

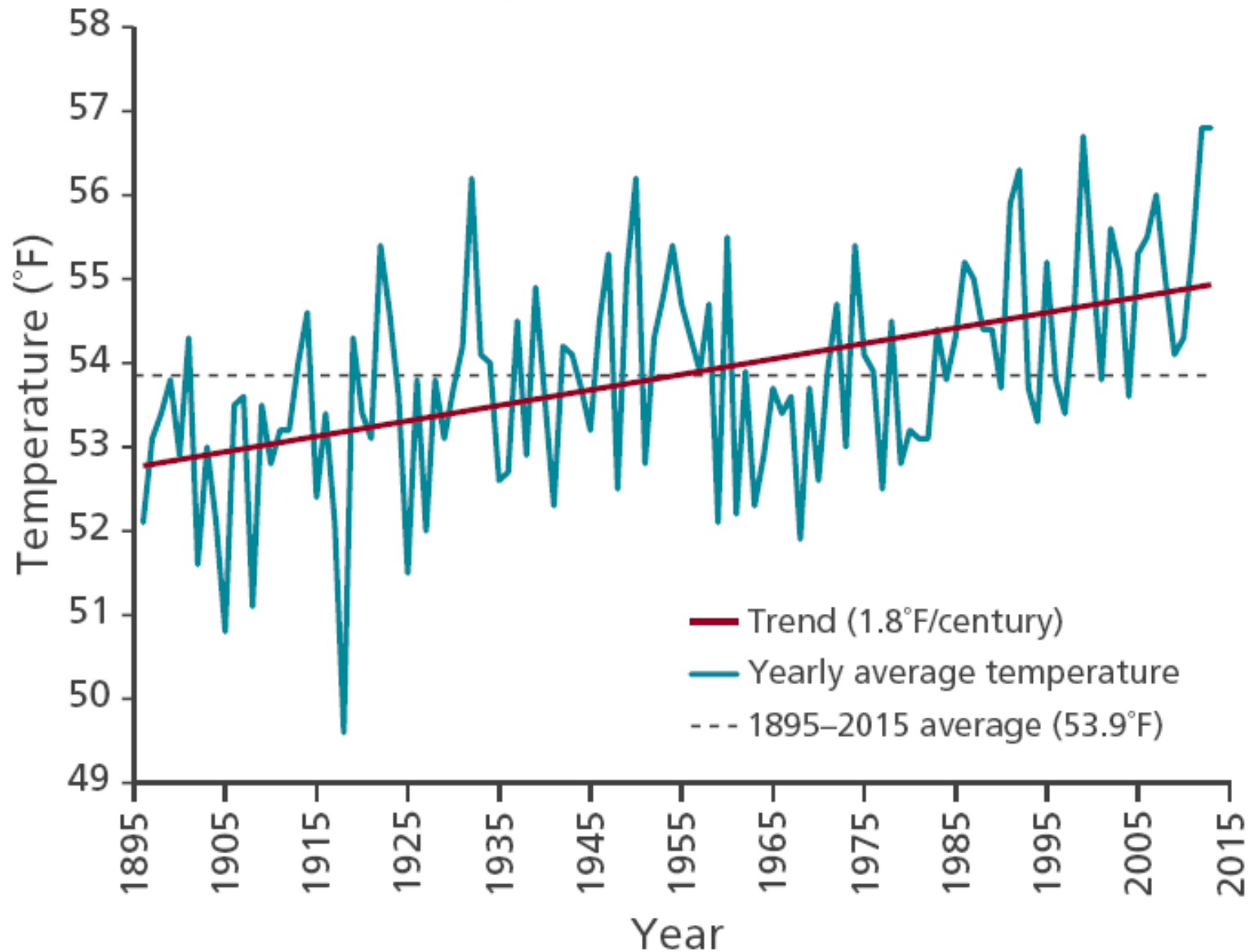
# Maryland's Greenhouse Gas Reduction Plan

**Achieving a 25% Reduction by 2020**

**November 2013**

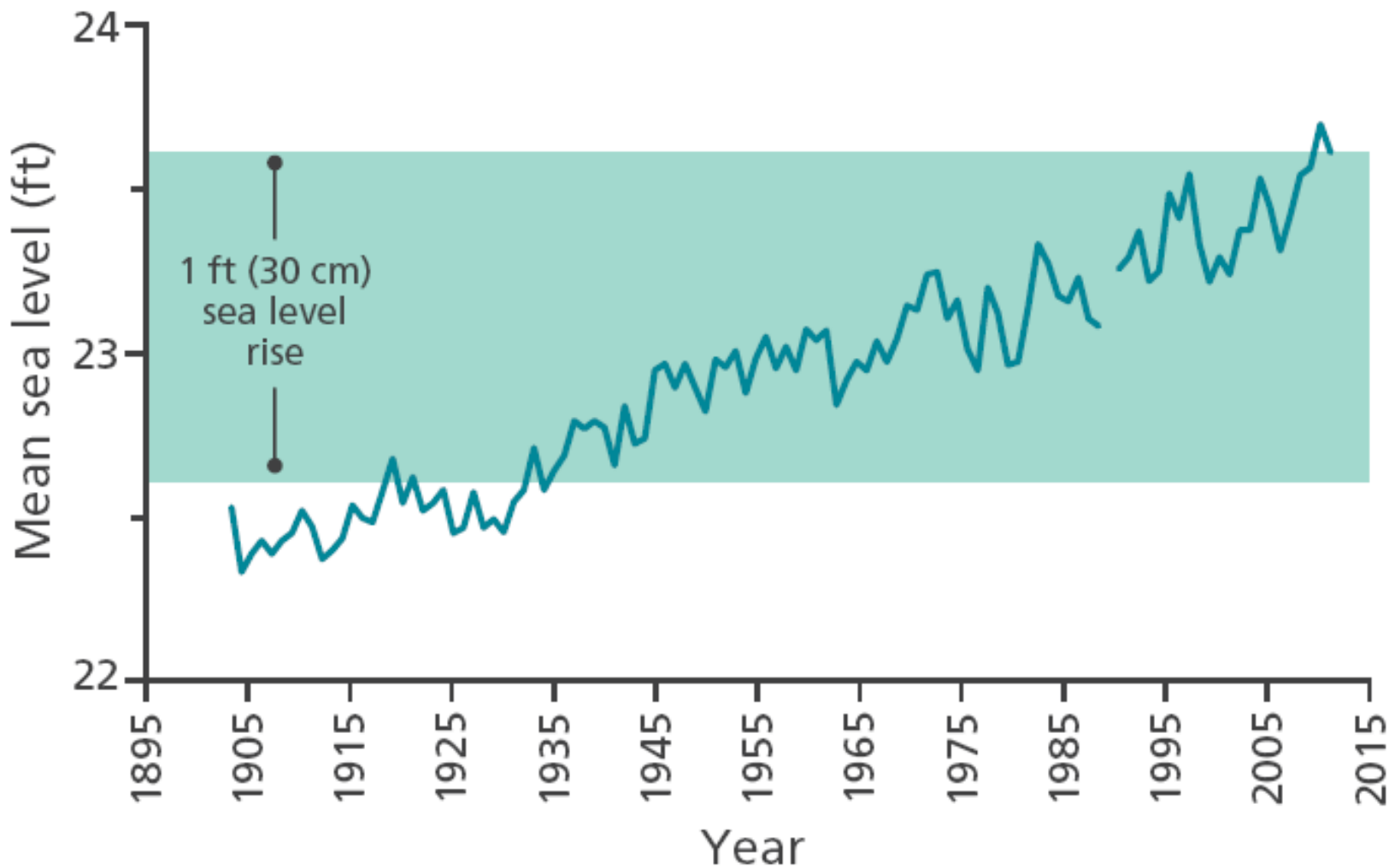


## Annual average air temperature in Maryland



Source: <http://climatechange.maryland.gov/science/>

## Mean sea level in Baltimore



Source: <http://climatechange.maryland.gov/science/>

# An Example

- Maryland's Vulnerability to Sea Level Rise & Coastal Storms

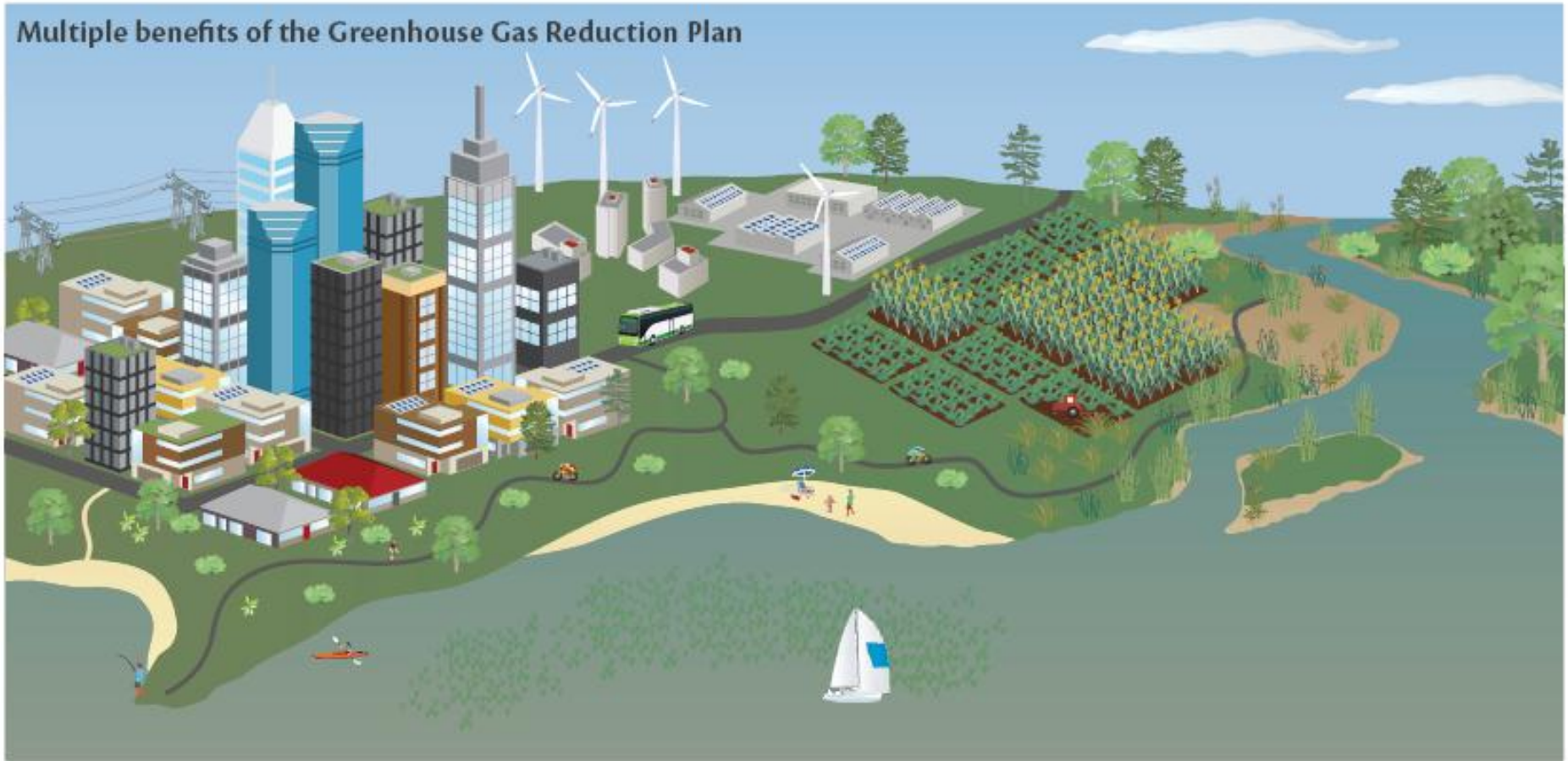




# Maryland's Solution

- Adaptation (DNR)
  - Reduce vulnerability to climate change
    - Such as protecting infrastructure
- Mitigation (MDE)
  - Strategies to reduce the impacts of climate change
    - Such as reducing carbon emissions
  - Greenhouse Gas Reduction Act (GGRA) Plan
    - Utilizes market based and regulatory approaches to reduce emissions within the State
    - Targets all sectors of the economy

## Multiple benefits of the Greenhouse Gas Reduction Plan



Low impact development (high density housing near stores and jobs) is designed to minimize the impact of sprawl on the environment. It reduces emissions by contributing to lower vehicle miles traveled and stimulates the economy.

Investing in green energy will reduce emissions and stimulate the economy.

Reduced air pollution from factories and traffic improves public health (respiratory illnesses like asthma) and supports Bay restoration. This improves tourism and our economy.

Preserving forests, agricultural lands, and wetlands improves quality of life, and removes carbon dioxide from the environment.



# Projected annual reduction of carbon-dioxide equivalent

Annual reduction (million metric tons of carbon dioxide-equivalent)

60  
50  
40  
30  
20  
10  
0

Goal

Projected reductions

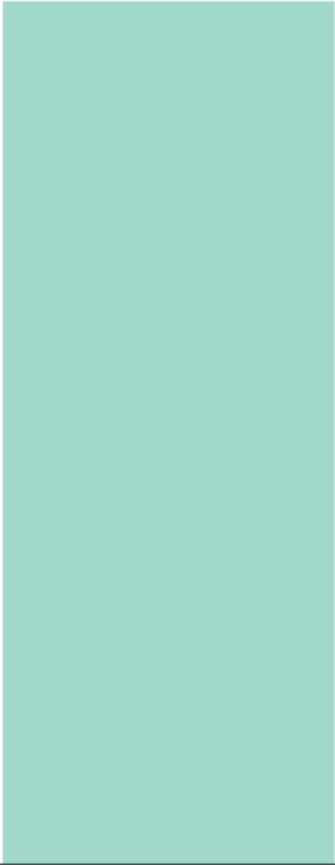
Other

Zero waste

Agriculture and Forestry

Transportation

Energy



Other

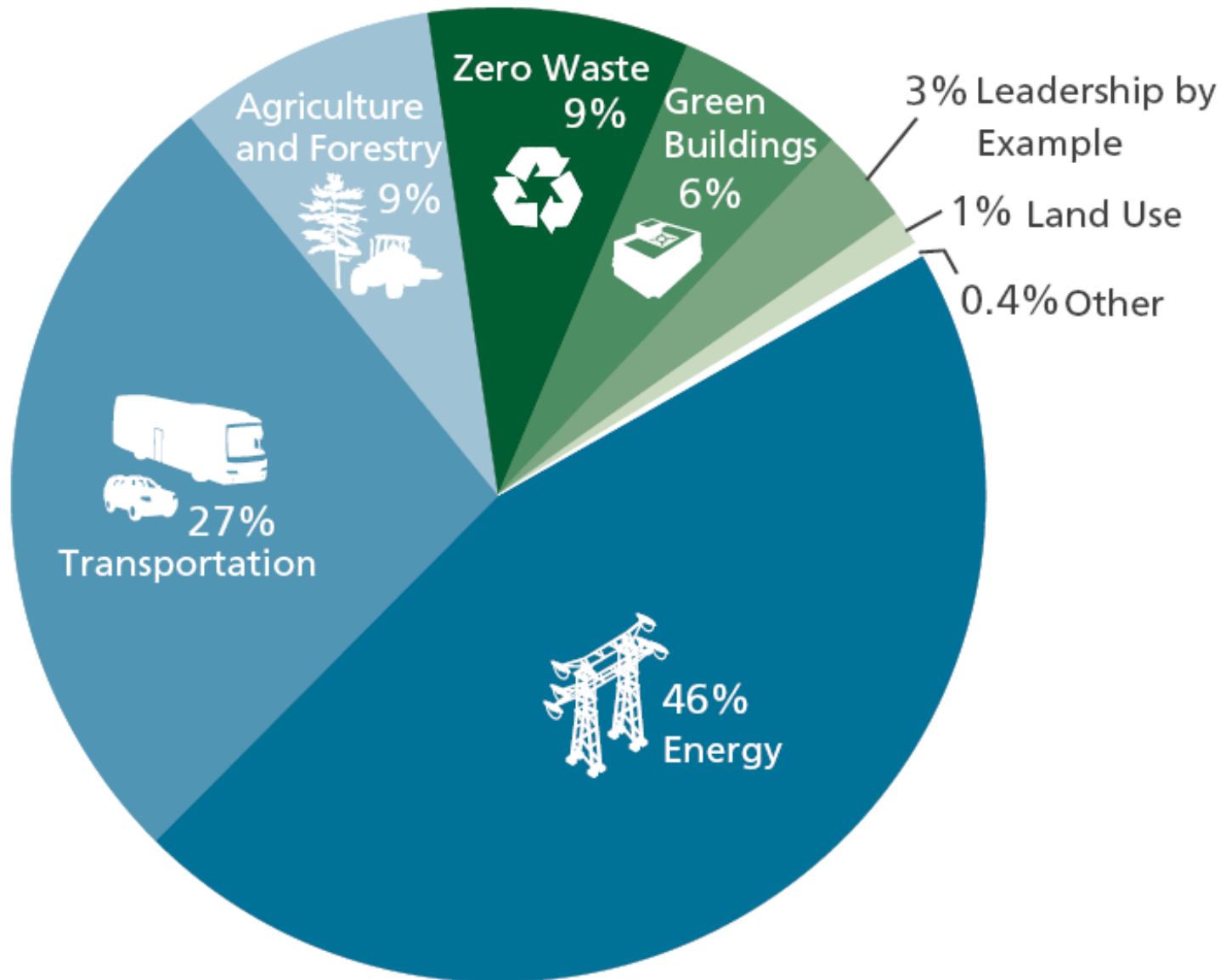
Zero waste

Agriculture and Forestry

Transportation

Energy






# Percent annual reduction of carbon-dioxide equivalent by sector





## Top ten strategies and programs

The enhanced reductions are the result of measures to strengthen the listed programs as initially drafted in February 2012. Reductions are measured in million metric tons of carbon dioxide-equivalent and are an annual amount.

Sector	Program	Program description	Initial reductions	Enhanced reductions
	Maryland Renewable Energy Portfolio Standard	The intent of this law is to establish a market for new sources of mostly in-state renewable electricity generation by requiring that Maryland power providers supply 18 percent of electricity from renewable sources by 2020, increasing to 20 percent renewables by 2022. Eliminating "black liquor" and other carbon-emitting fuels as qualified sources, and increasing the State's Portfolio Standard beyond 20 percent could drive additional reductions.	6.86	10.96
	EmPOWER Maryland	Enacted in 2008, the EmPOWER Maryland Energy Efficiency Act set a target to reduce both Maryland's per capita total electricity consumption and peak load demand by 15 percent by 2015. EmPOWER includes numerous State- and utility-managed energy efficiency and conservation programs. The optimization of these programs should allow the State to increase its per capita electricity consumption reduction target above 15 percent and enable Maryland to achieve additional reductions.	8.42	10.52
	Zero waste	Zero waste is a concept that calls for the near elimination of solid waste sent to landfills or incinerators for disposal; instead the vast majority of Maryland's solid waste will be reused, recycled, composted, or prevented through source reduction.	2.80	4.80
	Maryland Clean Cars	The Maryland Clean Cars Program adopts California's stricter vehicle emission standards and directly regulates carbon dioxide emissions. These standards became effective in Maryland for model year 2011 vehicles, significantly reducing a number of emissions including volatile organic compounds and nitrogen oxides.	4.33	4.33
	Regional Greenhouse Gas Initiative	The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort by nine Northeast and Mid-Atlantic states to design and implement a regional power plant emissions cap-and-trade program. Revenues from the program support energy efficiency programs and augment EmPOWER Maryland and the Renewable Energy Portfolio Standard. The recent agreement to lower the RGGI cap from 165 to 91 million metric tons of carbon dioxide-equivalent will directly contribute to emissions reductions by 2020.	0.00	3.60

## Top ten strategies and programs

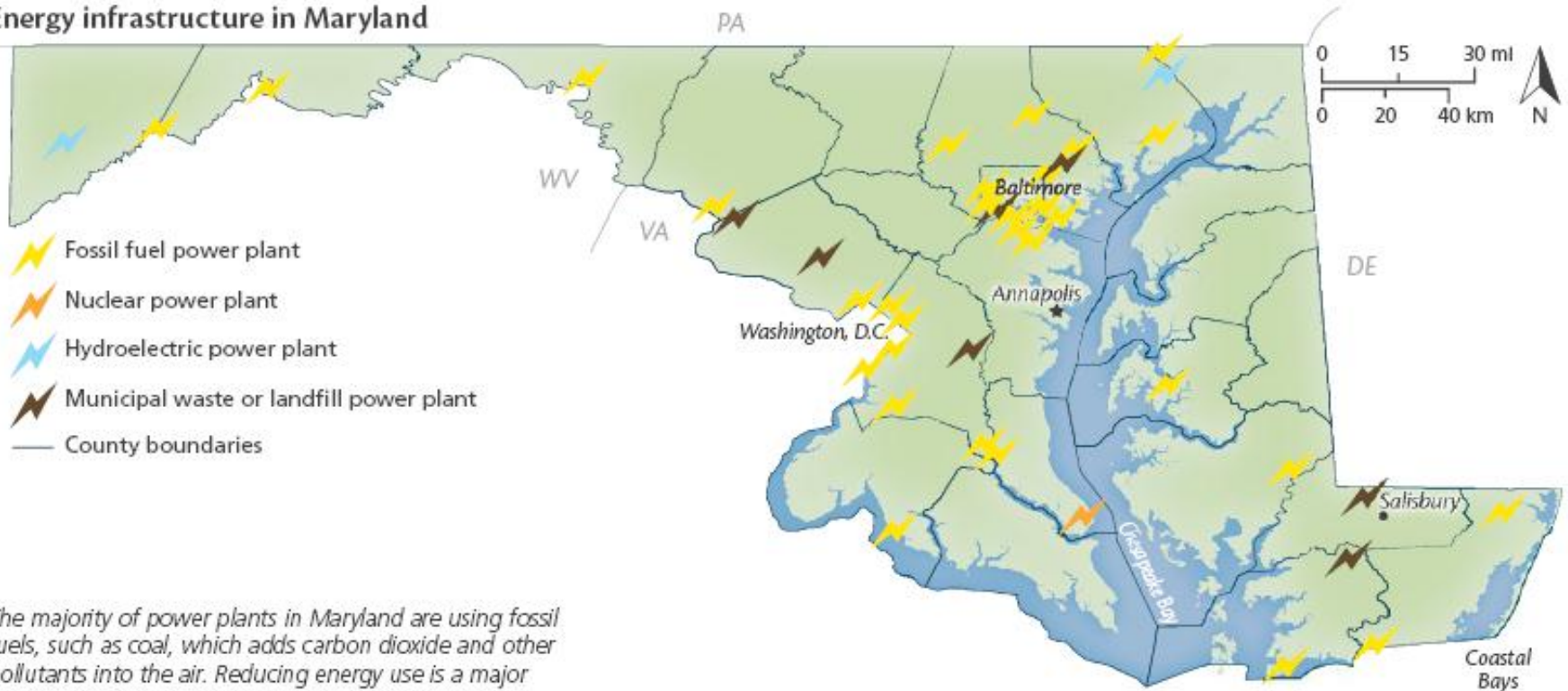
The enhanced reductions are the result of measures to strengthen the listed programs as initially drafted in February 2012. Reductions are measured in million metric tons of carbon dioxide-equivalent and are an annual amount.

Sector	Program	Program description	Initial reductions	Enhanced reductions
	Buildings codes	Given the long life of most buildings, upgrading State and local building codes to include minimum energy efficiency requirements provides long-term emissions savings. Maryland's Building Performance Standards are updated by regulation every three years following the three-year cycle of the International Code Council.	3.15	3.15
	Public transportation initiatives	For several decades, vehicle miles traveled have risen faster than the increase in population in Maryland and nationwide, and land use development over the past 40 to 50 years has put more people living beyond the reach of easy access to transit facilities. Planned transit and Transit Oriented Development expansions in Maryland should lessen vehicle miles traveled in the State.	2.00	2.89
	Corporate Average Fuel Economy (CAFE) Standards	First enacted by Congress in 1975, the purpose of the CAFE standard is to reduce energy consumption by increasing the fuel economy of cars and light trucks. Since introduction in 1975, CAFE standards have increased from the initial 18 miles per gallon standard to 35 miles per gallon by 2020, as established in the Federal Energy Independence and Security Act of 2007.	2.27	2.27
	Managing forests to capture carbon	Managing forests to capture carbon will promote sustainable management practices in existing Maryland forests on public and private lands. The enhanced productivity resulting from enrolling unmanaged forests into management regimes will increase the amount of carbon captured in forest biomass, amounts of carbon stored in harvested, durable wood products, and availability of renewable biomass for energy production.	1.80	1.80
	Planting forests in Maryland	Planting trees expands forest cover and associated carbon stocks by regenerating or establishing healthy, functional forests through practices such as soil preparation, erosion control, and supplemental planting to ensure optimum conditions to support forest growth. The implementation goal is to achieve the afforestation and/or reforestation of 43,030 acres in Maryland by 2020.	1.79	1.79



# Energy

## Energy infrastructure in Maryland



*The majority of power plants in Maryland are using fossil fuels, such as coal, which adds carbon dioxide and other pollutants into the air. Reducing energy use is a major part of the Greenhouse Gas Reduction Plan.*

# Regional Greenhouse Gas Initiative (RGGI)

- Carbon Dioxide Budget Trading Program
- Establishes a committee to make choices on auction process and convenes an annual stakeholder process for comment on how to best utilize the funds
  - MDE
  - MEA
  - PSC
- Directs auction proceeds to appropriate Fund and specifies appropriate categories of use

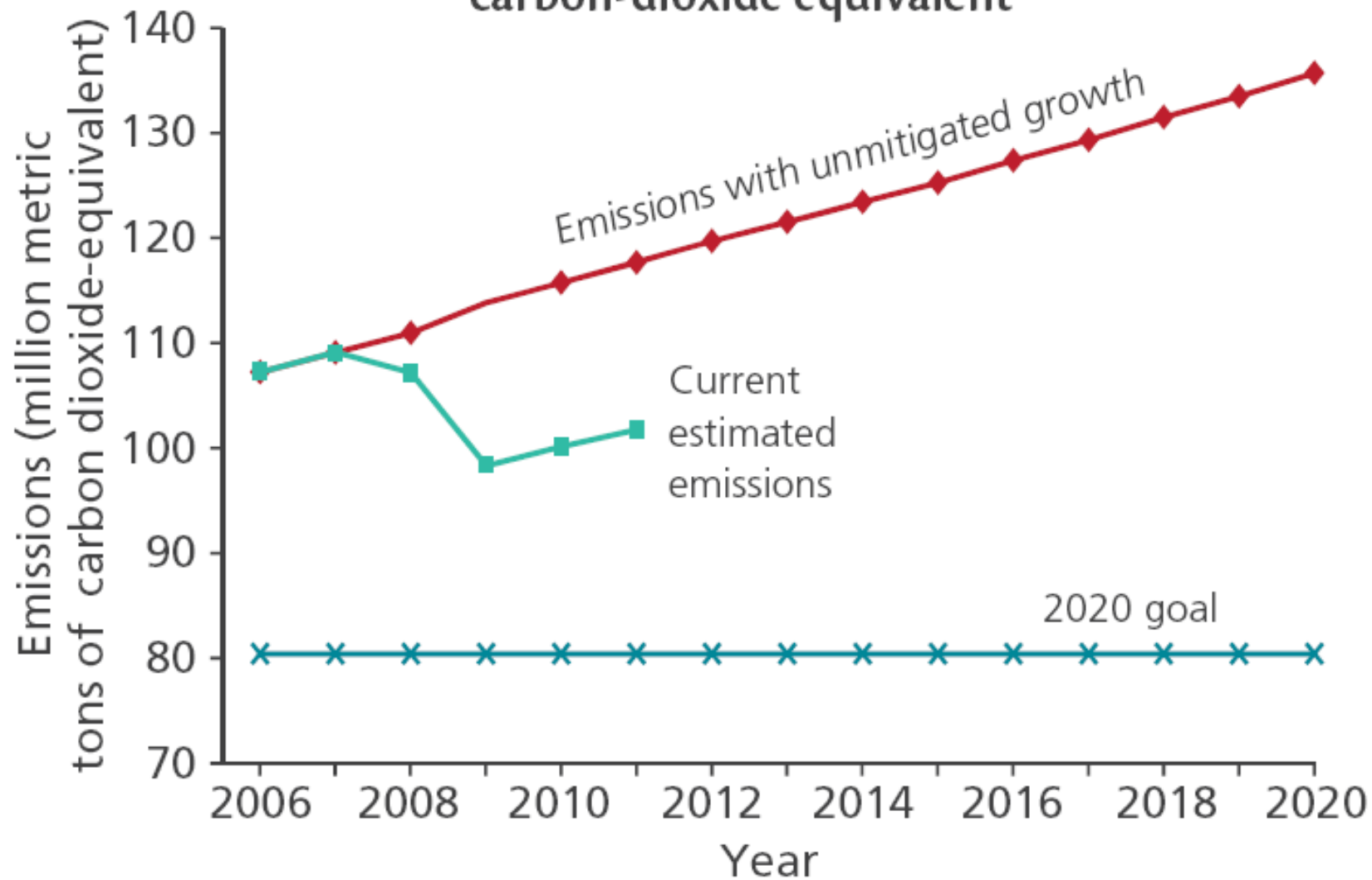




# Regional Greenhouse Gas Initiative (RGGI) – How it Works

- A predetermined amount of allowances are available for purchase at each auction
  - Determined at the beginning of the program based on reducing levels of pollution 10%
  - Each year less allowances are available for purchase
- Quarterly Auctions
- Companies/Individuals must register to bid
- No entity may buy more than 25% of available allowances

## Projected emissions of carbon-dioxide equivalent







# Economic Analysis

- Economic analysis
  - Conducted from 2010-2020
  - Worked with the state agencies responsible for implementing the various programs
    - They provided cost data for implementation and operation
      - When this data was not available other public data was used
  - Analysis was performed using REMI (Regional Economic Modeling Inc) a dynamic macroeconomic modeling tool





# Economic Results

- A net benefit of \$1.6 billion in economic output to the Maryland economy as a result of the implementation and operation of the GGRA plan
  - Benefits = \$33.8 billion
  - Costs = \$32.4 billion
- A total of 37.2 thousand jobs will be created and maintained in 2020





# What you can do

## Energy and Green Buildings go hand-in-hand

- Use energy-saver light bulbs, such as compact fluorescents.
- Purchase *Energy Star* appliances, electronics, and lighting.
- Unplug all electronics when not in use, for example: your cell phone charger, TV, toaster, coffeemaker, computer.
- Install ceiling fans, window fans, and whole-house fans as a low-energy way to cool the house in summer.
- Upgrade your heating and cooling system with an energy-efficient one, including a programmable thermostat.
- Clean the lint filter on your dryer for higher efficiency, or hang your clothes outside on a line to dry (or inside on a rack).
- Sign up for renewable energy through your electric company.
- Weatherproof your home, sealing cracks and gaps.
- Buy furniture made from sustainable materials, such as bamboo and reclaimed wood.
- Use a reel lawnmower, which is quiet and has zero emissions.
- Always maintain your septic system, including gas emissions.
- Opt out of paper catalogs, phone books, and other 'junk' mail.
- Bring reusable canvas totes to use at the grocery store.
- Buy your produce locally to decrease the amount of vehicle miles that your food has to travel.
- And, remember, always *reduce, reuse, and recycle!*



# What you can do

## Transportation and Land Use go hand-in-hand

- Cycle instead of driving.
- Walk short distances rather than drive.
- Use public transportation or carpool for long trips.
- Take advantage of telecommuting.
- Shop online instead of using your car to drive to stores.
- Combine trips to the grocery store, library, and other places into one.
- Consider buying a fuel-efficient, low-greenhouse gas-emitting vehicle, such as a hybrid, electric, or diesel.
- Maintain your vehicle by getting a tune-up, an oil change, and properly inflating your tires.
- Drive efficiently: maintain the speed limit, use cruise control, decrease the weight of the car, and avoid idling.
- Reduce air friction by only using roof racks when necessary.
- Buy a home in a Low Impact Development area, if possible.
- Buy a home near your work to reduce commuter miles.
- Landscape with native trees and plants, and install rain gardens to reduce the amount of impervious surface on your property.

# Questions?

