SIERRA CLUB
MONTGOMERY COUNTY, MD

To
The Montgomery County Council
100 Maryland Avenue
Rockville, MD 20850

September 24, 2020

Re: Zoning Text Amendment (ZTA) 20-01
Position: Support

Dear Montgomery County Council members,

Zoning Text Amendment (ZTA) 20-01 as now amended will allow the development of small (2 megawatt or less) solar energy generation arrays on less than two percent of land in the county's Agricultural Reserve. This is an essential action to meet the county's own highly ambitious – but necessary – greenhouse gas reduction goals. Sierra Club Montgomery County has had multiple discussions with many stakeholders and provided input to strengthen, clarify, and balance the ZTA in response to specific concerns. We therefore support this ZTA and strongly urge the Council to pass it without further amendments.

Sierra Club Montgomery County's position on ZTA 20-01 reflects the Sierra Club Maryland Chapter's significant experience over five years with the issues of siting solar projects in Maryland, especially on agricultural land. As now with Montgomery County, Sierra Club Maryland has worked with County level Sierra Clubs in Anne Arundel, Baltimore, Frederick, Howard, and Prince George's counties in discussion and development of local solar siting policies. In this process, we have worked with local and state government, environmental, land preservation, agricultural, solar development, and technical organizations. In 2018, we collaborated with the Maryland Association of Counties to organize a consultative forum on solar siting that drew on the experiences of county-level political representatives and planners, the Public Services Commission (PSC), environmental organizations including Sierra Club and League of Conservation Voters, the Maryland Farm Bureau, Preservation Maryland, and representatives of the solar industry working in Maryland. In 2019, we participated in the multi-disciplinary consultation on solar siting convened by leadership of the Maryland House of Delegates Environment and Transportation Committee. The lead author of this testimony, Dr. Alfred Bartlett, has served since 2015 as an active member of the PSC-led Working Group that developed the regulations and implementation arrangements for the legislatively-established Community Solar Pilot Program and which continues to monitor and troubleshoot its implementation.

We understand that solar siting on open land is a sensitive matter in which there are multiple important interests and positions that need to be considered and balanced. In our work with all these other organizations, we and they have become convinced that there exist "win-win" approaches to solar siting on agricultural land. We believe that, as revised, ZTA 20-01 now represents such an appropriate and balanced approach: it recognizes the agricultural focus of the Agricultural Reserve and offers the opportunity to incorporate and strengthen that focus in an innovative way, while addressing the inescapable reality of climate change.

Our position is based on the following major points:

Climate Change is the core issue -

- As a conservation organization, Sierra Club works hard to protect our natural environment and has common cause with farmers and land preservationists.
- However, climate change is a threat to all Marylanders - including farmers - from heat waves, flooding, severe storms, and changing weather patterns; there are already documented changes in our growing seasons.

- The Intergovernmental Panel on Climate Change has affirmed that we must act urgently to reduce the greenhouse gases that drive climate change in the next 10 years – the IPCC's and World Meteorological Organization's most recent assessment[1] projects that we may reach the Paris Accord's end of century warming limit of 1.5° Celsius by 2025 instead (Attachment 1).
- Montgomery County's own greenhouse gas reduction targets are consistent with this urgency – but we are a long way from hitting those targets.

Moving our electricity generation from fossil fuels to clean renewable energy - plus increased energy efficiency - is the biggest near-term step we can take to reduce greenhouse gases -

- Marylanders' use of electricity is one of our two top sources of greenhouse gas production (transportation is the other) and a major source of other health-harming pollutants including nitrogen oxide (the major precursor of the ozone that triggers asthma attacks, especially in children)[2,3] and small particulate matter (a major risk factor for pulmonary and cardiovascular disease and death).[4,5]
- Electricity generation is the sector where we already have the proven, low-cost, scalable, job-producing technologies - wind and solar - to rapidly decarbonize our energy production.
- Decarbonizing other sectors - like moving to electric vehicles and all electric buildings - will take longer, and will only increase our electricity needs.

Expanding solar electricity production is a key part of our county's clean energy transition -

- Montgomery County is unlikely to have substantial amounts of wind power, meaning that for wind power we will rely on imported wind generated electricity from other parts of the state, or other states.
- However, solar electricity is generated near where it is used, making it feasible, low cost, and reliable.
- Using expert-based estimates of wind and solar proportions at 100% clean renewable energy (projected at 2040), Maryland will need to get about 40% of its electricity from solar generation.[6,7]
- Based on present usage, as just over 1/6th of Maryland's population, our county will need over 800 megawatts (MW) of solar by 2030 (under Maryland's existing Clean Energy Jobs Act commitment) and about 2,500 MW of solar by 2040.[8]
- Right now, Maryland and our county have about 1/8th of the solar we need by 2030, and 4% of what we need at 100% clean renewable energy.
- In Montgomery County, most existing solar capacity (except for the county's own projects) is on rooftops.

Montgomery County can't build all the solar it needs on just rooftops, parking lots, brownfields, or commercial/industrial property -

- In 2016, the National Renewable Energy Laboratory (NREL) used LIDAR and other techniques to estimate the "Technical Potential Rooftop Capacity" for photovoltaic solar in each state,[8] and in 2018, the PSC used the NREL data to get an aggregate estimate for each utility's service area.[9]
- Montgomery County has 53% of the Pepco region's population, making the county's estimate of "technical" rooftop potential 2,350 MW.
- Because of factors including cost, regulations such as setback requirements, structural issues, and actual roof conditions and obstacles, "Actual Rooftop Potential" is estimated at 25-50% of "Technical Potential."
- Therefore, the estimated actual rooftop solar potential for Montgomery County is 588-1,175 MW – at best, less than half of the 2,500 MW of solar we need.[10]
- Building all the potential rooftop solar will take well over a decade: because a solar array's lifetime is 20-25 years, the cost of taking a solar array down and then reassembly if a roof needs to be replaced sooner means that it's only cost-effective to build solar on roofs that have been recently built or replaced. (This limitation doesn't apply to ground-based solar.)

- Requiring solar on all new residential roofs will add only a small amount of solar capacity: the county's data, applying a high-end estimate using the 5-year average of new residential construction, project that 6,617 new single family detached homes would be built by 2030 – if every one of them has an average-sized new rooftop solar system (6 kilowatts), this would add only about 40 MW of total solar capacity.
- Parking lots and garages offer additional solar potential; however, the greater structural requirements plus electrical and physical safety factors make solar parking canopies and solar on parking garages among the most expensive forms of solar project, and only a small amount (estimated 1,800 MW in 2018) has been built in the whole U.S.[11]
- Both rooftop and parking lot solar basically provide just part of the power used by the roof or parking lot owners (on a very sunny day, an array may put some extra electricity onto the grid, but the resulting credit is used later by the owners themselves at night or on less sunny days).
- A 2018 in-depth analysis of 402 EPA-identified potential sites in Maryland found no viable brownfield sites in Montgomery County.[12]
- Of the county's two landfill sites (Gude and Oaks), the county itself has already established agreement to develop 6 MW of solar on the larger Oaks site in Laytonsville.
- The high cost of industrial or commercial land – generally $100,000 to $1 million or more per acre – is far too expensive for the small size solar projects that can be built here.
- The county has begun exploring the possibility of solar development at the site of the Dickerson coal-fired power plant; initial GIS analyses find that up to 350 acres could be viable for solar, allowing up to about 60 MW of solar generation.
- Doing so will be complicated by the fact that there are three property owners involved - GenOn, Pepco, and Montgomery County - and also by the substantial price that will be expected for the land; in any case, this 60 MW would add only a small part of the 2,500 MW of solar our county will need, and only one-fifth of the expected 300 MW that can be generated under the ZTA.
- **Therefore, while the county definitely must support the most rapid possible development of rooftop, parking lot, and other solar sites, the "Bottom Line" of these analyses is that the county can't meet all its solar energy requirements on rooftops, parking lots, contaminated lands, the Dickerson site, or other non-agricultural zoned land.**
- **Building ground-based solar can't wait years until all the rooftop, parking lot, and other solar is built - these strategies have to be simultaneous, not sequential.**

Montgomery County isn't providing the expanded solar access available under Maryland's Community Solar program[13] –

- The state's Community Solar program is designed to offer access to low-cost locally generated solar power to the over half of Maryland households that can't have solar on their own rooftop – apartment dwellers, condo owners, those whose roofs aren't suitable or too shaded or who can't afford their own solar system.
- The program specifically includes solar access for low- and moderate-income households, who so far have been essentially left out of solar development.
- Community solar projects are small by national solar standards - not larger than 2 megawatts - but can serve several hundred households.
- Although relatively small - approximately 12 to 15 acres - community solar projects are too large to be built on any rooftop.
- Solar projects allowed under the ZTA could serve roughly 50,000 households – about 140,000 people.
- The cost of community solar to participating households in Maryland has consistently been 5-10% lower than the "Standard Offer" (basic service) cost of the utility area where they're located.

- Special financing mechanisms have been developed to make the cost to low-income households even lower, meaning significant savings on electricity bills.
- While some residents of our county are already getting power from community solar projects in the Pepco service area, Montgomery County's current restrictions on ground-based solar development have resulted in all of the Pepco area's community solar projects built to date being in Prince George's County – none have been built in our own county.

ZTA 20.01 provides a balanced approach to the county's need to build some solar on agricultural land -

- The ZTA limits the amount of agricultural land used for solar to a very small fraction of Agricultural Reserve land - 1,800 acres, or just 1.9% of the Reserve's 93,000 acres.
- It includes all the county's requirements for protection of trees and forests, streams, stream buffers, major drainage courses, wetlands, wetland buffers, 100-year-flood-plain, environmentally sensitive areas, as well as rare, threatened, or endangered species.
- It also provides additional protections, prohibiting the removal of topsoil, limiting use of concrete, and restricting development of solar on USDA prime (Class 1) soil.

Note: The county's own GIS analysis finds that because of the extensive intermingling of soil types and the superimposition of individually owned parcels on these soils, restricting solar on soil types beyond Class 1 will result in too small a number of potential parcels to make solar development feasible. We therefore agree that the best way to limit impact on agriculture is to restrict the total acreage allowance under the ZTA to less than 2% of total Ag Reserve acreage.

Passing a ZTA with additional restrictions that make it non-workable would be a lose-lose, operationally and politically – those who oppose the ZTA will be unhappy it passed, and those who are concerned about the urgency of moving to clean renewable energy will be unhappy that the ZTA doesn't actually do that.

- The ZTA also requires that solar arrays be pollinator-friendly or have co-located agricultural activities.

Limited solar development under the ZTA has important agriculture-positive aspects

- Unlike residential or commercial development - the greatest consumers of our county's agricultural land - land used for solar development is not lost - there is no negative impact on the soil itself, and when the array ceases to be used, it can be removed with full restoration of the land.
- The emerging practice of "agrivoltaics" - systematic combination of agriculture with solar arrays - results in actual net gains for both agriculture and carbon reduction:
  - Even while in use, solar arrays allow environmentally and agriculturally positive practices like pollinator-friendly plantings between rows of panels or co-location with other crops or even grazing animals.
  - Pollinator-friendly solar farms have been established successfully at scale throughout the U.S., actually reducing operating costs of solar arrays – thus lowering the cost of electricity produced – and also increasing the number of pollinators and the productivity of surrounding agriculture.
  - The deep-rooted plants used are actually better than grass or gravel at reducing erosion and runoff.
  - Solar projects effectively combined with agricultural practices are important resources to fight climate change: the solar power generation displaces carbon pollution (and other pollutants) caused by burning fossil fuels, and the agricultural components capture carbon; this combined carbon reduction effect is almost 100 times greater than conventional agriculture, reforestation, or even regenerative agriculture alone, which absorb carbon but don't reduce its generation.

- Compared to conventional agriculture, these "agrivoltaic" practices are more effective in conserving soil and water, reducing erosion, storing carbon in the soil, and sustaining pollinators. (Attachment 2)

Limited solar in the Agricultural Reserve can also provide important benefits to individual farmers

- The Ag Reserve is actually a complex place economically – data from the most recent (2017) USDA Agricultural Census[14] reveal the following characteristics of agriculture in the county (almost all of which is in the Ag Reserve) –
  - Of the county's 65,537 acres of "land in farms," 30 farms that are 500 acres or larger hold 58% of that land (37,905 total acres); 13 farms that are 1,000 acres or larger by themselves hold 40% (25,925 acres) of the "land in farms."
  - Even including these large farms, the average farm size is 117 acres; the median farm size is just 25 acres (meaning that at least half of farms are ≤ 25 acres).
  - Most of the crops grown are not feeding the county population – they are "commodity crops," grown mostly for large scale commercial sales or use in feed: specifically they are corn, 11,977 acres; wheat, 7,758 acres; soy, 14,559 acres; sorghum, 1,648 acres; hay and other silage, 8,878 acres; totaling 44,820 acres, or 68% of "Total Montgomery County farmland."
  - Another large segment is land used for nursery plants, sod, and greenhouses.
  - The actual acreage in crops most likely to go directly to county consumers is relatively small; specifically, vegetables were grown on 429 acres, berries on 79 acres, and orchards on 332 acres (for a total of 840 acres, or 1.3% of "Total County farmland").

- The USDA Ag Census also indicates that many farmers in the Ag Reserve might benefit from use of a small amount of their land for solar arrays –
  - Of the 558 farms identified by the census, the 40 richest farms (incomes $250,000 and above) had an average income of $1,025,850 per farm, while 395 farms (71%) had farm income less than $10,000/year, and 299 farms (54%) had income less than $2,500/year
  - The average net income (income minus production expenses) across all farms was negative, averaging $6,430 net loss per farm (in the previous [2012] Ag Census, the average was $2,590 net profit – not great then, but getting progressively less profitable); 407 farms had net losses in 2017.
  - In terms of demographics, the USDA census identified 1,026 male and female farmers on the 558 farms; of these farmers, 637 (62%) were age 55 or above, 341 (33%) were age 65 or older, and 98 (10%) were age 75 or older – the average age across all farmers was 58 years.
  - Leasing a portion of land for solar can provide dependable income that protects a farmer from the uncertainties of weather, crop failure, and market prices, and potentially allows the remaining land to be used for riskier but more environmentally sound practices like organic or sustainable farming.
  - This steady income might also allow a family with aging parents on the farm to keep the farm in the family, or younger farm families to put their kids through college.
  - Together these Ag Census data suggest that many farmers in the Ag Reserve might benefit from this steady income from solar.
  - Of note is that if a soil restriction beyond Class 1 were implemented, besides making the ZTA non-functional, it would also block a majority of small farmers from accessing the potential income from hosting small solar arrays, and also keep them from participating in the future-oriented agricultural area of agrivoltaics.

In Summary –

Sierra Club's specific policies related to the siting of ground-based solar – both at national level and in Maryland – support approaches that balance the real and urgent need to move to clean renewable energy with agriculture, land preservation, the environment, and community interests.

Based on the facts cited in this document, we find that ZTA 20.01 clearly achieves that essential balance. The most recent IPCC and WMO analyses make it clear that our window for action is closing quickly… more quickly than we thought even 2 years ago. We are on notice that if we don't take real dramatic action to reduce greenhouse gases *within this decade*, we – mostly our children and their children – will live in a far more difficult world.

There are always reasons to say "no" to change – "*Let's wait for next year, for more information, for somebody to invent something new that will make the problem go away*." But at this moment in time, with the impacts of climate change all around us, we need to act and act quickly. While there are additional approaches to be developed and additional plans to be debated, it's clear that Montgomery County will need to build some solar on its agricultural land. Sierra Club finds no reason to wait.

We strongly urge the Council to adopt the ZTA in its present form.

Sincerely,

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[1] World Meteorological Organization, *United in Science 2020*, public.wmo.int/en/resources/united_in_science
[2] American Academy of Pediatrics, Policy Statement - Ambient Air Pollution: Health Hazards to Children, *Pediatrics* 114, 6:1699–1707 (2004).
[3] O'Connor GT et al, Acute respiratory health effects of air pollution on children with asthma in US inner cities, *Jl Allergy Clin Immunology*, 121, 5, 1133–1139.e1 (2008).
[4] Jerrett M et al, Long-Term Ozone Exposure and Mortality, *N Engl J Med*, 360:1085-95 (2009)
[5] Caiazzo F. et al, Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005, *Atmospheric Environment* 79:198-208 (2013).
[6] Jacobson MZ *et al*, *100% Clean and Renewable Wind, Water, and Sunlight (WWS) - All-Sector Energy Roadmaps for the 50 United States*, Energy and Environmental Science; April 2015
[7] Institute for Energy and Environmental Research, *Renewable Energy Capacity Analysis* (for 2018 100% Clean Renewable Energy legislation); October, 2017
[8] Gagnon P et al (National Renewable Energy Laboratory), *Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment*; January, 2016
[9] Daymark Energy Advisors *et al*, *Benefits and Costs of Utility Scale and Behind the Meter Solar Resources in Maryland*; September, 2018
[10] These figures are based on current consumption – the actual future requirement will vary depending on the balance between energy use reductions from increased efficiency and reduced demand, versus increased requirements from vehicle and other electrification.
[11] Rooney C, *The best idea in a long time: Covering parking lots with solar panels*; Washington Post, January 28, 2015
[12] Utility Scale Solar Energy Coalition, *Solar Development Potential on Contaminated Lands in Maryland*; October, 2018
[13] COMAR 20.62, *Community Solar Energy Generating Systems*
[14] U.S. Department of Agriculture, *2017 Census of Agriculture, Maryland, State and County Data*, Volume 1 • Geographic Area Series • Part 20

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MONTGOMERY COUNTY, MD

<u>Attachment 1</u> – Summary of the August 2020 U.N. statement on the increasing rate of global temperature change

World losing time to avoid worst warming effects — U.N.

A new United Nations report warns that average global temperatures could rise to 1.5 degrees Celsius above preindustrial levels within five years — an alarming projection that potentially shortens the window for the world to prevent the worst effects of climate change.

The report, released yesterday, also revealed disturbing scientific observations of Earth's climate over the past five years. Those include an accelerated pace of sea-level rise and a dramatic contraction of the polar ice caps.

"The heating of our planet has not let up," U.N. Secretary-General António Guterres told reporters. "There is a significant and growing chance of reaching the 1.5-degree threshold over the coming five years."

The COVID-19 pandemic, and the economic slowdown it has caused, is unlikely to provide much relief, either.

The World Meteorological Organization, the U.N. agency that organized the report, estimates that the financial fallout from COVID-19 would push carbon dioxide emissions lower by 4% to 7% in 2020 compared with last year. But U.N. officials said they expect emissions to rebound once the global economy gets going again.

"This is a temporary anomaly," said WMO Secretary-General Petteri Taalas. "We are still heading toward a much warmer climate."

The average global temperature has risen by at least 0.2 C since the 2011 to 2015 period and is now 1.1 C higher than the 1850-1900 estimate. At the current pace, the temperature in 2100 will be 3.4 C higher than the preindustrial period, according to scientists with WMO.

Global average temperatures are rising far faster than governments would like, said Pep Canadell, a research scientist with Australia's Commonwealth Scientific and Industrial Research Organization.

Though the Paris Agreement on climate change commits countries to try to limit the temperature increase to 1.5 C by the end of the century, Canadell said there is a 1 in 4 chance the world would have hit that mark by 2025.

"In less than eight years since the Paris Agreement entered into force, we might be touching that first critical threshold of 1.5 C, which 189 countries committed not to cross," Canadell said.

The consequences are far-reaching. Climate-fueled natural disasters already are killing people and causing economic harm.

Of climate-related weather extremes, the authors said heat waves have caused the greatest loss of life, though the report doesn't provide an estimate of the number of people killed by extreme heat over the past five years. "Heatwaves were the deadliest meteorological hazard in the 2015-2019 period, affecting all continents and setting many new national temperature records," the report's authors said.

But tropical cyclones caused the most economic damage. The report singles out the 2017 landfall of Hurricane Harvey in Texas as the costliest single natural disaster of the prior half-decade, with the U.N. pricing the devastation from that storm at $127 billion.

The authors predict emissions would not peak in 2020 despite the COVID-19 economic crisis, nor would they peak by 2030 given the current trajectory of economic growth.

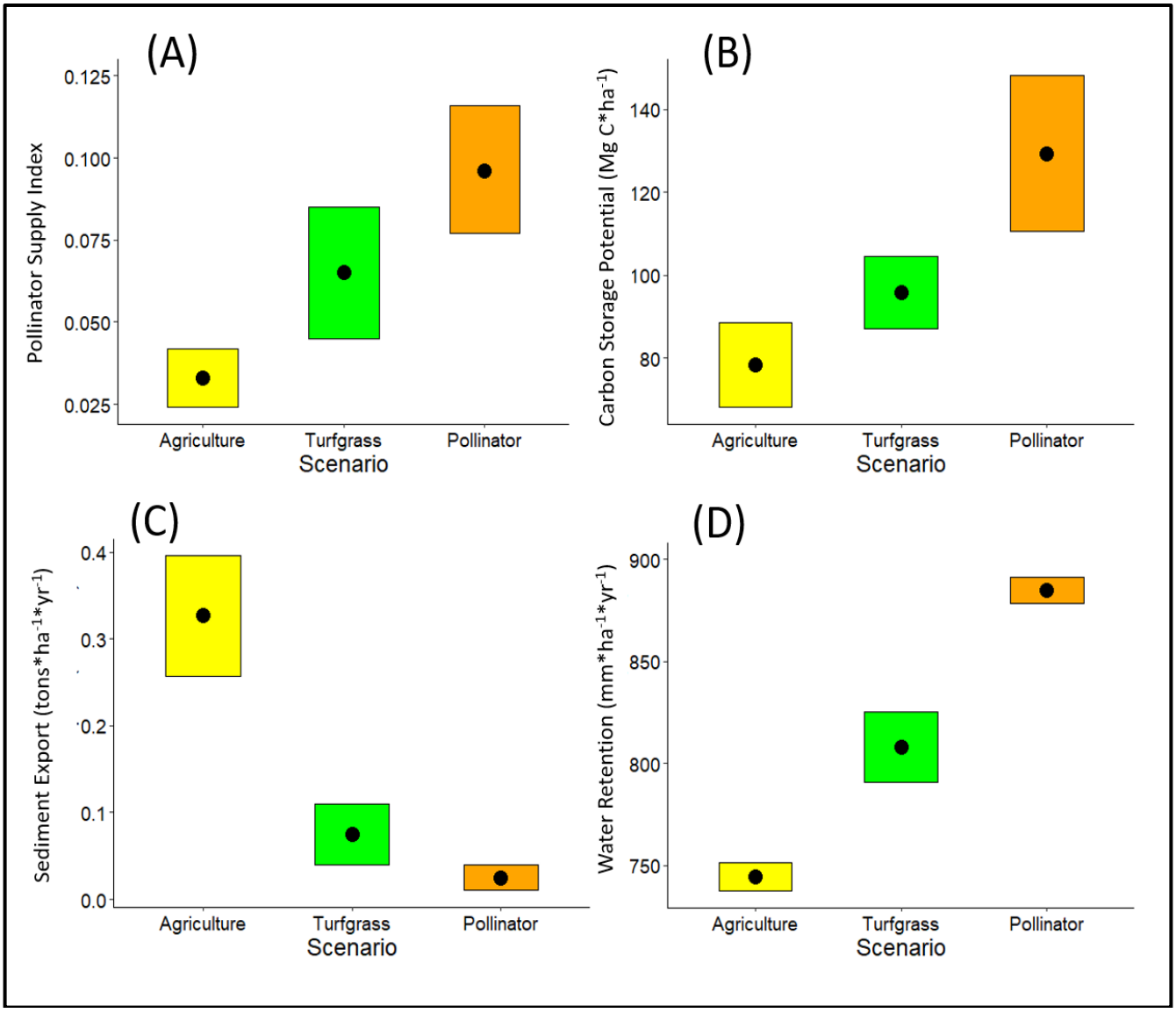
The result is a continuing decline in both summer and winter sea ice in the Arctic and Antarctic.

"In every year from 2015 to 2019, the Arctic average summer minimum and winter maximum sea-ice extent were well below the 1981-2010 average," says the report. "The four lowest values for winter sea-ice extent occurred in these five years."

Higher temperatures have led to massive losses of land ice in Antarctica and Greenland and from mountain glaciers.

Guterres added that "110 million Olympic-sized swimming pools of lost ice in Greenland alone. Short-term lockdowns are no substitute for the sustained climate action we need to meet the goals of the Paris Agreement."

<u>Attachment 2</u> – Comparison of effects of conventional agriculture (row crops), turfgrass, and pollinator-friendly solar arrays on pollinator supply, soil carbon storage, sediment runoff, and water retention



Compared to the agricultural land use, solar-pollinator habitat produced:

- 65% increase in carbon storage potential
- 3-fold increase in pollinator supply
- 95% reduction in sediment loss
- 19% reduction in water runoff

(Source – NREL and Argonne National Laboratories, the DOE InSPIRE Program: *Ecosystem Services of Solar-Pollinator Habitat*)