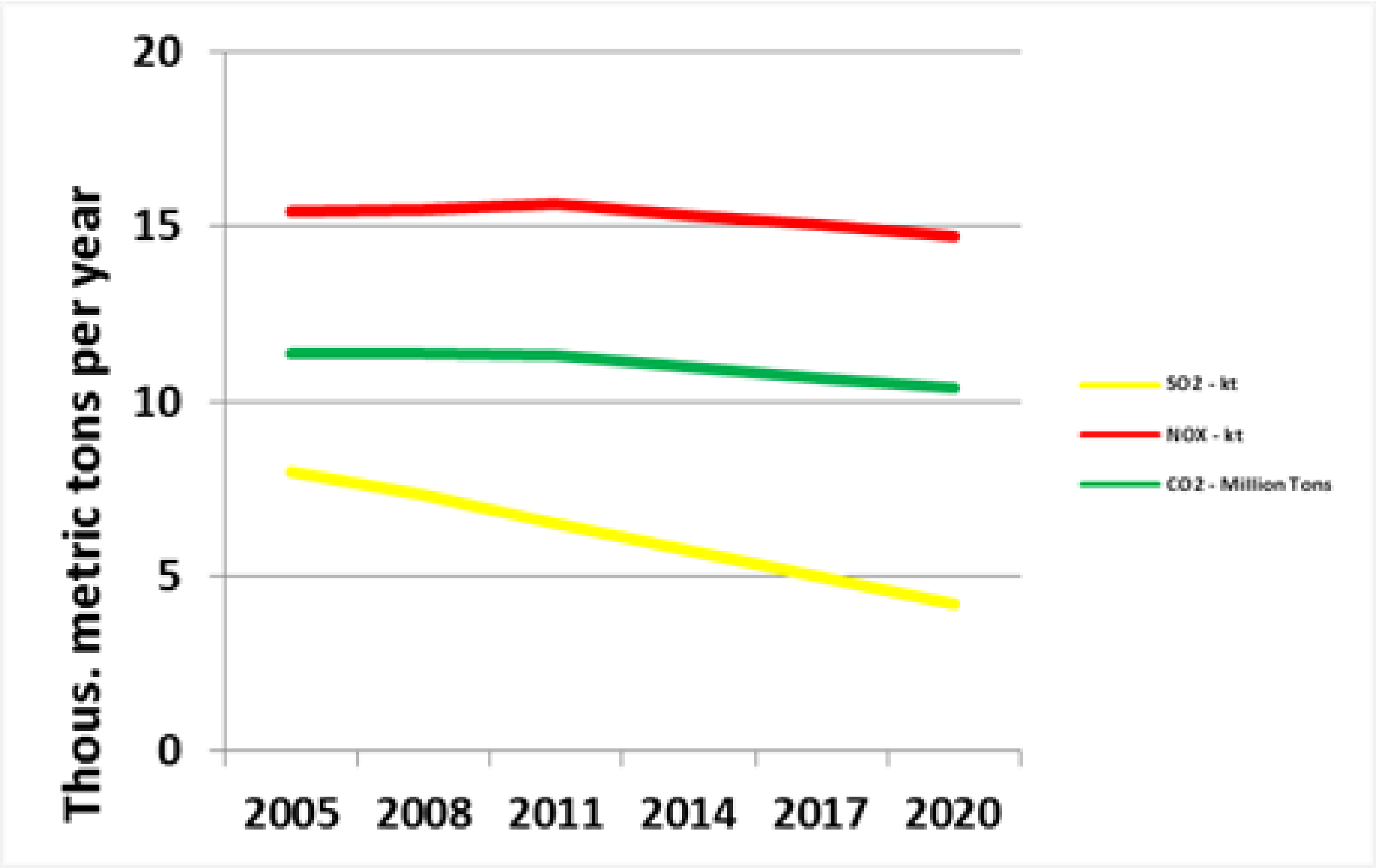
… from EE/RE Efforts



Very Preliminary Results – For Demonstration and Discussion Purposes Only

Building Sector Emission Reductions

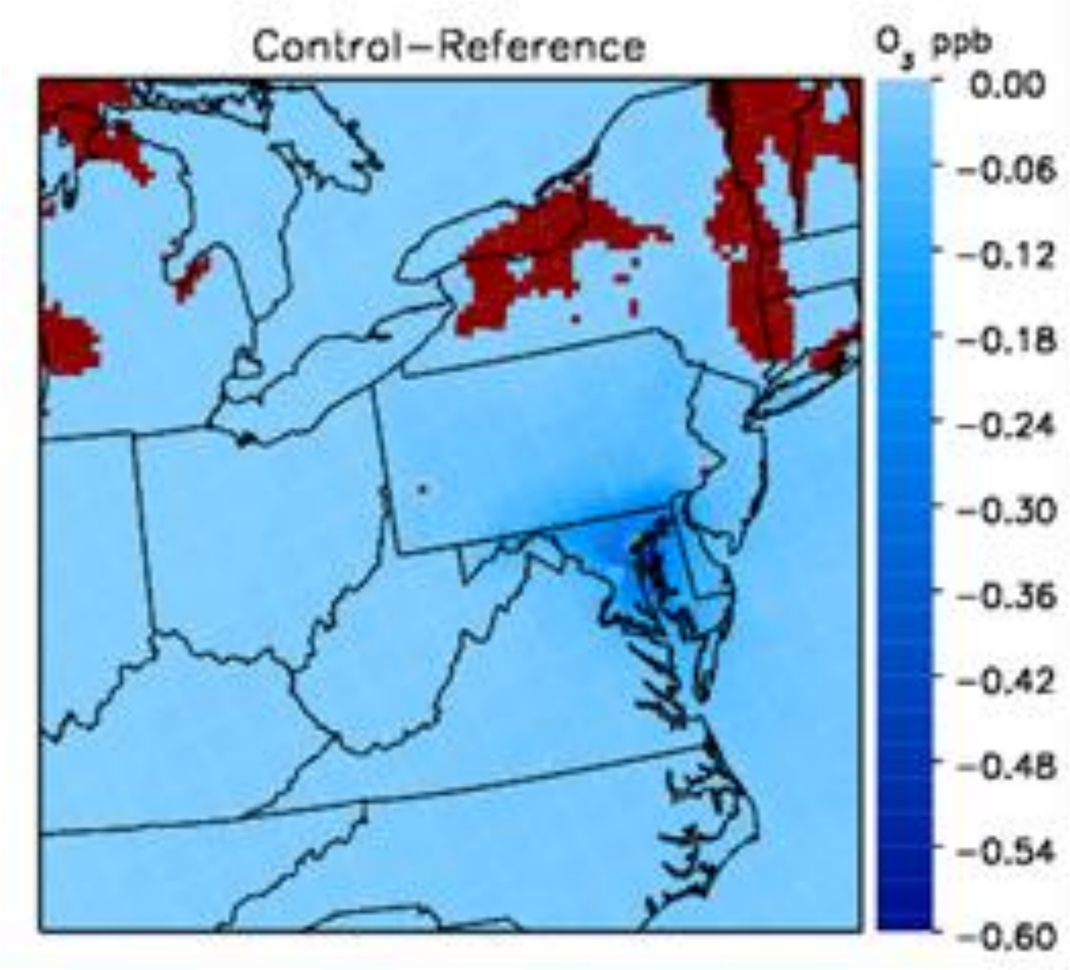
… from EE/RE Efforts



Very Preliminary Results – For Demonstration and Discussion Purposes Only

Modeled Ozone Benefits

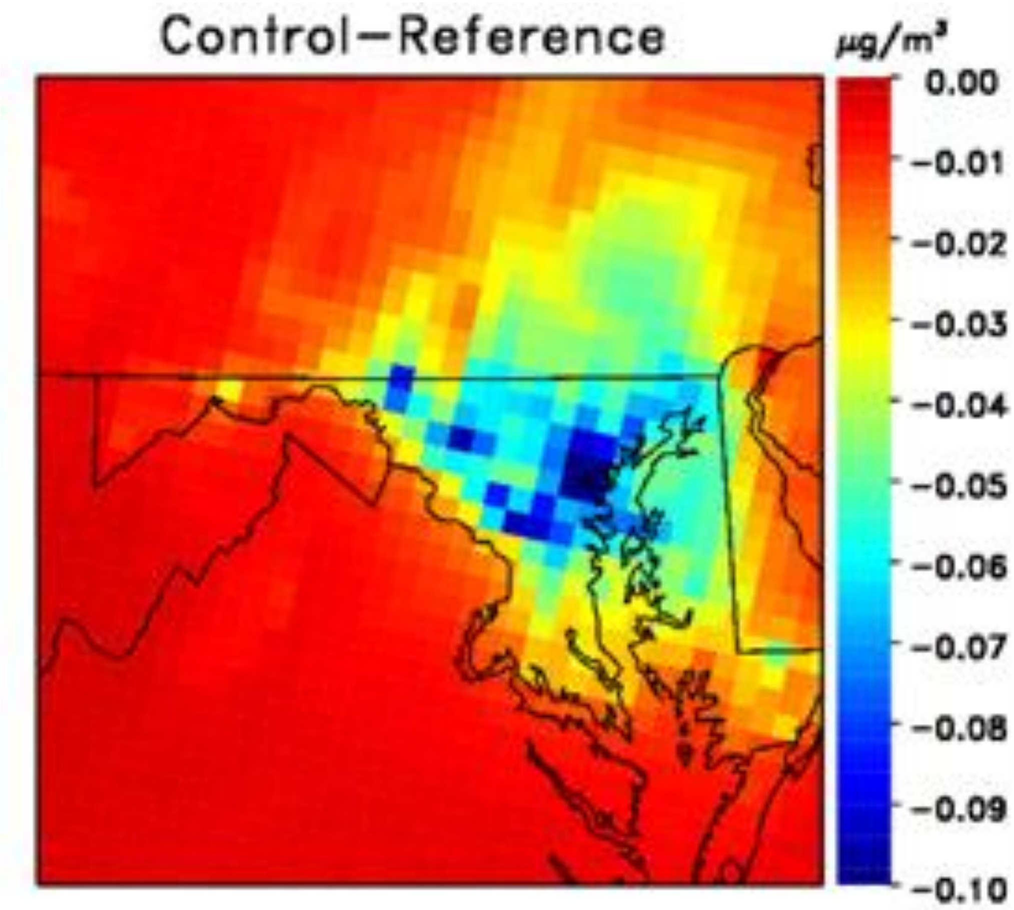
… from EE/RE Efforts



Very Preliminary Results – For Demonstration and Discussion Purposes Only

Modeled Fine Particulate Benefits

… from EE/RE Efforts



Very Preliminary Results – For Demonstration and Discussion Purposes Only

Public Health Benefits – Fine Particulate

State (Abbrev.)	Incidence											Valuation (millions $)	
	Mortality (All Cause)	Acute Bronchitis	Acute Myocardial Infarction	Acute Respiratory Symptoms	Asthma Exacerbation	Emergency Room Visits, Respiratory	Hospital Admissions, Cardiovascular	Hospital Admissions, Respiratory	Lower Respiratory Symptoms	Upper Respiratory Symptoms	Work Loss Days	Mortality	Morbidity
CT	0 - 1	-	-	45	4 - 25	-	-	-	1	1	7	2.0 - 6.9	0.0 - 0.1
DC	1 - 3	1	-	180	19 - 103	-	-	-	4	3	30	8.0 - 27.1	0.1 - 0.2
DE	1 - 3	1	-	138	15 - 81	-	-	-	3	3	23	6.0 - 20.1	0.1 - 0.2
MA	1 - 3	1	-	157	15 - 85	-	-	-	4	3	26	6.3 - 21.2	0.1 - 0.2
MD	**21 - 71**	**32**	**0 - 5**	**4,067**	**431 - 2,394**	**2 - 4**	**1 - 2**	**1**	**102**	**77**	**687**	**168.4 - 568.2**	**1.5 - 5.0**
ME	-	-	-	(19)	(10) - (2)	-	-	-	-	-	(3)	(3.3) - (1.0)	0.0
NH	-	-	-	25	3 - 14	-	-	-	1	-	4	1.0 - 3.5	0.0
NJ	5 - 17	7	0 - 1	968	100 - 557	1	0 - 1	-	23	18	162	40.3 - 136.1	0.4 - 1.3
NY	0 - 2	-	-	61	5 - 25	-	-	-	1	1	10	3.6 - 12.3	0.0 - 0.1
PA	15 - 52	19	0 - 5	2,391	248 - 1,377	1 - 2	1 - 2	1	58	44	401	123.2 - 415.7	1.0 - 4.1
RI	(1) - 0	-	-	(40)	(22) - (4)	-	-	-	(1)	(1)	(7)	(5.9) - (1.7)	(0.1) - 0.0
VA	3 - 10	6	0 - 1	688	74 - 409	0 - 1	-	-	17	13	116	24.2 - 81.8	0.3 - 1.0
VT	-	-	-	5	0 - 2	-	-	-	-	-	1	0.3 - 1.1	0.0

Very Preliminary Results – For Demonstration and Discussion Purposes Only

Public Health Benefits – Ozone

State (Abbrev.)	Incidence					Valuation (millions $)	
	Mortality (All Cause)	Morbidity				Mortality	Morbidity
		Acute Respiratory Symptoms	Emergency Room Visits, Respiratory	Hospital Admissions, Respiratory	School Loss Days		
CT	-	52	-	-	15 - 35	0.2 - 0.3	0.0
DC	-	260	-	0 - 1	76 - 181	1.0 - 1.4	0.0
DE	-	643	-	1 - 3	201 - 479	2.5 - 3.5	0.1
MA	-	12	-	-	3 - 8	0.1	0.0
MD	**3 - 5**	**6,853**	**3 - 6**	**3 - 20**	**2,107 - 5,020**	**24.9 - 35.1**	**0.6 - 0.7**
ME	-	(84)	-	-	(53) – (22)	(0.6) – (0.4)	0.0
NH	-	3	-	-	1 - 3	0.0	0.0
NJ	1	1,806	1 - 2	1 - 6	542 - 1,292	7.0 - 9.9	0.2
NY	2	3,731	3 - 6	2 - 10	1,095 - 2,613	12.2 - 17.2	0.3 - 0.4
PA	2 - 3	2,939	1 - 3	2 - 13	873 - 2,083	13.8 - 19.4	0.3
RI	-	-	-	-	2 - 5	0.0	0.0
VA	1	2,151	1 - 2	2 - 9	676 - 1,613	6.7 - 9.4	0.2 - 0.3
VT	-	(16)	-	-	(10) – (4)	(0.1)	0.0

Very Preliminary Results – For Demonstration and Discussion Purposes Only

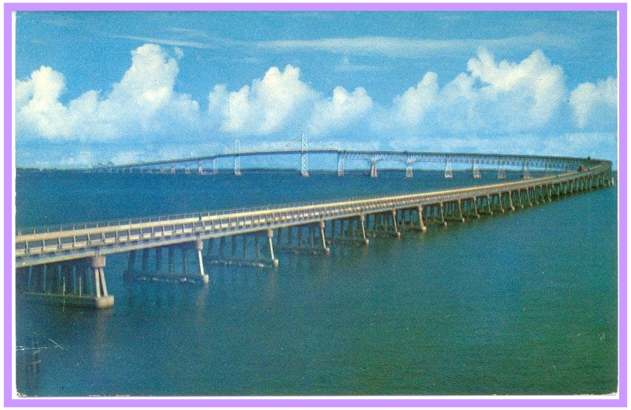
Economic Benefits

- Jobs
  - On average a net increase of 4,300 jobs per year through 2020
- Wages
  - Average increase in direct wages of $131 million/year
    - Associated with technology transition
- Household Income
  - Average savings of $80 per year
- Just a few examples

MARYLAND

Next Steps

- Have already started the next phase of this work – same partners
  - Now targeting the 2015 Ozone SIP
    - Improving emission reduction estimates
    - Refining NE-MARKAL platform
    - Continued air quality, health benefit and economic modeling
    - Quantifying Chesapeake Bay benefits
    - Adding new EE/RE efforts into the mix
      - Offshore wind, updated RGGI, others
    - Increasing coordination work with State agencies (MEA, PSC, MDOT, etc.)
- Also working with EPA to evaluate this work and assess appropriate use in SIP context



Questions?