

What is Missing in Montgomery County's Draft Climate Action Plan

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Introduction

Reading through the draft of Montgomery County's Climate Action Plan, I was struck by how much I agreed with the criticisms of it laid out by Eleanor Clemans-Cope of Sunrise Rockville. Although we come to the document from quite different places – she is a junior at Richard Montgomery High School, while I'm a 71-year-old retired scientist living on a farm in Dickerson – we are in agreement in finding the Plan to be fundamentally inadequate. It is vague, poorly and incompletely quantified; lacks key scientific information on options; and ignores questions that are vital for effective climate action by the County.

As one of the many citizens who worked for many months to produce the recommendations that were the basis for this draft document, I had high hopes for it. My workgroup (on Sequestration and Adaptation) and the several others put forth hundreds of goals and actions that would allow the County to achieve its overall goal of an 80% reduction in emissions by 2027, and complete carbon-neutrality by 2035. The County's climate team and its consultant AECOM were supposed to quantify the impacts of these goals and recommendations, and synthesize them into an actionable plan that could be adopted and implemented by the County Government – urgently, since 2027 is now just six years away.

But this “plan” is a deep disappointment. It does not accomplish the tasks laid out for it. It needs to be substantially – and rapidly – revised, so that the County Government can fulfill the commitment it made in 2017 in declaring a Climate Emergency. Otherwise it will simply be another example, as Clemans-Cope said in her comment, of “a lot of talk about the climate but not action.”

I will detail the shortcomings of the plan, from a climate scientist’s point of view, in the following sections. My emphasis is on climate mitigation – reducing net greenhouse gas (GHG) emissions -- because this is the area of my expertise and professional experience. The four sections cover:

1. The failure of the report to quantify the options for climate action by the county, and thus to demonstrate how they could be combined to achieve the 80% by 2027/100% by 2035 goal.
2. The nearly total focus on the demand side (reducing our need for energy, obtaining it from electricity rather than fossil fuels, and allowing the county to purchase it in the market for its residents). All these are important, but they leave out the key question of supply – how, where and by whom will all this renewable electricity be generated?
3. The nearly total omission of the option with the most potential on the supply side – producing large but quite feasible amounts of renewable energy by solar power generation within the county.
4. The failure to quantify the potential of carbon sequestration, particularly from reforestation, and to integrate it into the plan -- even while depending on it to achieve the final transition between 2027 and the achievement of carbon neutrality in 2035.

The Lack of Numbers

Although a fundamental task of the consulting group was to quantify the citizen Workgroups' suggestions and show how they could be combined to achieve the 80% by 2027/100% by 2035 goals, the draft report gives only qualitative assessments for reductions in greenhouse gas emissions, or even worse, just leaves them as "TBD". Thus it fails to provide County Government with the necessary numbers to put together a plan that would achieve the goals of the 2017 Declaration of Climate Emergency.

Rather than providing the estimates of annual GHG reductions corresponding to each action, the draft plan simply expresses them as "High", "Medium" and "Low", with the cutoff points for these categories set at 0.5 million MT CO_{2eq} for Low and 1.0 million MT of CO_{2eq} for Medium. But clearly the difference between a reduction of, say, 1.2 million MT and one of 4.6 million MT is important – particularly if, as is the case for Montgomery County, we need to reduce by more than 10 million MT of GHGs in the next 14 years. Yet both are simply lumped together as "High".

Where are the original numbers from which this grouping of actions into three categories is derived? We are told that they were the basis for the High-Medium-Low classification, and we are shown graphs apparently derived from these original data (e.g. Figure ES-1 on page xvi and Figure 21 on page 59). Why, then, are the numbers not provided in the text, or at least in an online appendix?

For actions related to Carbon Sequestration, the situation is even worse. Here, we are not even given the grouping into High, Medium and Low. Rather, the net GHG sequestration amounts from all the actions in Table 16 are classified as "TBD," with a footnote telling us the "the level

of emissions reduction is to be determined (TBD) and cannot be estimated without further study.”

Who is going to doing this “further study”, and when? Is this delay the reason that the final reduction from 2027 to 2035 is shown in Figure ES-1, Figure 21 and in the graph on page 138, as being totally due to these additional actions? Are we putting off any actions on sequestration for six years, because we haven't yet done the analysis necessary to quantify them? Conversely, these Figures seem to show that even though all the reductions between 2021 and 2027 will be due to the actions classified as High-Medium-Low (Clean Energy, Buildings, Transportation), these actions will not achieve any additional reductions between 2027 and 2035. This is quite unrealistic, and in fact the opposite of what can reasonably be expected, which is that climate action will take time to get started but will achieve more and more as time goes on.

In summary, the document has failed in the basic task of quantifying greenhouse gas reductions.

Overwhelming Focus on the Demand Side

The Plan's major elements are nearly all on the demand side, relating to how we can buy (or reduce the need to buy) clean energy. They include the Community Choice Energy Program, which would allow the county to purchase clean electricity in the market on behalf of county residents and businesses; a variety of changes in building codes and performance standards; and electrifying private and public vehicles. All these are important actions, but they leave out a vital question: where is the clean electricity going to come from?

It is clear that we will not only need to convert all our current electricity demand to non-carbonemitting sources -- we will also have a substantial increase in our need for electricity. The additional demand for powering electric vehicles, and the amount needed to replace natural gas use in residences and buildings, have each been estimated by the County Executive's analysts as on the order of 25% of our current total. Thus, we will need half again as much electric power as we currently use.

The issue of supply is vital because just assuming that "if we're willing to buy it, it'll be there" is totally unrealistic. The U.S. and the PJM grid covering the Mid-Atlantic region still have quite limited amounts of clean energy available, and with the ongoing trend of vehicle electrification there will be more and more competition for it. If we want to be able to use clean energy in greatly increased amounts, we will need to figure out how to produce it. Yet the Plan has very little that even recognizes this problem, let alone provides action to solve it.

Ignoring the Highest-Potential Source of Clean Energy

Ironically, the Plan does have a few paragraphs about the way to supply clean energy that has the greatest potential. But these paragraphs (p. 96) provide no numbers and do not answer the question of whether it should be done at all. This high-potential option is ground-mounted solar power.

Electricity from ground-mounted solar is now cheaper than fossil fuel sources, which in turn are still cheaper than solar mounted on roofs, office buildings and other structures.

Type	\$/MegaWattHour		
	Low Estimate	High Estimate	Average
Rooftop Solar, Residential	\$150	\$227	\$189
Rooftop Solar, Commercial/Industrial	\$74	\$179	\$127
Ground Based Community Solar	\$63	\$94	\$79
Ground Based Utility - Chrystalline	\$31	\$42	\$37
Ground Based Utility - Thin Film	\$29	\$38	\$34
New Nuclear	\$129	\$198	\$164
New Coal w/90% Carbon Capture	\$65	\$159	\$112
New Gas Combined Cycle (no Carbon Capture)	\$44	\$73	\$59
Data source:			
https://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2020/			

Table A. The cost of solar power – if installed on the ground -- is less than for fossil fuels.

Unlike solar on structures, which is limited by the number and orientation of existing buildings, solar on the ground is easy to scale up, and the County has much more land than is needed to do this. For example, the electricity needs for the county, including vehicle electrification and replacing natural gas and assuming achievable improvements in conservation, have been estimated at 2500 megawatts (MW). Ground-mounted solar requires about 5 or 6 acres to generate one MW, so even if we wanted to generate our entire electric power requirements from ground-mounted solar, we would only need about 15,000 of the county’s 315,000 acres. In other words, even under this extreme assumption, which excludes rooftop solar, wind and nuclear, we would need to use less than ½ of 1% of the county’s land.

It is understandable that the authors of the Plan did not want to take a position on the question of how to permit community solar in the Agricultural Reserve, which has been controversial for

years and was unresolved when the document was drafted. What is much less understandable is that they did not provide any numbers on the potential of ground-mounted solar, wherever it is located. This omission is the most egregious aspect of leaving out the supply side of clean energy, which I discussed in the last section. It is urgent (and relatively straightforward) to correct it in the final version of the document, with estimates showing its potential on a per-acre basis. This is vital if we really want to have a feasible Climate Action Plan.

Omitting Reforestation (and Numbers) from Carbon Sequestration

As mentioned, the entire section on Carbon Sequestration leaves out the numbers. The possible contributions to climate mitigation from sequestration, which takes CO₂ out of the atmosphere and thus reduces net GHG emissions, are all “TBD.” This omission is especially strange because, as indicated in the graph at the beginning of the Sequestration section (page 138) as well as in Figure 24 on page 65, we are depending on sequestration to carry out the needed effort between 2027 and 2035. How can we know whether it will be sufficient to get us to carbon neutrality, if we do not know how much it is?

The problem, however, goes beyond the lack of numbers. Also missing is the approach that has the greatest ability to sequester carbon (Fargione, J. et al. 2018. Natural climate solutions for the United States. *Science Advances* eaat1869), and contributes the most in terms of health, environmental, economic and racial equity co-benefits (Figure 26 on pages 77-78). That approach is reforestation.

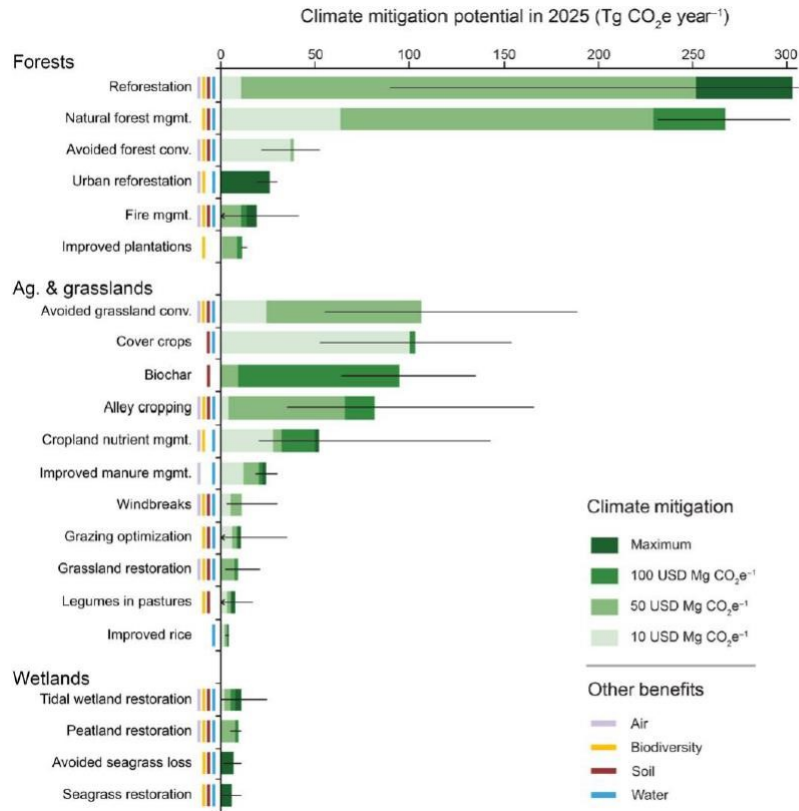
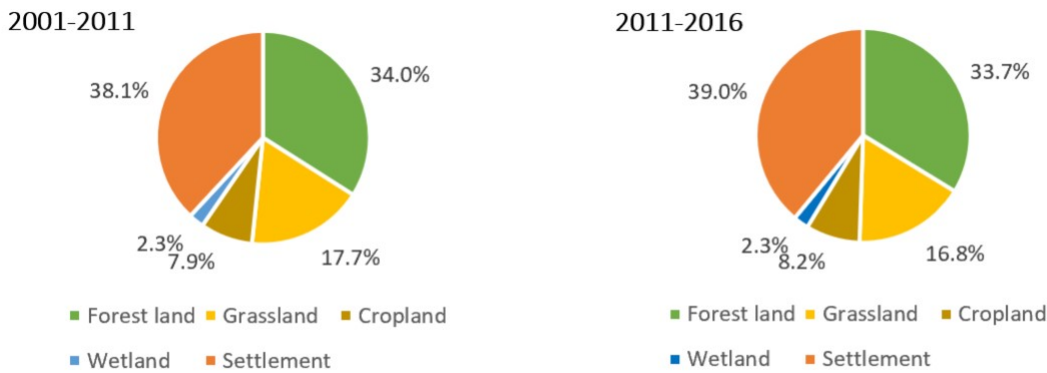


Figure A. Reforestation is the sequestration approach that has the highest potential in the U.S. Source: Fargione et al., 2018. *Science Advances*.

Reforestation is not the same thing as the preservation of existing forests (discussed under action S-1), nor increasing tree canopy outside of forests (S-2), nor restoring forests (as well as meadows and wetlands) in county parks (S-3), nor the incorporation of trees into agricultural systems (S-4). All these are valuable and help support reforestation, but they are all limited in terms of how much sequestration and co-benefits they can achieve. Rather, it means an extensive program, on both private and public lands, to increase the area of forest of the county. That area has been essentially constant for the past two decades (34.0% in 2001-2011 and 33.7% in 2011-2016), as shown by the National Land Cover Database.



Source: National Land Cover Database (USGS, 2019)

Fig. B. Montgomery County's forest land cover has been essentially constant, at 34%, at least since 2001.

Merely staying constant is not sufficient, if we are serious about the fact that we are facing a Climate Emergency. This is why the Climate Workgroup on Sequestration put forward a specific, quantified goal: "Increase the County's forest area to 37% by 2027 and 45% by 2035 (as compared to 34% in 2001-2016)." This goal, however, has been completely dropped from the Climate Action Plan. We do not know who made this decision or why, but failing to even mention this goal, let alone to estimate its GHG reduction potential, seriously undercuts the potential to act successfully on carbon sequestration.

I should be clear that reforestation, and carbon sequestration in general, needs to be in addition to dramatic action on renewable energy and electrification, not a substitute for it. Its contribution will not be large enough in terms of GHG reductions, nor rapid enough in light of the imminent 2027/2035 goals, to view it as a replacement for renewable electricity. But it has very substantial co-benefits (e.g. increased biodiversity, reduced erosion and flooding, cooling neighborhoods,

etc.; see Figure 26 on pages 77-78). These, in addition to the carbon that it sequesters, are why it needs to be put back into the Climate Action Plan.

Conclusion

As Eleanor Clemans-Cope pointed out in her comments for the Sunrise Movement, “Despite the fact the county has been ‘planning’ for over ten years to reduce emissions, actual emissions reductions have been incredibly slow.”

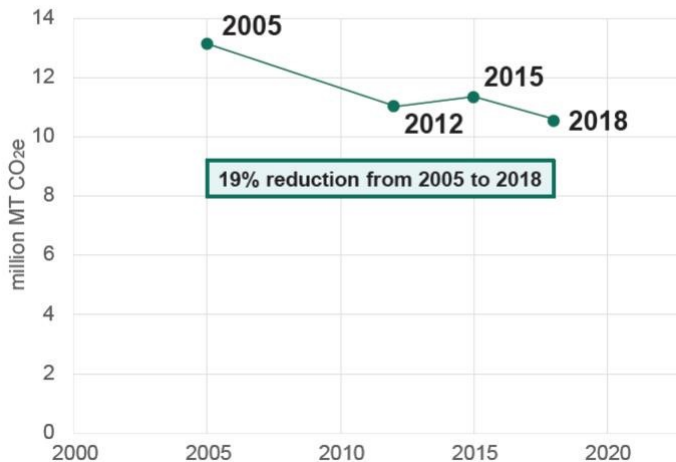


Fig. C. Figure 17 of the Plan (page 55) claims a 19% GHG reduction since 2005, but nearly all of this happened in the first seven years. Since 2012, there has been essentially no progress.

We have done a lot of little things, while avoiding doing the big things that would transform our energy and land use systems. This makes it even more disappointing that the draft Climate

Action Plan lacks both numbers and consideration of the actions, such as ground-mounted solar and reforestation, that would make the most difference.

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Now we have run out of time. The draft Climate Action Plan needs substantial revision to correct what it leaves out, but this revision must be accompanied by simultaneous action. Elizabeth Kolbert recently summarized our predicament succinctly in *The New Yorker*, “In dealing with climate change, the United States is by now thirty years—and billions of tons of carbon dioxide—behind schedule.” There is no longer any time for either inadequate plans or inadequate action.