CUTTING VIRGINIA's CARBON POLLUTION

Opportunities for Climate Action under Executive Order 57

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SIERRA CLUB
VIRGINIA CHAPTER

Introduction

"I don't think there's a bigger long-term economic risk than climate change."

Former Treasury Secretary Henry Paulson, September 2016

"We cannot condemn our children, and their children, to a future that is beyond their capacity to repair. . . We are the first generation to feel the impact of climate change, and **the last generation that can do something about it.**"

President Obama to UN General Assembly, September 2015

Critical Considerations

Emissions planning should be based on **four key factors**:

1. **Climate science is clear**. Man-made carbon pollution (CO_2) and other greenhouse gases are changing the earth's climate, increasing the threats to our families, communities and economy.
2. **The Clean Power Plan is just one step** toward needed CO_2 cuts. Virginia should **plan to make reductions beyond this benchmark**.
3. **The Paris Agreement** requires greater cuts between now and 2050, and more beyond that. These milestones **can be used as a guide**.
4. **The benefits** – public health, environmental and economic – **of early action are substantial, as will be the costs** of half-measures and delays.

A Strong Carbon Reduction Plan

To provide long-term economic stability and energy reliability, Virginia needs a **forward-looking carbon pollution reduction plan** that mitigates climate change and anticipates more stringent future standards on greenhouse gases.

To accomplish this, Virginia's plan should:

- Set a firm, mass-based **limit on emissions from both new and existing sources**
- Aim to reduce total power-sector CO_2 emissions **40% by 2030**
- Promote **energy efficiency and clean, renewable energy**
- Encourage **trading of allowances** and a competitive clean energy market
- Auction CO_2 allowances or consider a mix of allocations and auctions, **using set-asides** and/or **auction funds to support efficiency and renewable energy, help low-income residents** and those at greatest risk from climate change impacts and the transition off fossil fuels, and/or to rebate auction revenues to all electric customers (joining the RGGI is one way to achieve this)

Limiting Emissions from All Power Plants

Virginia can reduce carbon pollution well beyond the Clean Power Plan target without great difficulty, while addressing pollution from all power plants.

Capping emissions from <u>both</u> new and existing sources is critical:

- Solves "leakage" problem
- Prevents CO_2 emissions from rising due to new generation
- Reduces economic risks of stranded assets

By addressing carbon constraints early, Virginia will:

- Prepare for the large CO_2 cuts required by the Paris Climate Agreement
- Better attract jobs and new businesses
- Help protect our country from climate disruption

Dominion Power Station in Chesterfield, VA

Our Best Move: Start Cutting Carbon Now

Adopt a mass-based CO_2 limit for new and existing power plants.

- Intensity measures for new sources invite CO_2 increases.
- New generation can be built under a CO_2 cap if the new sources are: 1) zero-carbon, or 2) new emissions are offset by closing high-emitting plants, or 3) allowances are purchased.
- The climate is affected by total greenhouse gas emissions, not emission "rates."
- Energy efficiency and zero-fuel renewables can lower bills.

Require our power sector to cut CO_2 emissions 40% by 2030.

- Set a path for reductions (e.g., a rolling average %/year) and allow producers to trade allowances.

Achieving the Desired Results

If CO_2 is limited by an emissions standard, electric companies will find compliant solutions, such as greater emphasis on:

- Energy Efficiency – The cheapest option; lowers customers' bills
- Renewable Energy – Low-cost and dropping in price; zero-carbon
- Storage – Dropping in price and capable of many functions
- RFPs and rate schedules – Attract demand-side management; low-cost clean energy
- Markets for carbon allowances – Lower total compliance costs and encourage innovation
- Smart grid design – Supports more distributed energy resources
- Allowance set-asides, auctions and trading – Increase incentives

Leading on Renewable Energy

The future of electricity lies in zero-carbon generation, and the transition is in full swing.

- **Setting a standard is essential.** Virginia currently trails other states in clean energy development because electric companies are not required to meet a goal, and preferential state policies continue to limit access to clean energy resources.
- **New technology** is expanding the areas of Virginia suitable for wind farms.
- **Costs of solar and wind continue to fall, and tax credits are now available** to companies and users who invest in the next few years.
- **Locally-based companies** support the most jobs.
- **Caution: Burning biomass, particularly from trees, is not clean. It can emit more CO_2 and particulates than coal,** and undercuts our ability to stay within a carbon budget.

North Carolina is a hub for solar energy and jobs.
At the end of 2015, NC had **2294 MW** of solar capacity,
100 times more than the 22 MW in Virginia.

Increasing Energy Efficiency

Energy efficiency is the cheapest energy solution we have. Saving energy reduces CO_2 and customers' bills. Let's start using it!

Virginia's **voluntary goal for electric companies** to achieve a 10% demand reduction by 2022 **is not working**.

- According to DMME, Virginia's IOUs have achieved only **10% of the goal** and are likely to achieve 25% or less by 2022.
- Bloomberg New Energy Finance reports that nearby states' utility companies **spend up to 3.9% of their revenues** to improve efficiency, but **Virginia's utilities spend 0.01%.**
- Utilities have a conflict: they want to grow demand, not reduce it.

Virginia's building codes are also behind national standards, allowing new as well as old residences to needlessly waste energy.

Where Is Virginia Headed?

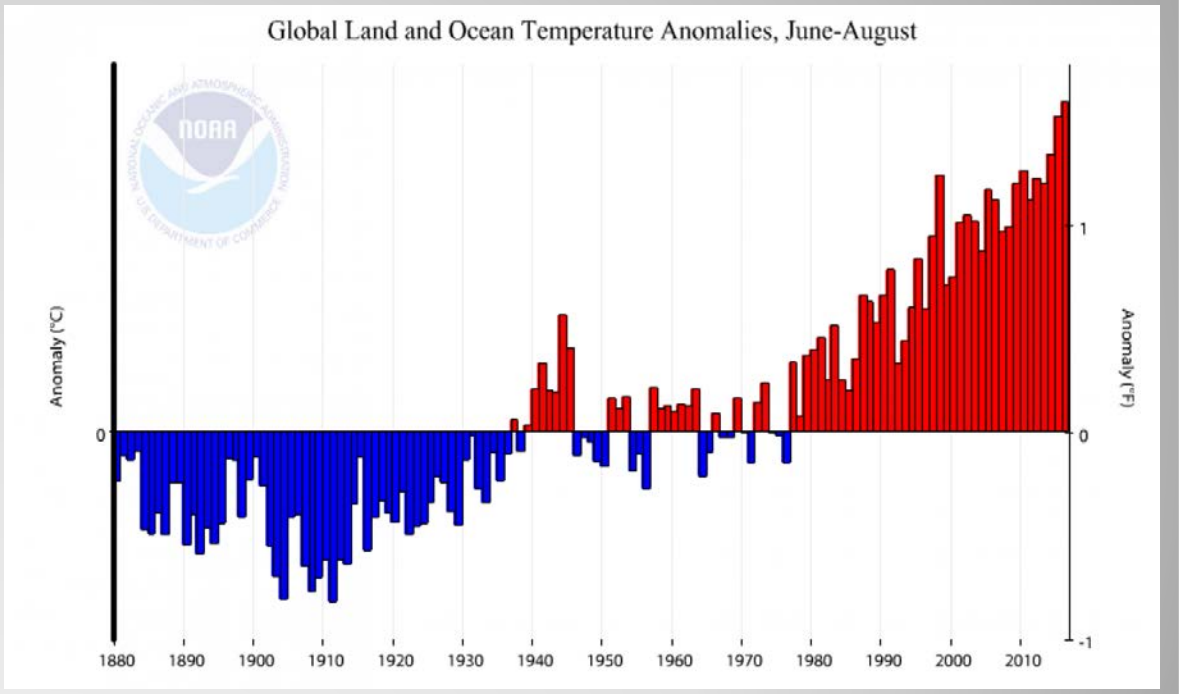
- **Virginia's current policies will increase, not reduce emissions.**
- Continuing to invest in carbon-polluting generation (possible under a rate-based plan) would increase stranded costs and displace wind, solar and energy efficiency.
- Dominion forecasts that its CO_2 emissions could increase by 83% (2012-2041) under a rate-based plan, raising our state's total emissions.
- Minimal reductions would "kick the can down the road" for clean energy, efficiency and CO_2 reductions, harming Virginians in the long run.
  - We are already losing renewable energy jobs to North Carolina and other states.
  - Other states are working to adapt their utility systems to the climate imperatives.
  - Businesses want to go to states that have prepared for the future.

The Wile E. Coyote Strategy: Keep Chasing Fossil Fuels In a Rapidly Warming World

Global Warming is Happening Now and Getting Worse

According to NOAA:

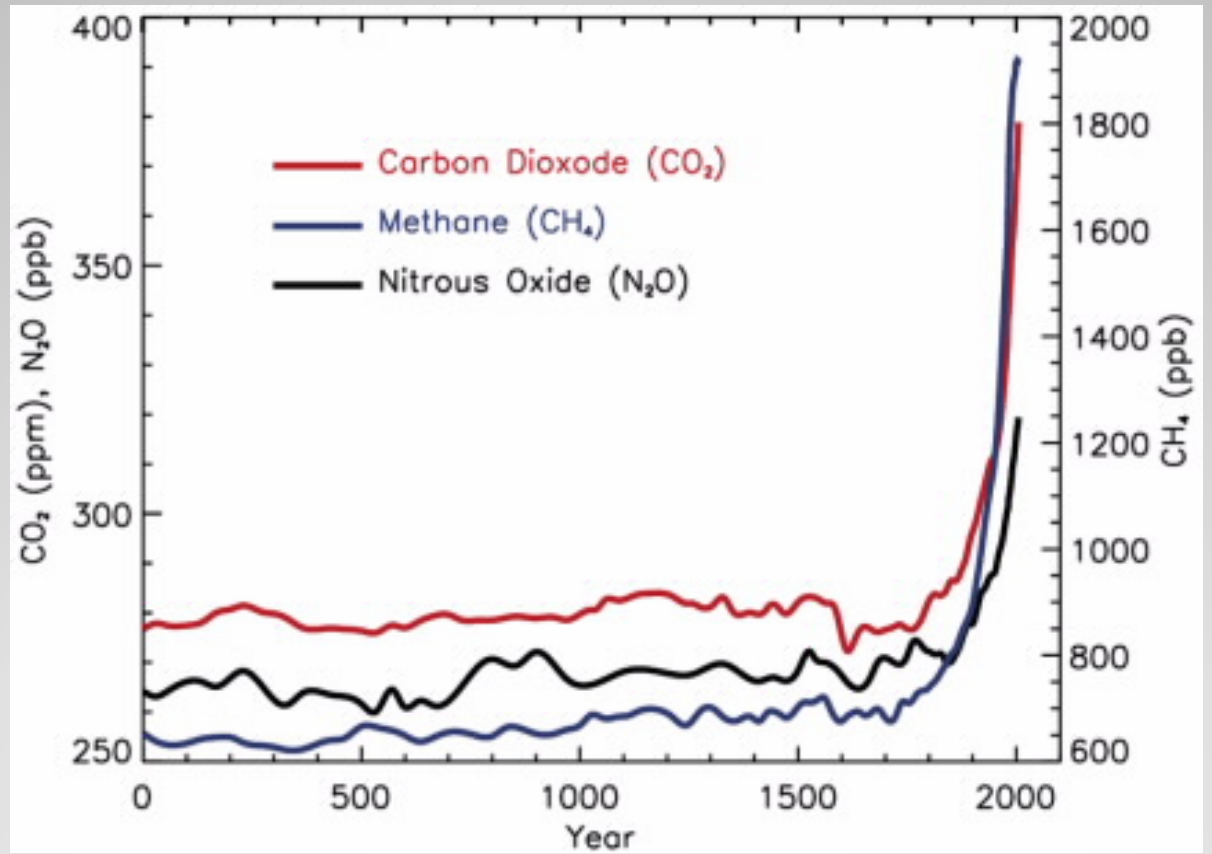
- 15 of the 16 hottest years since 1880 occurred between 2001 and 2015
- 1998 (which allegedly started a "pause") is tied for 6th hottest
- 2016 is on track to surpass records set by 2014 and 2015
- 2016 will be the 40th consecutive year above 20th Century average



Greenhouse Gas Emissions

- **Science shows that our emissions are causing global warming.**
  - The heat-trapping role of CO_2 has been known for over 150 years.
- **CO_2 is especially harmful—a curse to generations for centuries to come:**
  - CO_2 persists in the atmosphere for many centuries, declining slowly over millennia.
  - CO_2 accumulates because we emit it far faster than natural forces can sequester it.
  - CO_2 concentrations have risen over 40% (now, 400 PPM) since the industrial revolution began.
  - The current CO_2 concentration is ⅓ higher than any time in the past 400,000 years.
- **Methane (CH_4, natural gas) is next most dangerous greenhouse gas:**
  - We emit less CH_4 than CO_2 , but it is 87 times more potent a heat-trapping gas than CO_2 over 20 years, a critical period for reducing global warming.
  - Natural gas production, processing and transportation are major methane sources, undercutting claims that natural gas is the solution to climate dangers.
- **Climate feedbacks could abruptly accelerate emissions and warming.**

Rate of Change in the Last 2000 Years



IPCC 4th Assessment Report, Fig. 1, FAQ 2.1, Chapter 2 (2007)

Climate Change Harms People, Places and the Economy

Our health, lives, property, natural heritage and economy are harmed by:

- Rising temperatures and weather instability (extreme precipitation, storms, droughts, etc.)
- Rising oceans threatening coastal communities, like Hampton Roads and Tangier Island
- Movement of species, including pests and diseases, and extinction of species
- Costs to taxpayers, ratepayers and businesses of repairing, replacing or abandoning infrastructure for transportation, energy, manufacturing, etc.
- Growing threats to national security from conflicts and human migration

To make matters worse,

- There is a growing risk of abrupt warming due to climate feedbacks

Co-Benefits From Cutting CO_2 Emissions

Cutting CO_2 emissions achieves **additional benefits for our health** and the environment, including reducing harmful byproducts, such as:

- SO_2
- NO_x
- Ozone/smog
- Mercury, other heavy metals
- Particulates
- Water pollution
- Coal ash

Reducing carbon pollution can also create **new business opportunities**, as other states have seen with substantial solar and wind generation.

Focusing on near-term rate claims would be "penny-wise and pound foolish," ignoring the broader costs and dangers ahead (the "social costs of carbon").

Working Toward Environmental Justice

Calculating in the health-related costs of burning fossil fuels shows a stark contrast in our energy choices.

- **Over half a million people in Virginia live within 3 miles** of a power plant covered by the Clean Power Plan.
  - 52% are minority and 34% are members of the low-income community, while Virginia has a total minority population of 35% and low-income population of 26%.
- 5 VA power plants received an "F" for environmental justice performance in the NAACP's *Coal Blooded: Putting Profits before People* report (2014).
  - Grades were based on power plant impacts on low-income and minority communities.
  - Power companies were also scored, and **Dominion ranked 6th worst** among all the companies reviewed nationwide.
- According to the U.S. Office of Minority Health, black people are **3 times more likely to die** from asthma-related causes than white people.

The Paris Climate Agreement

In December 2015, the world's countries agreed to:

- Act to **keep worldwide temperature increases "well below" 2.0°C** with a goal of not more than 1.5°C compared to pre-industrial levels;
- **Achieve sustainability – net-zero greenhouse gas growth – after 2050**;
- Implement **initial pledges** to reduce CO_2;
- **Strengthen CO_2 reduction pledges every 5 years** starting in 2020;
- Recognize that developed countries, including the U.S., must reduce CO_2 emissions significantly more than developing countries;
- Implement international reporting and monitoring of CO_2 emissions.

Ratified by enough countries to take effect in November 2016.

Paris Agreement and the United States

The United States submission to the U.N. negotiations:

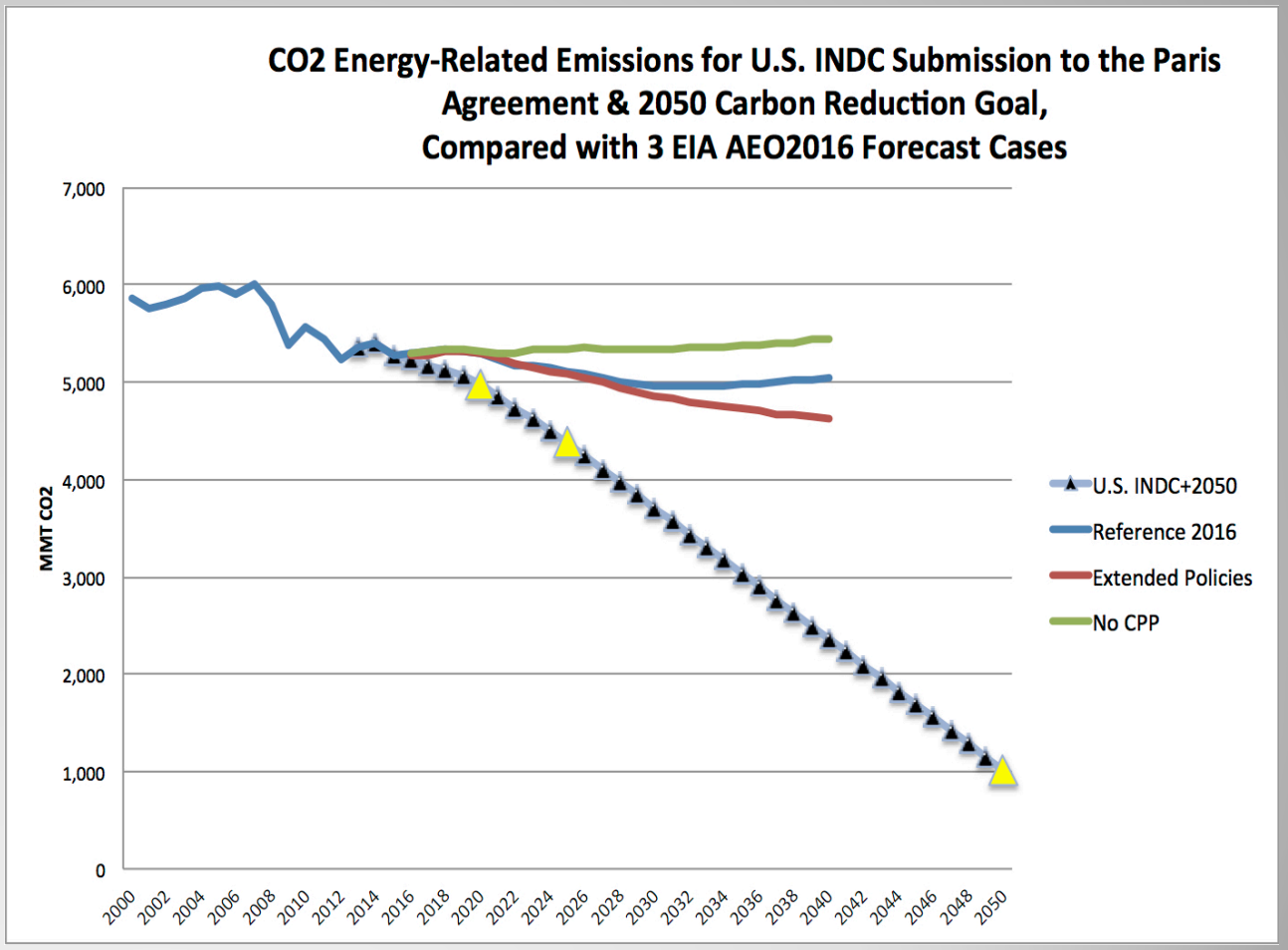
- acknowledged the urgent need for the world to achieve "deep decarbonization" with greater CO_2-reductions by developed countries, which emitted most of the world's CO_2 to-date;
- committed to cut U.S. emissions of CO_2 (economy wide) 26-28% (v. 2005) by 2025; and
- reaffirmed a "straight line" path to an 80% reduction by 2050, consistent with previous U.S. representations.

The EU promised to reduce its CO_2 emissions by 40% (v. 1990) by 2030 and confirmed its intent to reduce CO_2 by 80-95% by 2050.

80% CO_2 Reduction by 2050

The U.S. has said that it intends to reduce CO_2 emissions 80-83% by 2050 in support of worldwide goals.

EU set to reduce CO_2 emissions 80-95% by 2050.

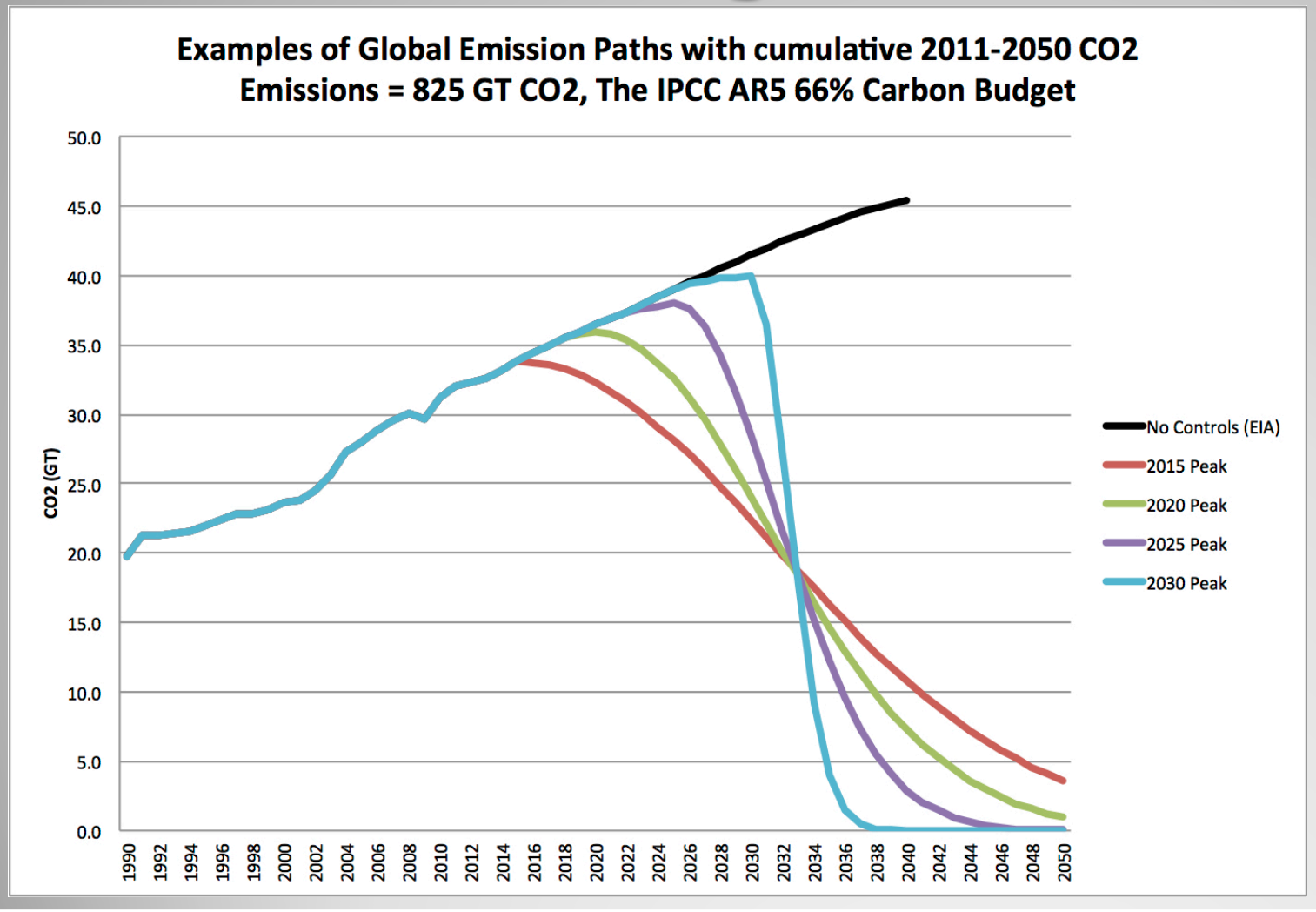


Budget for Future Emissions

- Achieving the Paris Agreement's 2.0°C cap requires a limit on future carbon pollution, or a **staying within our "carbon budget."**
- **Only 650 GT remains in the budget**; 175 GT were emitted 2011-2015.
- Like funds in a bank account, **every ton of carbon pollution emitted must be subtracted from available future emissions.**
- **Achieving net-zero emissions after 2050** will require further cuts.
- **Planning and action must begin now.**

For a 66% chance of staying below a 2°C increase, total worldwide emissions of CO_2 from 2011-2050 must be under 825 gigatons (1,000 million tons/GT).

Averting a "Crash Landing"



Delaying CO_2 reductions will make it far harder and more disruptive to stay within the budget—a slope will become a fire pole.

Carbon Budget Implications For Virginia

- **Virginia cannot pretend it's an "island"** and keep raising emissions.
- Continuing to rely on **combustion-based generation and modestly efficient buildings will harm our long-term economy.**
- Power plants, pipelines and buildings (dwellings and commercial) have **35-60 year lives, but deep cuts in carbon need to begin now.**
- **Prices for carbon emissions are coming,** directly or indirectly.
  - Polluting fuels will not be cheap when carbon costs are added (and aren't cheap now when environmental and health harms are considered).

Here we are. It’s time to change course.

2017 and Beyond

Virginia should proceed with a carbon reduction plan that limits all CO_2 emissions from our electric sector.

- Only a standard limiting CO_2 from both new and existing generation will protect our state and its citizens in the long run.
- Utilities can comply with these limits using efficiency, renewable energy and trading, while phasing out their highest-carbon power sources.

As compliance proceeds, our traditional utility model should be re-examined.

- Our current system provides utilities incentives to build facilities, add load, help affiliates, and protect their monopolies from innovation by customers and competitors. They lack incentives to reduce CO_2, innovate or reduce usage.
- Clean energy is needed and prices are falling, but we will be left on the sidelines without decisive action.
- Distributed generation, demand-side management, microgrids, and greater non-utility competition can increase reliability and lower costs and risks to customers.
- Other states are studying how to revise utility regulation and maximize benefits from distributed generation.

We must act now to protect our economy and environment for our families and future generations