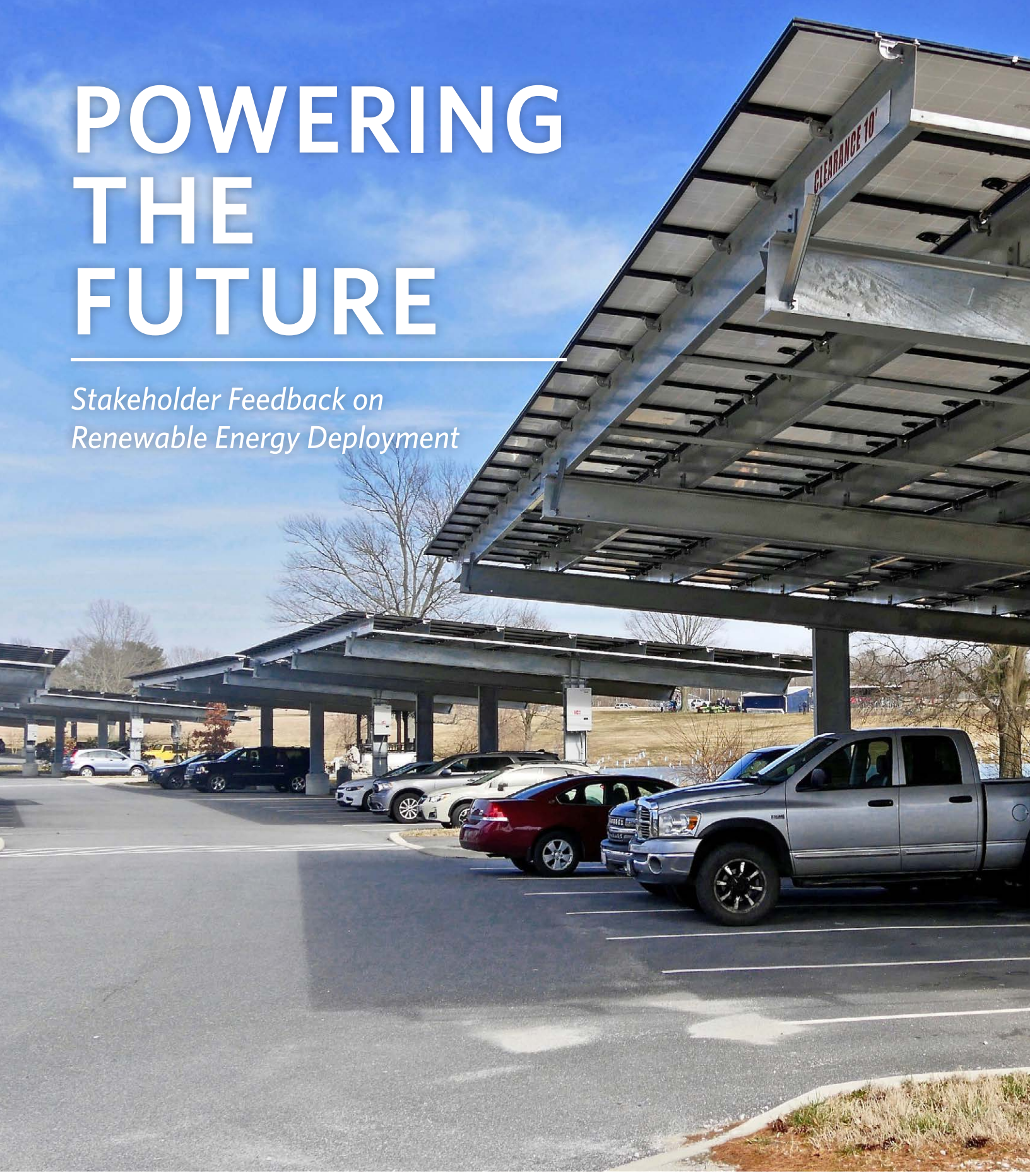
POWERING THE FUTURE

Stakeholder Feedback on Renewable Energy Deployment



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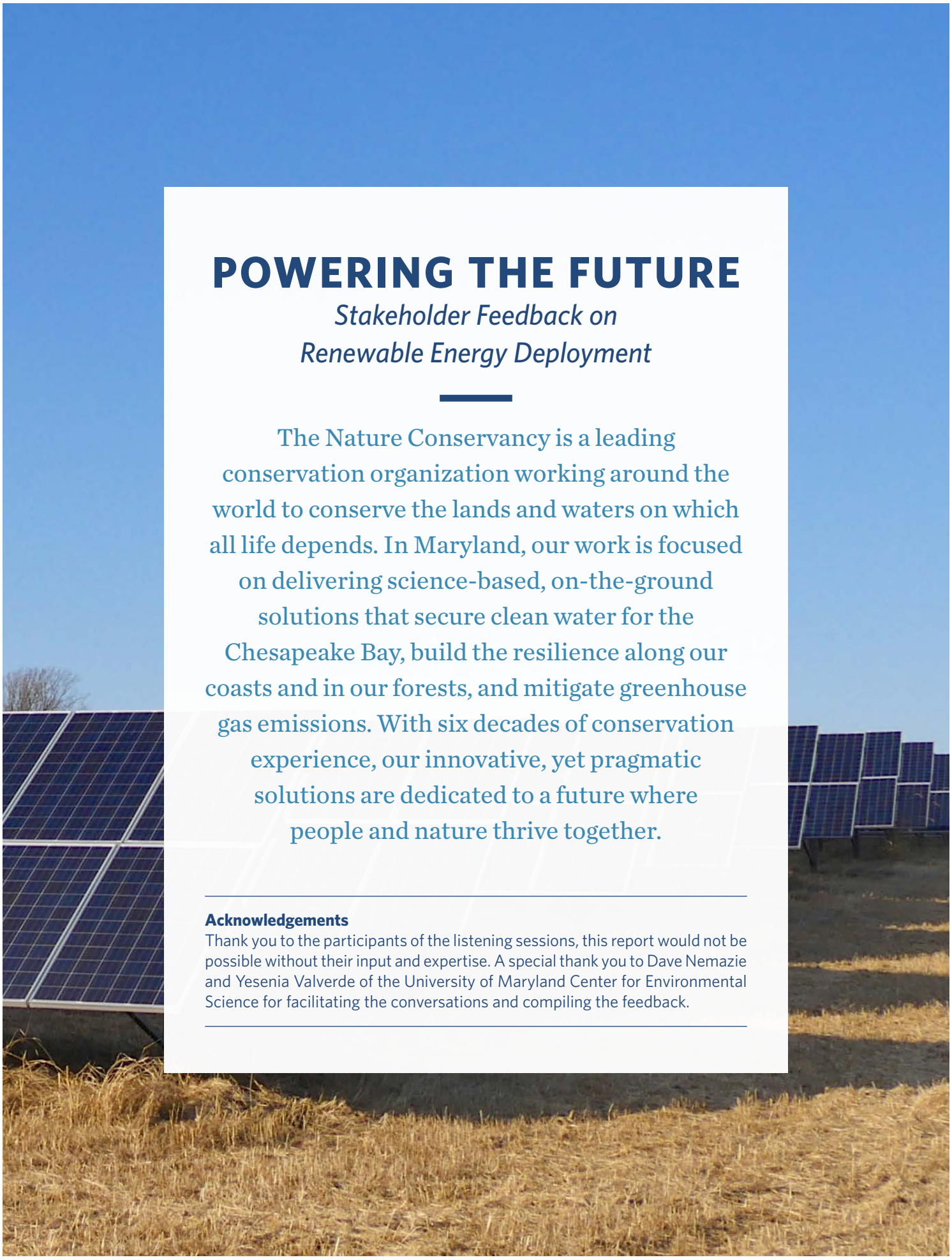

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The Nature Conservancy is a leading conservation organization working around the world to conserve the lands and waters on which all life depends. In Maryland, our work is focused on delivering science-based, on-the-ground solutions that secure clean water for the Chesapeake Bay, build the resilience along our coasts and in our forests, and mitigate greenhouse gas emissions. With six decades of conservation experience, our innovative, yet pragmatic solutions are dedicated to a future where people and nature thrive together.

Acknowledgements
Thank you to the participants of the listening sessions, this report would not be possible without their input and expertise. A special thank you to Dave Nemazie and Yesenia Valverde of the University of Maryland Center for Environmental Science for facilitating the conversations and compiling the feedback.

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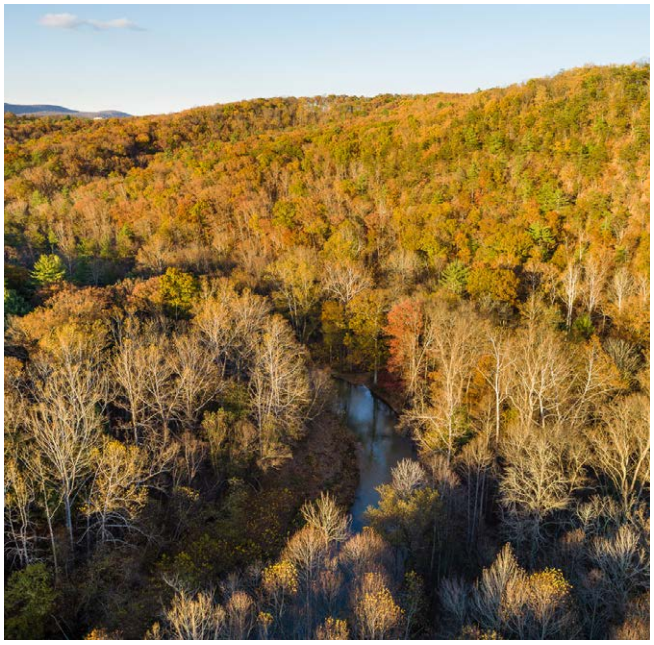
INTRODUCTION

Recent international and US government climate reports have highlighted that time to take meaningful action on climate change is running out. Maryland has taken bold steps to reduce emissions through the Greenhouse Gas Reduction Plan, mandated by the Greenhouse Gas Reduction Act of 2009. In 2016, the Maryland General Assembly updated the GGRP to require a 40% reduction in emissions from 2006 levels by 2030 (Maryland Commission on Climate Change, 2016). The GGRP encompasses more than 150 programs that work collectively to reduce or mitigate emissions. According to the GGRP, the greatest potential to reduce emissions in Maryland is through changes to electricity generation. To that end the Maryland General Assembly passed the Clean Energy Jobs Act of 2019, which will require 50% of electricity for consumers to come from renewable sources by 2030. If Maryland incorporates a greater proportion of energy from renewable sources into its energy generation portfolio, both a reduction in greenhouse gas emissions, and along with it the opportunity to increase economic and human health benefits will follow. A recent study commissioned by the Maryland Public Service Commission found that increasing solar energy generation between 2018-2029 could create more than $3.8B of economic benefit and create over 20,000 jobs in Maryland (Daymark Energy Advisors, RLC Engineering, & ESS Group, 2018). Moreover, a large majority of Marylanders support the growth of renewable energy sources, with 77% supporting solar and 72% supporting wind (Akerlof, Parker, & Winch, 2016).

However, as of December 2018, only 3.2% of electricity generated in the State of Maryland came from renewable resources (U.S. Energy Information Administration, n.d.). While that amount seems small, it has quadrupled (from 258 MW to over 1,000 MW or the equivalent to powering 110,000 homes) since 2015 (Maryland Energy Administration, n.d.). This development has been spurred by the State's creation of incentives (e.g., grants, tax credits) for solar development as well as policy drivers that increase demand for renewable energy (i.e., renewable portfolio standard).



ABOVE: © KENT MASON

Although this increase in renewable energy contributes to emission reduction goals, its expansion comes with growing pains. The development of solar installations can require a large footprint of land. For example, a solar array to power 1,000 homes can require up to 32 acres of land (Ong, Campbell, Denholm, Margolis, & Heath, 2013). In communities across Maryland, conflicts between solar energy development and other land uses, particularly agriculture, have arisen. However, these conflicts can be greatly reduced, if not avoided entirely, with better targeting of solar energy development towards areas that are not highly valued for other land uses.

The Nature Conservancy is focused on tackling climate change and recognizes the importance of accelerating the development of renewable energy in Maryland. At the same time, we are committed to renewable energy development that minimizes or eliminates negative impacts on traditional land uses. To better understand the perspectives of stakeholders engaged in and/or impacted by renewable energy development in Maryland, The Nature Conservancy held listening sessions across the state. A summary from each session follows, with a more detailed compilation of what was discussed in each listening session provided in Appendix A. Our findings point to the potential for a bright future for renewable development in Maryland.

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METHODS

The Conservancy held three facilitated listening sessions in Frederick, Annapolis and Salisbury in October and November 2018. We invited representatives from key constituencies and sectors that are involved in and/or impacted by renewable energy development. These sessions were open to any impacted or interested Maryland resident. We specifically invited participation from several sectors: local and state government, renewable energy developers, utilities, government, agriculture and conservationists. A full list of attendees can be found in Appendix B. The goal of this report is to reflect the diverse perspectives shared by participants. We did not ask the participants to strive for consensus or develop recommendations.

The discussions at each session focused on four questions:

1. What is your interest in renewable energy development and how does it impact you/your constituents?
2. Where do you want to see renewable energy development?
3. What are the hurdles to the development of renewable resources in the areas discussed above?
4. How can we foster and incentivize innovation? What areas of innovation have you seen that excite you?

RESULTS

The results below are a high-level summary of the more detailed notes provided in Appendix A. Across all three sessions, the following three points consistently emerged from a large breadth of stakeholders.

- A shared focus on developing renewable energy in marginal and low-conflict lands will allow Marylanders to take advantage of the many benefits of renewable energy while avoiding potential negative impacts.
- Significant hurdles currently prohibit or disincentivize renewable energy development in desired locations (i.e., low-conflict lands). These hurdles provide opportunities to revise or create incentives and development drivers focused towards these types of lands. This could be done in many ways including, developing criteria for or designating specific areas comprised of or containing marginal and low conflict lands.
- State and local governments play a critical role in assuring success and fostering continued innovation. Working to coalesce around a common goal of increasing renewable energy development focused on marginal and low-conflict lands will get the best outcome for the State.

1 Why are you interested in renewable energy development and how does it impact you/your constituents?

Drivers of interest in renewable energy included both perceived benefits and negative impacts from expanded deployment of renewables in Maryland. Most stakeholders voiced an interest in potential economic benefits, including opportunities for income through the lease of private lands, job creation as well as cost savings from residential rooftop solar. Others were motivated by the potential to reduce emissions from energy production to mitigate the impacts of climate change.

As of December 2018, solar energy alone employed over 4,000 Marylanders (Solar Energy Industries Association, 2019).

Connected to their interest in emission reduction is an interest in improved air quality. The focus on air quality was focused mostly on those impacts to human health caused by fine particulate matter.

Electricity created by the combustion of fossil fuels releases several compounds that induce respiratory ailments including asthma, bronchitis and pulmonary inflammation (Union of Concerned Scientists, 2016).

Combustion of fossil fuels also negatively impacts water quality and supply. In the Chesapeake Bay, approximately one-third of nitrogen levels in the water (a nutrient that contributes to poor Bay health) come from deposition of nitrogen created in part by burning fossil fuels for electricity and transportation. Power plants also require a large amount of water for cooling and operations, negatively impacting local supply.

To power one home in the US, a coal-fired plant uses an average of 199 gallons of water per day and natural gas powerplants use 114 gallons (Castillo & Gutierrez, 2018).

Participants highlighted negative impacts due to the amount of land required for renewable energy production and provided examples of lands that are directly in conflict with this kind of development. The loss of prime productive agricultural lands was a major concern heard at all three listening sessions. We also heard concerns from participants around losing natural areas and their associated environmental services (e.g., clean water, clean air, wildlife habitat etc.). Cultural heritage and sense of place were also discussed at each session. Other areas of concern included the feasibility of new development given the existing grid and associated security concerns. Increase in energy price was also a concern mentioned in every session.

2 Where do you want to see renewable energy development?

According to a National Renewable Energy Lab analysis, Maryland has 404 GW of potential for solar renewable deployment (Lopez, Roberts, Heimiller, Blair, & Porro, 2012).

Each stakeholder identified several different physical locations across the landscape, based on their experience and that of the constituents they represent, that they would like to see renewable energy developed. These areas had something in common, they were marginalized or degraded lands. Marginal lands have a purpose but also the capacity to be compatible with renewable development (e.g. public facilities, parking lots, public and transmission rights-of-way, etc.). Degraded lands (e.g. Brownfields, industrial sites, abandoned mine lands, unused agricultural lands, lands with poor soil quality, etc) were developed for other industries or purposes but may be compatible with renewable development. These opportunities are spread across the state and land-use context from densely urban to rural. Participants often referred to these desirable areas for development as marginal lands, degraded or low-conflict areas.

ABOVE: © ADRIAN JONES, INTEGRATION AND APPLICATION NETWORK, UNIVERSITY OF MARYLAND CENTER FOR ENVIRONMENTAL SCIENCE

3 What are the hurdles to the development of renewable resources in the areas discussed above (marginal, degraded and low-conflict)?

One of the largest hurdles identified was the lack of focus on marginal and low-conflict land as the priority for development. Currently a regulated market drives renewable energy investments. This market often drives those investments to the cheapest and largest contiguous plots, which are often forested or used for agriculture. Discussions around reshaping how that market is regulated (incentives, siting criteria etc.) could shift the development to marginal, degraded or low-conflict areas. There were a broad range of other hurdles that fell into the categories of economic, financing, engineering and community resistance to projects. By evaluating each of these hurdles with a shared outcome of driving development to marginal or low conflict lands we can accelerate renewable deployment to maximize benefit and reduce negative impacts. Participants identified the critical role that state and local governments play in the process of removing hurdles. Although several hurdles were identified that fall outside of State and local jurisdictions, including, the reduction of federal tax credits, tariffs and international market costs of goods directly related to development.

4 How can we foster and incentivize innovation? What areas of innovation are the most promising?

There was a wide range of items identified here from MDOT's work standardizing contracts and unlocking public lands to technological improvements to drive down price and increase efficiency of these resources. The importance of storage was also identified in all three sessions as an important technological hurdle to incorporate more renewables onto the grid in a sustainable manner. Several participants referenced successful projects, with the Chesapeake College solar array referenced frequently. Participants appreciated how it was built over the parking lot and marginal field areas and didn't impact the other land-uses on the site. Innovation in the renewable energy space is a critical component of success and we need to continue to foster, publicize and incorporate these accomplishments into policy and regulations.

APPENDIX A

Why are you interested in renewable energy development and how does it impact you/your constituents?

Land-Use

Natural Resource Protection: Concerns about the loss of existing contiguous areas of forest and other natural cover to renewable development. Interests in how environmental services (habitat, clean water etc.) will be weighed when evaluating sites. Interests in potential tradeoffs between natural resources and reducing emissions.

Agricultural Productivity: Concerns over loss of productive farmland to renewable energy development, landowner vs. leasing farmer (60% of rural land are not owned by farm owners). Currently, revenue for leasing land for solar development can substantially exceed revenues from leasing to farmers. Potential impacts to agricultural heritage. Concerns over ever growing need for food production in response to population growth and how that is weighed against lease values for solar development. Concerns over the impact to other parts of the agricultural economy with the loss of farmlands to solar development. Costs for leasing for solar land far exceed that for farming. Interested in the ability to incorporate solar panels to offset some costs and make some farms more profitable. Interested in potential energy savings from incorporating renewables into the agricultural landscape.

Cultural Heritage: Potential conflicts between important cultural sites and energy development and transmission.

Impacts to Legally Protected Lands: concerns over how lands under easement and enrolled in federal programs can be impacted/can be compatible with renewable deployment.

Environmental and Human Health

Air Quality: Improvements to air quality with a transition away from combustion-based energy sources. Nitrogen deposition reduction and water quality to the Bay. Reductions in particulate matter that lead to asthma.

Water Quality: Reducing nitrogen deposition to the Bay from fossil fuel combustion. Concerns over potential sediment and erosion issues on renewable energy sites, specifically solar.

Site Design Co-benefits: Utilizing new renewable energy sites for pollinator habitat and for stormwater management.

Healthy Soils: Concerns over losing healthy soils for agricultural production and carbon capture to large-scale solar development.

Human Health: Concerns over transmission buildout and substations on human health.

Economic

Economic Growth: Distributed job creation across the state (engineering, design, construction, installation, maintenance etc.). Growth of jobs that are ancillary and support the renewable energy industry.

Cost Savings: Reduction in energy costs to homeowners, businesses and governments.

Price of Energy: Concerns over cost of energy due to lower costs of fossil fuels for electricity generation and need for increased investment in infrastructure to accommodate a more distributed energy supply. Concerns over existing subsidies for fossil fuels that make renewable sources far less competitive. Concerns over the increased price of electricity due to the cost of complying with several state mandates. Concerns over impact on congestion pricing and peak demand pricing.

Economic Loss: Losses in the agricultural community to farmers who lose their leases to solar generation. Cost of electricity for public infrastructure being passed on to tax payers.

Grid Function and Security

Delivery: Concern over impacts to the grid of going to a distributed energy generation system. Concerns over remote areas and critical infrastructure getting consistent supplies of energy.

Threats: Concerns over the grids susceptibility to terrorism/hacking, natural disasters and a fossil fuel supply.

Long-term Planning

Governance decisions: Impacting ability for local governments to develop long-term planning documents. Impacts from development are felt in many ways by the counties and municipalities, but also provide opportunities for reducing costs, creating another economic driver. Parallels to expansion of Big Box stores, concern over taking large amounts of land and putting them into a land use that can last for a long-time (Scale issue).

Retrofitting Current Infrastructure: Re-envisioning of our current infrastructure, how can we maximize that use. Large impervious surface areas to be retrofitted, further public asset development.

New Infrastructure Investment: Impacts decisions about state and local spending, weighed against other infrastructure projects.

Scale and scope of projects: Existing regulations require different processes and regulatory pathways to develop and deploy projects.

Maximize Existing Land Use Context: How does the state provide opportunities for development that's based on their land-use context (blending methane capture at sewage treatment, animal waste facilities etc.).

Meeting Existing Statutory Requirements: Interplay between deployment and meeting Renewable Portfolio Standard and Greenhouse Gas Emissions Reduction Program.

Existing Regulated Areas: Land use planning concerns for state agencies and localities in highly regulated areas like the Critical Areas.

Where do you want to see Renewable Energy Development in Your Context?

General Principles

Where communities support development, where impacts are minimized or mitigated, compatible with local land-use plans, state designated areas, high energy use areas, areas with lower dependability power supplies and compatible with natural resources and access to existing transmission infrastructure.

Renewable Sources/Locations

Rooftops: dairy farms, individual homes, industrial complexes, parking garages and maximize solar where economically feasible.

Industrial: industrial facilities, vacant industrial lands, warehouses, parking lots, storage facilities and piers.

Marginal Lands: rough terrain, poor soil quality, unused agricultural lands, land threatened by saltwater intrusion, vacant homes and derelict urban areas.

Within Context of Existing Land-Use: Methane trapping, anaerobic digestion, co-generation and renewables at existing coal plants.

Public Right-Of-Ways: Transmission, highway medians, noise walls and traffic circles.

Brownfields: abandoned mine sits, brownfields, landfills, dredge material sites and remediated superfund sites.

Parking Lots: public/private lots, kiss and rides, airports and trucking/shipping storage areas.

Developed Lands in Urban Settings: close to substations or distribution infrastructure, incorporated into new development and over impervious areas.

Public Facilities: schools, government offices, military installations, airports, MDOT landlocked properties and stormwater ponds.

Mobile Sources: ships, electric vehicles, and signs.

Offshore Wind: further development in the Atlantic.

What are the hurdles to seeing in development of renewable resources in the areas discussed above?

General: Need for a comprehensive plan and designated leader. Proactive, blend of feasibility/community driven, increased transparency about permitting and decision-making, the way energy is stacked, priced and sold, long-term certainty of private land-use is a major issue that impacts financing, private engagement and being compliant with local laws ((SOLUTION: develop multi-decadal plan, utilize PPAs, long-term contracts)) push back from traditional energy sources.

Public Lands: Competing interests (safety, operation & maintenance, utility use, federal regulations [ex. Solar canopies and charging stations could be considered commercialization].

Private Property: property rights, landowner relationships with industry (bad actors can/have poisoned the wells at times).

Economic Hurdles: Job loss from traditional energy sector, cost of upgrading infrastructure to accommodate a more distributed energy source, Cost of on-site use (it may be that generating the energy on-site is more expensive than purchasing from fossil fuel sources over time.), rental rates for properties for solar leases being publicly available.

Financing Hurdles: financing for installation on properties, regulatory hurdles to ability to spread financing out across community (community solar), depressed SREC market (prices dropped by two orders of magniture), tariffs on solar panels, tariffs on aluminum and steel for construction, working with private property owners requires extended time, effort and fiscal resources to educate and plan with land owner. Financing associated infrastructure retrofits to be able to accommodate solar panels, monthly fees for grid use.

Engineering Hurdles: Transmission capacity on existing infrastructure, lack of sensor technology in the grid, lack of storage capacity, maintaining consistency, initial infrastructure not designed for weight bearing solar panels and structures to support them (roofs, parking structures, etc.), interconnection process, restricted circuits among some utilities, takes a significant amount of acreage for solar to replace the production of a coal powered plant.

Community Resistance: property rights for large scale, aesthetic concerns and loss of access.

Local Zoning/Land-use Planning: local ordinances can limit areas where renewables can be developed.

State Drivers: Renewable portfolio standard driving investment and development out of state/PJM.

Cost of on-site use: potential that generating the energy on-site is more expensive than purchasing from fossil fuel sources over time.

What innovation have you seen in the space that excites you? How can we foster and incentivize innovation?

Technological Advancements: more efficient wind turbines (longer blades, large turbines make offshore wind capture far more efficient), incorporation of storage capacity to solar/wind projects allowing them to be far more feasible, electric vehicles and their ability to function as storage capacity, incorporation of smart grid technologies (i.e. sensors).

Pilot projects: Chesapeake College as ideal project, blend of parking lot cover and marginal land retrofit led to 10 acres of solar, demonstrates re-imagining the utilization of the space. MDA's Animal Waste Technology Fund, solar panels on light poles and existing public infrastructure, projects that incorporate the context of the existing land-use (ex. algae in bio-digesters in the port or methane capture on dairy farms) to offset costs of incorporating more renewable/energy efficiency practices sources on site.

Incentives: Increasing access to grants and funding, pairing energy efficiency savings with access to financing renewables, increasing requirements in the renewable portfolio standard, implementing prioritization policies geared towards sustainably sited renewables, allowing certain renewables to count towards other regulatory requirements for clean water (due to reduction of nitrogen deposition), developing further incentives/making existing incentives compatible with marginal land development for renewable energy.

Stream line permitting and contracting: developing a pipeline of "wish list" projects to be put out to bid, reduces upfront costs and creates template and pathway for private landowners, local and state government to follow to reduce upfront soft costs.

Education: Improve communication around successful projects, centralize and distribute information. Improve public perception and allow for discourse over benefits.

APPENDIX B

List of Participating Organizations

Rural Maryland Council

Frederick County Government

Frederick County Council

Maryland Farm Bureau Staff

Maryland Farm Bureau Members

Sierra Club

City of Salisbury

Deep Water Wind

Maryland Critical Areas Commission

Ground Star Energy

Maryland Grain Producers Association

Maryland Department of Transportation

Maryland Department of Agriculture

Maryland Department of Natural Resources

Powerplant Research Program

Chesapeake Bay Foundation

GHG Engineering

Preservation Maryland

The Nature Conservancy

Maryland Citizens

References

1. Akerlof, K., Parker, C., & Winch, P. (2016). *Public Knowledge, Behaviors & Preferences about Energy & Transportation.* George Mason University and Johns Hopkins Bloomberg School of Public Health. Fairfax, VA: George Mason University Center for Climate Change Communication. Retrieved from http://climatechangecommunication.org/wp-content/uploads/2016/10/2016-MD-Survey-Energy-Transportation-Report-100216.pdf
2. Daymark Energy Advisors, RLC Engineering, & ESS Group (2018, November). *Benefits and Costs of Utility Scale and Behind the Meter Solar Resources in Maryland.* Wooster, MA: Author.
3. https://www.eia.gov/state/?sid=MD#tabs-4
4. U.S. Energy Information Administration (n.d.). U.S. States. In *Maryland State Profile and Energy Estimates*. Retrieved from https://www.eia.gov/state/?sid=MD#tabs-4
5. https://energy.maryland.gov/Pages/Info/renewable/solar.aspx
6. Maryland Energy Administration. (n.d.). Solar Energy Progress. Retrieved from https://energy.maryland.gov/Pages/Info/renewable/solar.aspx
7. https://mde.state.md.us/programs/Marylander/Documents/MCCC/Publications/2016Report/MCCC_2016_final.pdf
8. Maryland Commission on Climate Change. (2016) *2016 Annual Report.* Retrieved from Maryland Commission on Climate Change website: https://mde.state.md.us/programs/Marylander/Documents/MCCC/Publications/2016Report/MCCC_2016_final.pdf
9. https://www.seia.org/state-solar-policy/maryland-solar

10. Solar Energy Industries Association (2019, March). *Solar Spotlight – Maryland.* Retrieved from https://www.seia.org/sites/default/files/2019-03/Federal_2019Q1_Maryland.pdf

11. https://www.scientificamerican.com/article/renewable-energy-saves-water-and-creates-jobs/

12. Castillo, L., & Gutierrez, W. (2018). Renewable Energy Saves Water and Creates Jobs. *Scientific American*. Retrieved from https://www.scientificamerican.com/article/renewable-energy-saves-water-and-creates-jobs/?redirect=1

13. https://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/hidden-cost-of-fossils Union of Concerned Scientists. (2016). *The Hidden Costs of Fossil Fuels.* Retrieved from https://www.ucsusa.org/clean-energy/coal-and-other-fossil-fuels/hidden-cost-of-fossils

14. Lopez, A., Roberts, B., Heimiller, D., Blair, N., & Porro, G., (2012, July). *U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis.* Oak Ridge, TN: http://www.osti.gov/bridge.

15. Ong, S., Campbell, C., Denholm, P., Margolis, R., & Heath, G., (2013, June). *Land-Use Requirements for Solar Power Plants in the United States.* Oak Ridge, TN: http://www.osti.gov/bridge.