

For Maryland to transition to a zero carbon future while producing economic growth and protecting and creating jobs, it will be necessary to use the next decade to not only deploy every strategy that will produce results now, but also develop the policies, programs, and infrastructure that will create bridges to innovative technologies and new developments in scientific and technical expertise as they come on line (agree with comments by Mike Powell). The natural and working lands sector can play a significant role in complementing and supporting those efforts, and along with topics of general interest, some specifics have been identified below.

#### Infrastructure (all good news for jobs)

- Electric vehicles/charging stations
  - In addition to improvements in vehicle battery capacity and range, an extensive network of charging stations will need to be available across the state if aggressive EV targets are to be met (there also needs to be more industry agreement about the types of charging stations that can be used by different makes and models, as well as the types of connectors).
  - Looking at farm equipment, and especially tractors, it appears likely that hybrids will take off before full electric models since current battery technology does not provide the same capabilities as conventional diesel power.
- Renewable energy
  - Increased storage capacity and grid improvements will facilitate the use and dependability of renewably-sourced energy generation.
  - The siting of sizeable arrays of on-ground solar panels has raised issues about the appropriateness of those installations when the loss of productive farmlands or stands of mature trees is involved.
  - Greater reliance on electricity also raises customer concerns about reliability and rates. Power outages during storms, and particularly winter storms, as well as power outages and rolling blackouts during periods of high usage, like those in California this summer, only cause more anxiety about the consequences of disruptions in energy supplies or the inability of supplies to keep pace with demand.
  - The production of energy from biomass gives farmers and foresters the opportunity to supply plant material that is grown specifically for that purpose or to dispose of waste from food crops, horticulture, livestock, and food or forest product processing. Plant and animal materials are renewable sources, but production should be proportionate to the sustainable production of low grade woody material or animal waste. If all the waste from managed forests and the lumber industry in Maryland was combusted for energy it would meet less than 2% of Maryland's current electricity. Biomass could be imported from out of state, but we would need to ensure the demand for biomass would not contribute to unsustainable forest management practices that would deplete forest carbon stocks over the long run.
  - MDA administers the Animal Waste Technology Fund, an annual competitive grant cycle, to award innovative technologies that treat or process animal waste and result in alternative, improved nutrient management strategies for

the farm. Projects reduce on-farm waste, often produce valuable energy supplies for the farm and grid (qualify as Tier 1 renewables), and create marketable nutrient by-products that can supply organic matter and micronutrient applications for crop fields.

- Roofs with reflective coating
  - Although more useful in urban areas (NYC has coated more than 10 million sq. ft. of rooftops or under 2% of the total), studies have shown that internal temperatures of buildings can be decreased by up to seven degrees by painting roofs or using reflective roofing materials.
  - Reflective roofing is a readily available, cost effective approach to energy efficiency and the reduction of heat islands.
  - The Berkeley Lab says the worldwide use of reflective roofing could produce a global cooling effect equivalent to taking 300 million cars off the road for 20 years.

#### Forest and Soil Sequestration Potential

- Forests and soils have the capacity to store more than three times the amount of carbon found in the atmosphere. Carbon sequestration in forests and agricultural soils represents a natural climate solution that complements mitigation strategies to reduce greenhouse gas (GHG) emissions from all sources.
  - Maryland farmers are leaders in the use of conservation practices and have been recognized nationally for their efforts in taking adaptive agronomic practices to new levels. Maryland farmers rank first and second in the country in the adoption of cover crops and no-till respectively.
  - Many of the agronomic and conservation practices used by Maryland farmers to improve water quality also sequester carbon and have already enabled agriculture to make a significant but unrecognized contribution to state GHG reductions. Maximizing the adoption of these practices while increasing the implementation of additional carbon-sequestering practices will allow agriculture to play an even greater role in meeting Maryland's climate change goals.
  - The menu of recommended practices included in the draft GGRA Plan as Appendix K provides a reference for the MDA Soil Health Advisory Committee to develop program recommendations to improve the health of Maryland's agricultural soils and promote the use of agricultural practices that enhance the sequestration capacity of Maryland farms. These practices were identified on the basis of their efficacy, scientific support, and suitability for Maryland-specific conditions and represent a range of options open to state producers. The Committee is currently prioritizing practices consistent with Appendix K and discussing the preliminary stages of a state program framework.
  - One of Maryland's greatest strengths is its agricultural conservation partnership. Through the state's network of 24 soil conservation districts, programs are delivered to the farm community from a trusted, proven source of technical and financial assistance. This network will facilitate delivery of the evolving Healthy Soils Program and its coordination with other ongoing conservation efforts.

- The forest carbon sink in Maryland is the largest of the natural and working lands but has decreased by 17% since 2006 according to the USFS carbon inventory. This is due to a number of factors, but the largest is the increasing age of Maryland's forests (forests grow more slowly as they age). Sustainable forest management can reverse this trend while meeting conservation and economic goals, but for this to happen landowner incentives will very likely be needed.
- Offering incentives to Maryland's farmers and forest landowners to realize the full potential of climate friendly soil and forest management practices is a well-established and cost-effective strategy that can be employed immediately, both for its own value and its ability to provide a bridge to emerging carbon capture and storage technologies.

### Agriculture and Forestry: The Original Green Economy

- Agriculture is the largest commercial industry in Maryland, employing about 350,000 people, including nearly 6,000 full-time farmers, and contributing some \$8.25 billion annually to the state's economy. This latter figure compares with \$3.5 billion from forestry reported in the last economic analysis conducted by the University of Maryland.
  - Most farmers and foresters operate as small, independent enterprises.
  - According to the most recent Census of Agriculture, the state currently has some 12,400 farms, and these farms account for more than two million acres or roughly 32% percent of Maryland's total landmass.
  - Healthy and vigorous working lands not only provide direct benefits in GHG reduction, but keeping them intact also helps to avoid or diminish GHG emissions associated with development.
  - Despite the size of agriculture's economic contributions, farm margins are typically razor thin, and 65% of Maryland's farmers rely on outside income to be profitable.
  - Rural poverty is an often hidden issue, and Somerset and Allegheny Counties have the second and third highest poverty rates in the State (after Baltimore City). Along with Somerset, three others in the top six (Dorchester, Wicomico, and Caroline) are also rural counties on the lower Eastern Shore.
- Agriculture and forestry cover the largest land uses in Maryland. The co-benefits of most water quality best management practices implemented on farms and the additional new practices to improve soil health, sequester carbon, and mitigate against climate change have been vetted through scientific research. Agriculture and forestry can be the bridge towards reduction of greenhouse gasses while new developed technology is being considered and the infrastructure is being installed. The framework for administering a soil health program already exists within the soil conservation districts.
- Identification of permanent, dedicated sources of funding for land-based sequestration offers an unprecedented opportunity to recognize Maryland's farmers for their leadership role in advancing climate solutions, provide supplemental income to the agricultural community, and promote rural economic development.

- Programs to protect soils and build carbon stocks also have the potential to attract private investment through payments for carbon credits and other ecosystem services as public awareness grows and markets evolve.
- Implementation of soil health practices will enable farmers to improve overall profitability by reducing water, energy, fertilizer, and herbicide/pesticide usage and attendant costs.