Maryland Commission on Climate Change (MCCC)
9/17/2019 Mitigation Working Group (MWG) meeting
Summary and Minutes

Background

Maryland's is considering all measures to meet the Greenhouse Gas Emissions Reduction Act (GGRA) 40% by 2030 goal while planning for the future. Emissions reductions in the energy sector through improved energy efficiency and increasing the availability of clean and renewable energy will be necessary.

Some Key Energy Programs (several are market based)

- EmPOWER
- Renewable Portfolio Standard (RPS)
- Clean Energy Jobs Act (CEJA)
- Clean and Renewable Energy Standard (CARES)
- Regional Greenhouse Gas Initiative (RGGI)
- Transportation Climate Initiative (TCI)

Maryland is a leader in adopting market-based mechanisms like the Regional Greenhouse Gas Initiative (RGGI) that aim to limit greenhouse gases (GHGs) in a cost effective manner. RGGI states have seen their power sector emissions decline over 50 percent below 2005 levels, netted $4 billion in economic benefits, and reaped a multitude of health benefits for their residents.

The Transportation Climate Initiative (TCI) is designed to address emissions from the transportation sector. In December 2018, nine Alliance states and Washington, D.C. announced their intent to "design a new regional low-carbon transportation policy proposal that would cap and reduce carbon emissions from the combustion of transportation fuels, and invest proceeds from the program into low-carbon and more resilient transportation infrastructure."

Clean Energy Jobs Act sets an RPS of 50 percent by 2030 - but Governor Hogan has committed to submit legislation next year to put the state on a path of 100 percent clean power by 2040 via CARES.

MWG Panelist Discussion: The Clean and Renewable Energy Standard (CARES)

The panel consisted of national experts: Bob Perciasepe, President of Center for Climate and Energy Solutions; Armond Cohen, Executive Director of the Clean Air Task Force; Jeremy Harrell, Managing Director of Policy at ClearPath; and Cole Simons, Chief of Staff at ClearPath. Any opinions or recommendations expressed below are those of the panelists.

The Clean and Renewable Energy Standard (CARES) proposed by Governor Hogan will build upon the Renewable Portfolio Standard (RPS) as well as incorporate other Maryland clean energy sources for the overall goal of reaching 100% clean electricity by 2040.

This MCCC Mitigation Work Group meeting explored the potential for other clean energy sources with participation from the Center for Climate and Energy Solutions (C2ES), Clean Air Task Force (CATF), and ClearPath.

C2ES and CATF highlighted the need to have a flexible policy framework that allows for the diversity of cost-effective, resilient and feasible technologies, which includes existing and new nuclear energy as well as carbon capture technologies that are emerging at commercial scales. Solar and wind energy generation can also be increased significantly in Maryland at cost-competitive pricing, but there are intermittency, storage, and transmission challenges to be considered.

Viewing the policy development process through the lens of market driven progress provides insight on the importance of having technology-neutral incentives to all participants, including those who will introduce emerging technologies. Markets are an efficient way to integrate clean and renewable energy generation. Markets can shed light on the most suitable energy mix - ensuring that electricity is clean and economical.

ClearPath discussed various 2018 bipartisan federal legislation that supports clean energy growth, including a 25% budget increase into federal clean energy innovation investments; as well as 2019 federal bills currently under consideration, such as the Utilizing Significant Emissions with Innovative Technologies (USE IT) Act that would support more research into carbon capture technologies by the United States Environmental Protection Agency (EPA).

Panelists stressed the importance of keeping all of MD's options open as we get deeper reductions to plan for. Carbon capture and sequestration and/or utilization, energy storage, and small modular nuclear may prove viable options in the future. Key points below:

- An inflexible 100% renewable (wind and solar) energy mix generates seasonal surpluses and deficits in the range of 2500-3500 MW
- Maryland wind and solar varies substantially not just daily but weekly-monthly, in a way that does not always match load
- There is a clear need for "firm energy" like hydro, and nuclear (and fossil fuel fired electric generating units if necessary)
- At high levels of wind and solar energy (> 60% of system energy), "filling the gap" begins to pose serious cost challenges

Panelists recommended that it would be unwise to rule out existing nuclear generation at this time, as the majority of the deficit in electricity generation resulting from its loss will be filled by natural gas use. Even if nuclear generation was replaced purely by wind and solar electricity, we would still have net zero gains. We need to target large carbon emitting fuel sources like coal, which will have more significant lasting effects on the atmosphere if the use of such fuels is not ceased.

Sequestration: Forestry and agricultural soils are important sinks/offsets to GHG emissions. The focus of the September MWG meeting was mitigation. Natural sinks don't capture GHG emissions on their own, but sequester carbon from the atmosphere.

Clean Energy Subsidies: There is no reason to create different subsidies for different sources of clean energy including existing or new nuclear. In the case of uneconomic nuclear an increase in energy prices from existing nuclear may be necessary. The clean generation subsidy would not apply to coal plants -creating a need to a transition plan for those affected workers.

Arjun Makhijani challenged the effectiveness of using nuclear energy in the future. He heavily stressed the need for converting to renewable sources. He created a "Renewable Energy Road Map" that he

wishes to share with the MWG; staff is currently working to set up time for him to present to the group and interested members of the public.

In response to the panelists, Arjun Makhijani agreed that battery storage was impractical for seasonal electricity storage. He also said that the C2ES approach assuming only renewable plus storage was wrong. IEER's Renewable Maryland work, including hour-by-hour modeling, has shown that a solar and wind supply system could meet load reliably with 0.05 TWh of storage – 120 times less than assumed by C2ES – if the storage is complemented by smart demand response and peaking generation using renewable hydrogen and light duty fuel cells.

Summary of Key Points from the Panel Discussion

A long-term plan for CARES: develop a cost effective, option-based approach including Renewables, Storage and Zero Emission Firm Energy sources with the following changes to current energy mix:

- Push non-hydro renewables beyond 50% (10x the MW produced today)
- Add appropriate storage for near-term management of renewables (daily to a few days)
- Long-term storage is too expensive
- Storage + 100% Renewables is at least 10x more expensive compared to 100% Clean energy mix
- Mix of zero emitting firm sources for the remainder
- Firm electricity will likely be necessary for affordable deep decarbonization of the power sector and therefore the energy system as a whole
- It is therefore wise to keep all plausible zero/low carbon options on the table, while ramping up renewables significantly in the next decade
- The Maryland Clean and Renewable Energy Standard (CARES), like the standards recently set in other states such as CA, NM, WA, NV, NY, and CO, should establish a 100% carbon-free goal and keep technology pathways open to allow for evolving innovation and costs

Helpful Links to Supplemental Info

Small Modular Reactors
https://www.energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors

Carbon sequestration from Agricultural Soils
https://www.fs.fed.us/ecosystemservices/carbon.shtml

Carbon Capture - Current Projects Progress
https://sequestration.mit.edu/

Industrial (Cement) CO2 emissions
https://www.bbc.com/news/science-environment-46455844

IEER analysis of 100% Renewables in MD
https://ieer.org/resource/economic-issues/100-renewable-electricity-supply-maryland/

24/7 Clean Energy (google)
https://www.fastcompany.com/90251085/google-aims-for-100-percent-renewable-energy-all-day-every-day

Advanced Biofuels Comments
https://advancedbiofuelsusa.info/comments-from-advanced-biofuels-usa-to-the-maryland-commission-on-climate-change-mitigation-working-group/

Meeting Minutes (recorded by MDE staff)

Welcome from Tad Aburn (10:08)

- Tad opened the meeting with an announcement that the air program is undergoing a reorganization. They have created a stand-alone climate change program due to the increasing workload of climate issues. Chris Hoagland has been appointed the new program manager and Chris Beck is the new division chief.
- He mentioned GGRA Plan is in the final stages of interagency review without a specific date and the plan has improved significantly. The plan now included TCI as well as the CARES initiative.
- Tad highlighted on the HFC regulations and noted they are working with NY, WA, FL, DE, and VT with a final stakeholder meeting on September 23rd with final approval Dec 11th at the advisory council. He mentioned the first step in minimizing methane emissions and this will go to advisory council as well on December 11th.

Attendance:

Ben Grumbles, Ben Hobbs, Elizabeth Bunn, Tad Aburn, Michael Powell, Les Knapp, Tom Walz, Susan Payne, Elliott Campbell, Ryan Opsal, Colleen Turner, Jeremy Harrell, Cole Simons, Armond Cohen, Bob Perciasepe, Drew Cobbs, Tom Ballentine, Anne Lindner, Drew Budelis, Jeff Silva, Ruth White, Adam Gaynor, Joe Lutz, Erick Thunell, Chris Beck, Cindy Osorto, John Masheim, Arjun Makhijani, David Smedick, Tim Judson, Paul Berman, John Slocum, John A Mosheim

Phone: Tom Weissingner, Joanne Ivancic

Public Comment

- Tim Judson (Nuclear Information and Resource Service)
    - He mentioned the CARES proposal and is concerned about the science basis which was proposed. He stated that the nuclear program has been a failure in the USA and is worried about technology diverting from de-carbonization. He doesn't believe sequestration will help in MD and doesn't believe we can use drilling technologies. He went on to say that nuclear technologies development might not be available or viable. He noted that they have a plan for decarbonizing MD and it was released three years ago, is a science based and he would like to use it to develop policy as we move forward.
- David Smedick (Sierra Club)
    - He would like to focus on CARES and TCI. He wants updates on meetings and more public engagement. He is concerned about the continued reliance on fossil fuels and mentioned there is no mention to coal leaving MD or models for planning to not have coal in MD. He went on to say that other states have a plan on how to move off of coal and he thinks MD needs this as well.
- John Moshein
    - He is an advocate for alternative fuels and low carbon fuels. He went on to mention the four liquid fossil fuels: gas, ethanol, diesel and biodiesel. He noted that it will be very important to move off of these fuels as they are all imported and purchased elsewhere. Asked if we are going to keepy buying fuels from other states? He stated that MD needs to create its own alternative fuels in the plan and he would like an opportunity to put this in the plan.

- Jeff Silva
    - "Why can't we all win?" He is concerned about CARES. He mentioned we need tangible results and talked about insulation in buildings. He would like to see us finance trade schools and education in inner cities. He would like to see programs to help students build siding and installed insulation. He feels as if this would help lower the demand for energy.
- Arjun Mahkijani
    - He stated that he created the renewable energy road map for the USA. He highlighted on "disaggregated demand" and would like to give a full presentation on an alternative to CARES. He noted that the 50/50 solar/wind is balanced between summer and winter. He agrees that we can't have seasonal battery storage. He would like to see a paradigm shift of the grid to only solar and wind. He mentioned that nuclear energy will be too expensive.
- Joanne Ivancic (Advanced Biofuels USA)
    - She stated the IPCC notes that Biofuels are necessary to keep climate change under control and CA shows that biofuels work well and are more effective than switching to electrified transportation. She mentioned we can start with two items which could help MD: fleet and infrastructure.
    - She provided her written comments after the meeting, publicly available at https://advancedbiofuelsusa.info/comments-from-advanced-biofuels-usa-to-the-maryland-commission-on-climate-change-mitigation-working-group/

Opening comments from Secretary Grumbles

- He stated that he just came from the Mid-Atlantic Bioenergy meeting summit and is thrilled to have a panel of national experts in front of him (see below).

- Discussion: The Clean and Renewable Energy Standard (CARES)

- Bob Perciasepe, President, Center for Climate and Energy Solutions
    - He stated that at this point we need a real solution to climate change and thought it was refreshing to hear the discussions in the public comments. He mentioned that he will speak on the need for managing risks. He also noted that we don't need to decide on a set path today but rather charge forward with what we have and leave our options open in the future. He highlighted the fact that we need to be concerned about lowering emissions and not letting them increase.
- Armond Cohen, Executive Director, Clean Air Task Force
    - Refer to Slides on Considerations for a Clean and Renewable Energy Standard
- Jeremy Harrell, Managing Director- Policy, ClearPath
    - He opened up by saying we need more ways to find cheap and zero-free emissions. He mentioned that we cannot wait for the federal government to come along and help us. The goal he stated is to decarbonize cheaply and quickly but keep all options open on the table.
- Cole Simons, Chief of Staff, ClearPath
    - He mentioned that his organization is focused on clean energy policies and the tide is shifting from "Is this a problem?" to "How are we going to solve this problem?". He stated that we are seeing a rise in utilities wanting to use a 100% clean energy as well as major corporations like Google.

Discussion (Questions)

- Mike Powell asked- in regards to 50% being renewable offshore wind- what the numbers will look like if we don't achieve this? He also mentioned that the best scenario was presented but not a worst case one.
    - Armond Cohen responded that we will need more offshore wind and solar and the cost could be higher as the cost deficit will be larger. He also responded that massive infrastructure builds will need to occur.
    - Bob Perciasepe stated that once you get deep reductions in renewables the options still need to be kept open to keep reducing emissions and an exact percentage shouldn't be the goal. He noted that this is not a binary choice and you will always have problems. He also mentioned that global issues occur such as emissions from cement.
- Ben Hobbs asked about losing 59% of nuclear capacity by 2025 and the demand response?
    - Bob Perciasepe responded that existing nuclear plants produce about 20% of electricity in the USA and if you add hydro it goes to about 30%. If mentioned that if we amp up solar and wind by 20% but lost nuclear then we don't really get anywhere and advised that we should hold on to nuclear.
    - Armond Cohend responded that economic deals in some states have just been a band-aid and asked if the marketplace in MD would support this. This would need to be modeled. In regard to the demand response he stated that no argument on demand response deals with seasonal issues. He did say the demand response would be good for daily intraday management.
    - Bob Perciasepe mentioned that we cannot electrify everything or the demand would increase.
- Armond Cohen stated that replacing fossil fuels right now would be very beneficial as the CO2 stays in the atmosphere for ages. Minimizing the amount we put into the atmosphere now is critical.
- Susan Payne asked if land based carbon capture and storage are economically feasible? She then mentioned that forest and agriculture lands are affordable and hold carbon, and that the technology/methodology is ready now.
    - Bob Perciasepe responded that the PARIS agreement mentions there must be a balance which includes sinks. These do not capture emissions directly and it will be more of an offset.
- Arjun Mahkijani stated the need to separate existing nuclear and we cannot manage risks if we avoid facts. He has not seen a path to produce economic nuclear energy and does not think nuclear should be given consideration. He would like to know if analysis has been done on what it costs to maintain nuclear vs. offshore wind energy.
    - Bob Perciasepe responded that we are compensating for the benefits they are providing, not subsidizing. If nuclear plants close now they will be replaced by natural gas providers. There is no gain right now by replacing nuclear with renewable sources. Looking past the economics of this subject, it will take a long time to build more renewables.
        - He directly answered the question that he has not personally done the analysis.
    - Armond Cohen responded that a 100% clean energy target is a market discussion and not renewable or nuclear.
    - Cole Simons mentioned that when you look at nuclear vs renewable, it’s a market discussion and not a discussion that they are having.

- Tad Aburn stated that the plan is trying to set up much deeper reductions in the future but we need more market based concepts.
    - Armond Cohen stated that the short term market will select the cheapest and then other markets will suffer. He said not all KW/hrs are created equal and the market cannot completely solve it on its own.
    - Secretary Grumbles asked how realistic is carbon capture and store for markets? What about carbon utilization examples? He mentioned soda manufacturer on a small scale.
    - Armond Cohen responded that economics are challenging and we are on the front end of commercialization. He stated a company in CA looks at carbon capture for fossil fuels which are input into cement.

Other Business

- Tad made a note at the end of the meeting about working with Arjun who offered to present his research and findings on renewable energy.

Adjourned 12:02