



# Maryland Department of the Environment

## The 2015 Update to the Greenhouse Gas Emission Reduction Act (GGRA) Plan



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**Maryland Climate Change Commission, September 8, 2015**





# Presentation Overview

- The general message that MDE believes the October “GGRA Update” report (and the Commissions November report) should convey
- Summary of the 2012 GGRA Plan
- Summary of the 2015 GGRA Update Report
- The Public Review/Comment Process
- A Path Forward - Beyond 2020





# The General Message

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- For the October GGRA Update Report... and
  - The November 2015 Commission Report
- Generally good news and a path forward
  - The GGRA Plan appears to have us on a pace to meet or exceed the 25% reduction by 2020 greenhouse gas (GHG) emission reduction requirement
    - This is good news
  - We have achieved these reductions in a way that has a positive impact on Maryland's economy and on job creation
  - There appears to be a path forward supported by many stakeholders that would involve gently moving towards a 40 by 30 (40% reduction by 2030) plan with an increased focus on a healthy economy and generating more jobs in Maryland
  - There are emerging issues that should be built into ongoing and future planning and analyses
    - Fast acting climate changers, life-cycle analysis, innovative financing, regional and local partnerships, etc.

# Summary of the 2012 GGRA Plan

- The GGRA was adopted in 2009
- Required that Maryland develop and implement a plan to reduce GHG emissions by 25% by 2020
- The law also requires that the plan support a healthy economy and create new jobs
- A report from MDE is required in October of 2015
  - The report must provide a 2015 update on the status of the plan
    - Emissions
    - Economy
    - Jobs
    - How to move forward
    - Other issues



# What Was in the 2012 Plan?

- A comprehensive multi-sector, multi-agency plan to reduce Maryland's GHG emissions with over 50 programs that utilize market based and regulatory approaches to reduce GHG emissions
- GHG Emission Reduction Projections for the measures in the plan
  - Reduce emissions 25% by 2020 (from 2006 baseline)
- Expected Economic Benefits
  - Projected net benefit of \$1.6 billion in economic output to the Maryland economy, and
  - That over 30,000 jobs would be created and maintained by 2020





# The 2015 GGRA Update

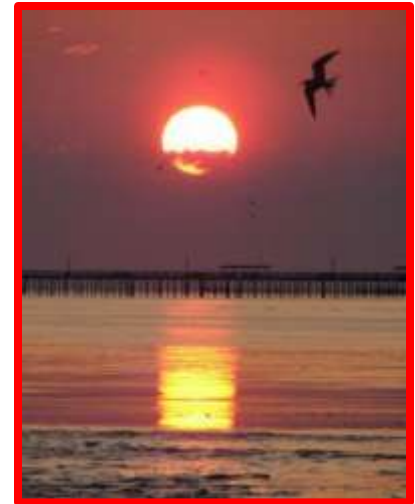
- The 2015 Update is a requirement of the law and the focus of this meeting
- Shows we are **ON TARGET** to meet the 25% reduction goal by 2020
  - Not declaring victory...but this is a positive first step...on a long journey
- Updates economic benefit and job creation analyses
- As required in the law, also discusses where the State may want to go next
  - How to improve the 2020 effort?
  - Beyond 2020 Goal?
  - Lessons learned from past 10 years?





# Why is the 2015 GGRA Update Important?

- The Maryland General Assembly must take an action on the law in 2016 ...
  - Without action, the requirements of the law sunset
- The 2015 GGRA Update is intended to provide information related to this decision
- Options include:
  - Changing, maintaining, or eliminating the 25% by 2020 GHG reduction requirement
  - Looking beyond 2020
    - 2009 law mentions the need to consider reductions as deep as 90% by 2050







# 2015 GGRA Update Report - Highlights

- Positive “first step” towards achieving deeper reduction goals
  - The reduction programs worked well, we are on track to exceed the 25% GHG reduction goal by 2020
  - Benefits to the economy and job creation estimates are better than those originally included in the 2012 Plan.
- There appears to be a common sense path forward that is supported by many stakeholders
  - Hoping to get significant input from the Commission on the “Path Forward” issue during today’s discussion



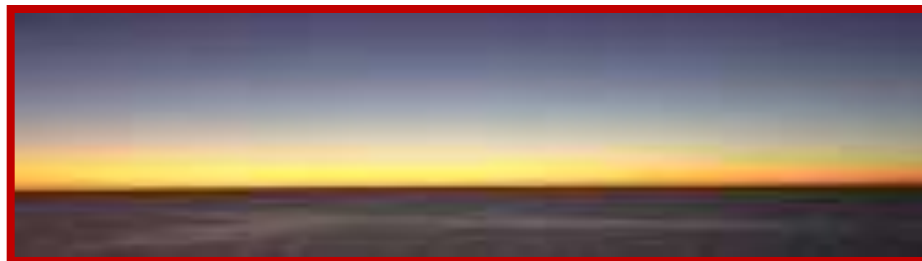




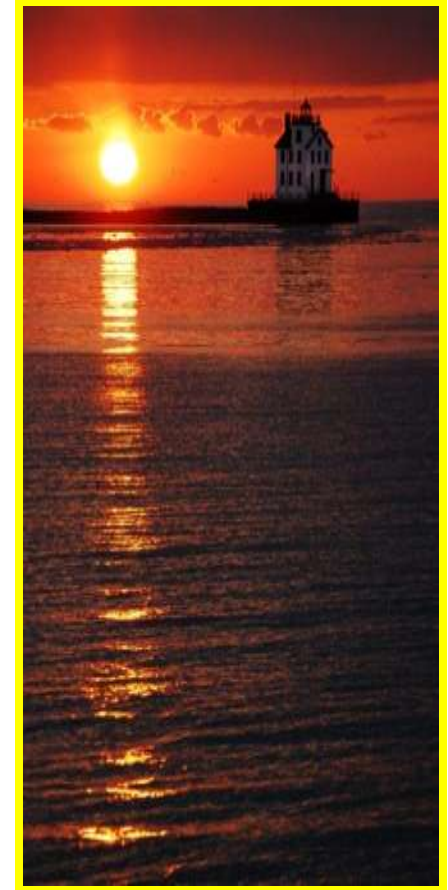
# What's in the 2015 GGRA Update Report?

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- Background on the 2012 GGRA Plan
- A status report on how we are doing with GHG emission reductions, job creation and enhancing Maryland's economy
- Summary of the 50+ GHG emission reduction programs
  - 2020 emissions reduction estimates for each program
- An update on how the GGRA Plan will help Maryland with economic development and job creation
  - Towson Universities Regional Economic Studies Institute (RESI) report completed and included as an Appendix



- Emissions Inventory and Forecast
  - Updated emissions inventories including all in-state emissions and imported electricity
- How Maryland is adapting to climate change
  - From the MCCC Adaptation Working Group - How Maryland can better understand and address potential risks posed by climate change
- An update to the “Cost of Inaction” work included in the 2012 Plan
  - Supported by report completed by Center for Climate and Energy Solutions (C2ES) - report included as an Appendix





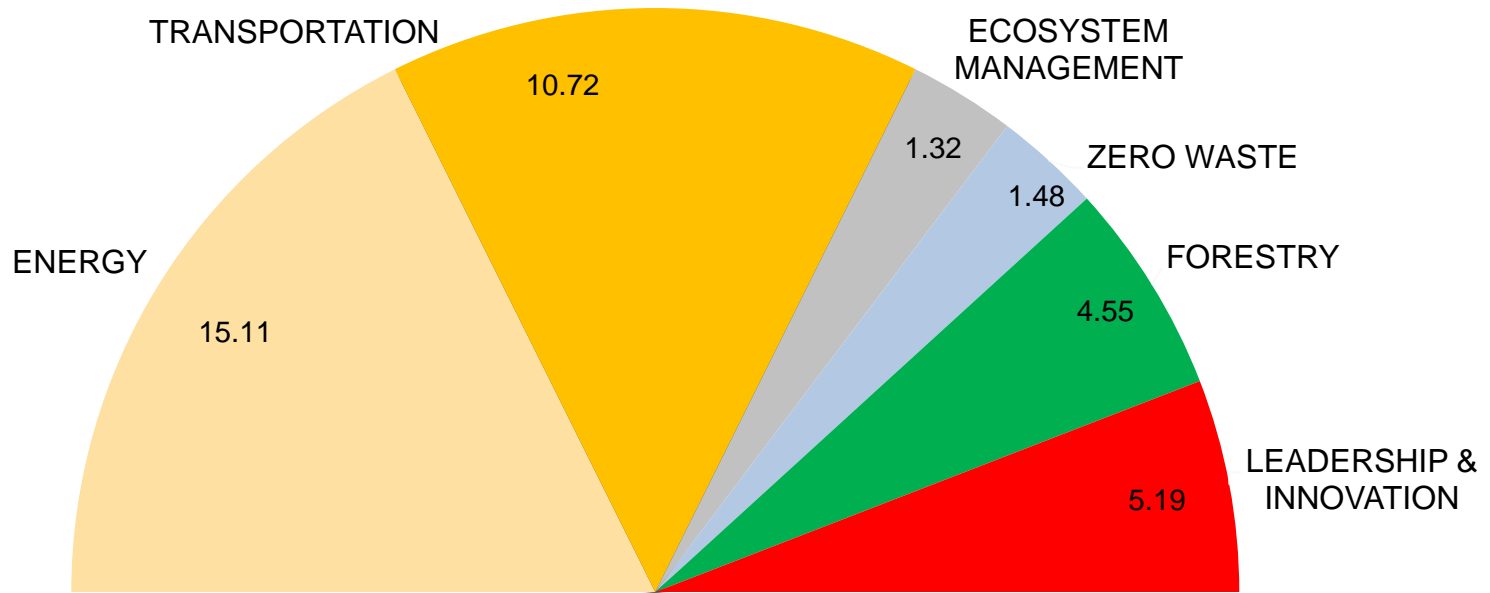
# What Else is in the GGRA Update Report?

- Update on climate change science
- Summary of emerging technologies related to climate change science
- How the GGRA will impact the manufacturing sector in Maryland
  - RESI Manufacturing Study completed and included as an Appendix
- Multi-Pollutant Benefits - Ozone, fine particles, more
  - NESCAUM report included as an Appendix
- How might Federal actions impact MD's progress – Clean Power Plan, new EPA vehicle standards, etc.
- Next steps...more on this later





# GGRA Bottom Line – Current Status



The 2012 Plan results in reductions that are slightly greater than the reductions required to achieve the 25% reduction by 2020. The Plan is expected to over-achieve by between 3.7 to 6.2 MMtCO<sub>2</sub>e





# Updated Economic Benefits and Jobs

- The 2015 GGRA Update includes refined estimates of the economic benefits and job creation driven by the Plan
- Each program analyzed individually by RESI with the assistance of implementing State agency
  - Program by program benefits included
- Report also includes real world examples of economic benefits and jobs
  - For example ... the top three new jobs are architecture and engineering positions, construction, and research and development
- Win, Win, Win programs are abundant – programs where we see reductions in GHG emissions, net economic benefits and additional new jobs
- More sophisticated analysis of economic benefits and employment estimates are planned for the future (an opportunity for outside resources to assist)

	<b>2012 Plan</b>	<b>2015 GGRA Update</b>
<b>Net Economic Benefit in 2020</b>	<b>\$1.6 Billion in economic output</b>	<b>\$2.5 to \$3.5 Billion in economic output</b>
<b>Jobs Created and Maintained in 2020</b>	<b>30,000 jobs</b>	<b>26,000 to 33,000 jobs</b>



# Helping the Economy - A Real World Example

## *The Maryland Clean Cars Program*

- RESI, MDE and MDOT all worked on the economic analysis of the Clean Cars Program
- Current analyses project a net economic benefit of approximately \$700 million in 2020 and that about 1,500 jobs will be created and maintained
- The Clean Cars program is helping generate numerous economic development and green job creation opportunities. Real world examples include:
  - The GM plant in White Marsh that manufactures electric motors and transmissions
  - Numerous new business starts related to electric vehicle infrastructure including:
    - SemaConnect (Annapolis – Charging Infrastructure)
    - TimbeRock (Frederick – Chargers, Solar)
    - Clinton Electric (Fast Chargers and installation)
    - Numerous other businesses







# GGRA Reduction Requirement

The 25 by 20 reduction goal requires not only a 25% reduction from 2006 levels but also that all growth between 2006 and 2020 be offset

The 2020 goal (25% below  
2006 Baseline) = **80.42**  
million metric tons of CO<sub>2</sub>e

Where will we be in  
2020 with no action?  
Emissions = 115.08  
million metric tons of CO<sub>2</sub>e

Reduction Required to  
meet 2020 goal = **34.66**  
(115.08 - 80.42 = 34.66)  
million metric tons of CO<sub>2</sub>e





# MWG Involvement

- MDE, other State agencies and the Maryland Climate Change Commission's (MCCC) Mitigation Working Group (MWG) have been heavily involved with reviewing programs and the revised 2020 reduction estimates
- The MWG met with all key Agencies (MEA, MDOT, MDE, MDP, DNR, etc) at individual MWG meetings where estimates of 2020 reductions were presented and discussed
  - Subgroup meetings were held to further discuss programs and reductions
- MWG has provided input on programs and emission reduction estimates consistent with deadlines established by MDE and Workgroup Co-chairs
  - Input from the MWG is greatly appreciated



# Challenges of Estimating Reductions

- There is significant uncertainty over how to quantify emission reductions from many of the GGRA Programs
  - GHG emission quantification is a brand new area
    - There is no long history of emission factors, GHG programs often overlap, etc.
- To account for this uncertainty, a 30% discount factor (based upon MDE and independent contractor research) has been applied to many of the emission reduction estimates
- More recent research indicates that a 30% uncertainty discount may be too cautious and that a 10% uncertainty discount factor may be more appropriate



<b>GGRA Policy / Program</b>	<b>REDUCTIONS (MMtCO2e)</b>			
	<b>2012 GGRA Status Quo</b>	<b>2012 GGRA Enhanced</b>	<b>2020 Updated Conservative Overlap (30%)</b>	<b>2020 Updated Aggressive Overlap (10%)</b>
<b>Energy</b>	<b>15.41</b>	<b>25.31</b>	<b>15.11</b>	<b>15.14</b>
A. The Regional Greenhouse Gas Initiative (RGGI)	0	3.6	3.60	3.60
B. EmPOWER Maryland	8.42	10.52	7.24	7.24
C. The Maryland Renewable Energy Portfolio Standard (RPS)	6.86	10.96	4.13	4.13
D. Other Energy Programs	0.13	0.23	0.14	0.17
<b>Transportation</b>	<b>10.51</b>	<b>13.8</b>	<b>10.72</b>	<b>10.72</b>
E. Transportation Technologies	8.1	8.61	6.20	6.20
F. Public Transportation	2	2.89	2.57	2.57
G. Pricing Initiatives	0.41	2.3	1.95	1.95
H. Other Innovative Transportation Strategies/Programs				
<b>Zero Waste</b>	<b>1.48</b>	<b>1.48</b>	<b>1.48</b>	<b>1.78</b>
K. Zero Waste	2.8	4.8	1.48	1.78
<b>Ecosystem Management</b>	<b>0.74</b>	<b>1.82</b>	<b>1.32</b>	<b>1.58</b>
I. Ecosystems Markets	0.2	0.68	0.68	0.82
N. Land Use Programs - Note: Enhanced II is 1.15	0.54	1.14	0.64	0.77
<b>Leadership and Innovation</b>	<b>4.86</b>	<b>5.18</b>	<b>5.19</b>	<b>6.23</b>
L. Outreach and Public Education	0.03	0.03	0.03	0.04
M. Building and Trade Codes in Maryland	3.15	3.15	3.15	3.78
O. Maryland's Innovative Initiatives	0.21	0.21	0.21	0.25
P. Leadership-By-Example	1.45	1.77	1.78	2.14
Q. Future or Developing Programs	0.02	0.02	0.02	0.02
<b>Forestry</b>	<b>4.55</b>	<b>4.55</b>	<b>4.55</b>	<b>5.46</b>
J. Forestry and Sequestration	4.56	4.56	4.55	5.46
<b>TOTAL</b>	--	--	<b>38.37</b>	<b>40.91</b>
<b>GGRA 2020 GOAL</b>	--	--	34.66	34.66
<b>2020 REDUCTIONS</b>	--	--	<b>+3.71</b>	<b>+6.25</b>

# Market Driven Changes to Projections

- Changes in the way the energy market works and driving behavior have played a major role in helping the State meet the goals of the GGRA
- Since the 2006 baseline year, CO<sub>2</sub> emissions in Maryland have decreased significantly because electricity generation and industrial sources are using more natural gas instead of coal
  - Natural gas emits half as much CO<sub>2</sub> as coal when used to make electricity
- Changes in driving behavior (partially linked to a slow economy) also contributed to the decline in CO<sub>2</sub> emissions from transportation, manufacturing, and electricity generation
- Other changes related to growth included:
  - Per-capita waste generation
  - Recycling and reuse rates
  - Several other issues



# Emerging Issues

- The MDE October report will also identify a set of emerging issues that will be part of ongoing and future planning and analyses efforts under the GGRA
  - Many of these issues are already addressed ... at least partially ... in the 2015 GGRA Update Report
- Examples include:
  - Fast acting climate changers ... Life cycle analyses ... Health risk and benefits analysis ... Regional and local partnerships ... Green financing ... Hydraulic fracturing and other natural gas issues ... More
- Should be considered as priority items for the Commission's 2016 Workplan





## Public Meeting Schedule and Locations

The Education, Communication, and Outreach (ECO) Working Group of the MCCC held five public meetings across Maryland between July and August of 2015.

The meetings were located in the following areas:

- Central Maryland (Baltimore)
- Western Shore of Maryland (Wye Mills)
- Western Maryland (Frostburg)
- Eastern Shore of Maryland (Sunderland)
- South Central Maryland (Largo)



# Purpose of the Public Meetings

- Inform the public of the mission and actions of the Maryland Climate Change Commission
- Provide background and purpose of the 2009 GGRA Act and the 2012 GGRA Plan
- Explain purpose of the 2015 GGRA Plan Update
- Take public comment on issues of concern regarding climate change in Maryland



# What We Heard

- Appears to be significant public interest on climate change in general and the States plans to address climate change
  - Several comments focused on the dangers of climate change and Maryland's vulnerability
- Many comments on the renewal of the GGRA during the 2016 General Assembly
- Other specific comments on elements of the GGRA Plan
  - The Renewable Portfolio Standard (RPS)
  - Fracking in Maryland
  - Natural gas issues



# Where Do We Go Next?

- MDE will be discussing our current thinking on what we believe is a common sense way to move forward on climate change while also helping the State with economic development and job creation
- It is based upon analysis of what's going on in other parts of the Country and ...
  - 10 years of MDE experience on what works,
  - Significant input from the MWG,
  - Individual discussions with MWG members and
  - Discussions with members of the Commission
- Having broad support from the Commission is extremely important





# The Path Forward

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- How does Maryland move forward to continue to address climate change?
  - In 2016, the General Assembly must take an action to renew the GGRA of 2009
    - No action - GGRA sunsets
    - Keep or adjust 25 by 20 requirement?
    - Move on to a beyond 2020 effort?
  - MDE recommendations will be included in the October report
  - Current MDE thinking ... Feedback from MCCC during today's discussion is critical
    1. Hold the line on 25 by 20
    2. Move forward with a gentle ... 40% reduction by 2030 process
    3. Increase efforts to support economic growth and job creation
    4. Address “emerging issues” as part of ongoing efforts

# What About Post 2020 Goals?

- Have worked with the MCCC Science and Technical Workgroup (STWG)
  - The science is clearly pushing for deep reductions
  - Something like 70% to 80% reduction ... world-wide by 2050 ... or earlier
  - Not terribly different from where we were when the GGRA was adopted in 2009
- The GGRA and other leadership states moved forward with a “first step” towards those deep goals in 2050
  - GGRA ... 25% reduction by 2020
  - Other states and nations adopted very similar “progress” steps
- Economic growth and job creation are more important than ever
- What should the next step in that progress be?





# How About 1/2/3/40 by 30?

- **1** ... Increase net economic benefit by 1 percent
  - Increase net economic benefits in 2030 to \$3.6 to 4.0 billion
- **2** ... Increase projected 2020 job creation by an additional 2 percent
  - Increase job creation from 33,000 jobs in 2020 to around 34,000 jobs in 2030
  - As part of this effort increase manufacturing sector jobs
- **3** ... Increase the real average annual wages paid to workers by 3 percent
- **40** ... Meet, exceed or get as close as you can to a 40% reduction in GHG emissions by 2030





# Economic Growth and Job Goals

*... specifically included in the planning process*

- Build from positive economic and job impacts from 2020 GGRA Plan
  - Push for economic growth
    - Increase net economic benefit (from 2020 projected benefits) by 1 percent by 2030
  - Push for more job creation
    - Increase projected 2020 job creation by an additional 2 percent by 2030
  - Push for job growth in the manufacturing sector
    - Protect and increase manufacturing sector jobs
  - Push for better paying jobs
    - Increase the real average annual wages paid to workers by 3 percent by 2030
  - Happy to discuss these goals with other experts





# 40% GHG Reduction by 2030?

- Generally consistent with other states
  - Red and Blue leadership states
- Consistent with international discussions
- An aggressive goal ... but one that you can identify a feasible path forward to get to
  - Federal vehicle and fuel efficiency standards provide deeper and deeper reductions as time marches on and the older fleet turns over
- U.S. target - 28% by 2025 from 2005



# 2030 Target - Goal, Mandate or Aspiration?

- Use the current GGRA policy as a model
  - Set 40 by 30 as a planning goal ...
  - But have the General Assembly confirm , strengthen or otherwise adjust the goal during a mid-course check-in
- Getting to the goal should continue to be tied - strongly tied - to improving the States economy and creating new jobs
  - Again, quantitative goals for economic growth and job creation should be part of the planning process
- Timing
  - Can logically build from the current GGRA schedule



# Potential Timing

- October 2015 - MDE submits GGRA report to Governor and General Assembly
  - Includes a recommendation on a path forward
- General Assembly takes action in 2016
- How it might work (2009 GGRA process as a guide)
  - 2019 - MDE (with the Commission's guidance) develops and submits a 40 by 30 Plan to the Governor and General Assembly
    - Includes goals for jobs and the economy
    - Also includes a status report on 25 by 20
  - 2020 - Implementation of the 40 by 30 Plan begins/continues
  - 2025 - MDE owes a status report to the Governor and the General Assembly on progress in reducing GHG emissions and how the plan is fostering economic development opportunities and creating new green jobs
  - 2026 - General Assembly (just like the 2016 process) must confirm or adjust the 2030 target to keep the requirements of the law in place ... if no action ... the law sunsets !!!



# Wrap-Up

- The States GGRA Plan appears to have us on a pace to meet or exceed the 25% reduction by 2020 GHG emission reduction requirement
  - This is good news
  - We have achieved these reductions in a way that has a positive impact on Maryland's economy and on job creation
  - There are emerging issues that should be built into ongoing and future planning and analyses
- There appears to be a path forward supported by many stakeholders that would involve gently moving towards a 40 by 30 (40% reduction by 2030) plan with an increased focus on a healthy economy and generating more jobs in Maryland
  - A 1/2/3/40 by 30 Plan is under consideration



# Discussion

- MDE is asking for Commission input on the beyond 2020 goals
  - The 1/2/3/40 by 30 “Path Forward” ideas presented earlier
- The 2020 Plan is on track to achieve the 25 by 20 reduction
  - MDE and the Commission should continue to look for ways to improve the 2020 effort - Emissions, jobs and the economy
  - Current and future planning should continue to analyze emerging issues

