DELAWARE'S Climate Action Plan

Technical Advisory Workshop Summary
Round 1: March 2020

KLA KIM LUNDGREN ASSOCIATES, INC.
Customized Solutions for the Community You Want

This report was prepared by Kim Lundgren Associates, Inc. (KLA) on behalf of the Delaware Department of Natural Resources and Environmental Control.

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OVERVIEW

Over the course of 2020, the State of Delaware will be working to put together the state's first comprehensive Climate Action Plan. The Plan will outline how the State will drive reductions of the greenhouse gas emissions that cause climate change and better prepare Delaware for its many impacts, from increasing temperatures to sunny day flooding and sea level rise. Developed hand-in-hand with residents, business leaders, and local governments, the Plan will contain strategies that fit the unique needs and desires of Delaware's constituents.

As part of the Climate Action Plan (CAP) development process, the State of Delaware, through the Department of Natural Resources and Environmental Control (DNREC) Division of Climate, Coastal, & Energy (DCCE), convened a Technical Advisory Workshop on March 4, 2020, at the Buena Vista Center in New Castle, Delaware. Invited Workshop participants consisted of professionals and experts working in the energy, transportation, industrial, and buildings sectors. This group of technical advisors represented a cross-section of public, private, academic, and non-profit entities. A total of 25 people participated in the Workshop; a full list of participants is provided in Appendix 4.

The purpose of the Workshop was to solicit input on the types of actions that should be implemented for the State to reach its greenhouse gas (GHG) emissions reduction goal (at least 26% reduction by 2025 from a 2005 baseline). Participants were also asked to assess the viability of certain climate mitigation strategies, methods for implementation, and examples of best practices for sector-specific emissions reductions. Given the key role businesses and industries will play in supporting and implementing the mitigation strategies selected as part of the CAP, DNREC understands the importance of engaging stakeholders in targeted dialogue and discussion to best inform the Climate Action Plan.

THE APPROACH

Opening Presentation

The Workshop opened with a welcome from DNREC Secretary Shawn M. Garvin and a presentation by DCCE Director Dayna Cobb (the presentation slides can be found in Appendix 1). Ms. Cobb provided an overview of the Climate Action Plan process, including work completed to date and DNREC's previous climate-related planning efforts upon which the Plan will be built. Members of the consultant team, Deb Harris (ICF) and Kari Hewitt (KLA), then provided some background on the GHG analysis that is under way, the process for developing potential climate change mitigation (i.e., GHG emissions reduction) strategies, and the types of programs and strategies already being implemented by many of the representatives participating in the workshop. The consultant team also shared results from a pre-workshop survey that was provided to all workshop registrants. The survey was intended to capture current perspectives and activities around climate action among sector-specific stakeholders. A summary of the pre-workshop survey results is depicted on the following page. The full survey results can be found in Appendix 3.

Secretary Shawn M. Garvin welcomes workshop participants.

Sector-Specific Breakout Discussions

Participants were then divided into sector-specific breakout discussion groups, each held in different rooms at the Buena Vista Center. Due to participant attendance, participants from the electric power sector and the industrial sector were convened as one breakout group. A transportation sector group and a buildings sector group also met for concurrent discussions.

Ideas to Reach Greenhouse Gas Emissions Reduction Goals

Each breakout group began their discussions by introducing themselves, including their role and the business or institution they were representing, as well as sharing some of their current efforts around climate mitigation and ideas.

Participants were then asked to brainstorm ideas about what types of strategies or programs they would recommend for reaching the state's GHG emissions reduction goals. They were asked to think on this question from both the perspective of State leadership as well as economic sector leadership. The following are some of the common ideas that emerged within each group. A full list of ideas documented is available in Appendix 5.

Transportation Sector

- Education and awareness raising program for residents/employees around transit and alternative commuting options
- Improved marketing of transportation funding opportunities
- Pilot electric vehicle (EV) and charging infrastructure programs within public/private fleets
- Establish efficiency and alternative fuel strategies for freight network
- Allow public utilities to install EV charging stations
- Encourage private companies, State and municipal government, to limit air travel and adopt "green commuting" practices
- Establish regional transit connections (connections between existing transit routes/systems)

- Develop a comprehensive land use strategy/plan that supports transit-oriented development, efficient movement of vehicles, and support of EV charging

Buildings Sector

- Establish green building/sustainable design certification/recognition programs
- Training for builders/contractors/inspectors for energy efficiency, such as County code enforcement training
- Raise awareness of Property Assessed Clean Energy (PACE) financing
- Consider "net zero ready" for new construction/development
- Make Energize Delaware (the Delaware Sustainable Energy Utility) a one-stop shop for grants, resources, evaluation, education, promotion
- Benchmarking energy performance for commercial buildings
- Work with utilities on realistic renewable energy goals
- Further promote/advertise energy efficiency investment fund or "green bank"

Electric Power and Industrial Sectors

- Adjust rate structures to encourage renewables
- Invest in offshore wind projects
- Price externalities (social and environmental costs and benefits) into projects, procurement, and generation of energy (fold into mandate of Public Service Commission)
- Research to better understand barriers to greater EV adoption/investment in charging infrastructure
- Climate resiliency/adaptation should be required to be considered in any infrastructure design
- Incorporate requirements for in-state generation in state Renewable Portfolio Standard
- Educate customers on energy efficiency, solar energy, and EVs
- Explore more opportunities for battery storage to enhance viability of renewables

Mitigation Strategies Discussed

The second phase of the breakout discussions involved an exercise in which participants reviewed selected sector-specific mitigation strategies for their potential GHG emissions reduction and/or other benefits. The mitigation strategies discussed in this session were compiled by ICF and reflect GHG reduction actions common in other state and local climate and energy plans. Additional information about each strategy was also provided, including mitigation effectiveness, legislative requirements, initial investment, and potential costs or savings. These strategies were provided to participants to stimulate discussion and were not necessarily a reflection of what any individual mitigation strategy would look like if implemented in Delaware.

Participants were asked to place each strategy within one of the following sections of a matrix on the table:

Non-starter (or not relevant)	Willing to do it, but need resources (knowledge or funding)
Have done to a certain extent, but hitting major barriers	Already doing this; can be a resource/example for others

The mitigation strategies were provided to participants on printouts specific to their sector. The text from each of the sector-specific printouts is provided in Appendix 2. This exercise served as a way to engage participants in a discussion about the feasibility of each of the potential mitigation strategies and the opportunities to most effectively implement them (or conversely, the strategies that should not be strongly considered for implementation in Delaware). Some key highlights from each sector group's discussion follow. Detailed notes from these discussions are included in Appendix 5.

Transportation Sector

The Transportation Sector group works through the breakout exercise.

The strategies that had the most traction among the transportation sector breakout participants based on the matrix exercise were those related to expanding public transit, implementing a mileage-based user fee, and incentive programs for more fuel-efficient vehicles, all of which have been research-tested, piloted, or implemented in some way in Delaware and could be built upon moving forward. There was significant willingness to expand freight best practices for fuel efficiency and to implement more travel demand strategies, with an awareness that additional resources are needed around best practice exchange and education. There was an interest in electric and other alternative fuel vehicles, but participants indicated that strategies that regulate vehicle manufacturers or carbon intensity of fuels would require much more education for adoption and implementation. Generally, there was agreement that more planning and education is needed in order to more broadly shift drivers and fleet managers to electric vehicles and to invest in the charging infrastructure needed to support them. Finally, participants expressed a number of concerns related to land use planning and proximity of transit to affordable housing. They indicated a need for better collaboration between State and local decision-makers for strategic and intentional planning for housing, economic development, and transportation needs that is able to overcome "not in my backyard" perceptions, traffic concerns, and social inequities.

Buildings Sector

Buildings sector participants' responses to this exercise indicate that the state has a strong foundation of energy efficiency programs, including low-income and weatherization assistance programs. However, what emerged was calls to further expand such programs, including more commercial scale programs, and the need to create more innovative financing structures through programs such as PACE or the Green Bank. Participants indicated much more hesitance around building electrification and expressed some concerns about the implications of building electrification and EV charging infrastructure impacting overall electricity demand. Most participants indicated willingness to engage on such efforts but conveyed a need for more education, training, and exchange of ideas surrounding best practices. Similarly, participants were willing to explore strategies to reduce the use of high-global warming potential (GWP) refrigerants, such as hydrofluorocarbons (potent greenhouse gases), in building products/processes but need additional financial or technical resources to do so. Similar to other breakout groups, a common theme that emerged was an overarching need for better messaging, communication, and collaboration among developers across the state and the general public about the benefits of investments in energy efficiency, clean energy, and electrification.

Electric Power and Industrial Sectors

There was a much greater spread of strategies across the matrix options within this breakout group. This was likely due to the diversity of participants across utilities, private industrial companies, and institutions. Among this group's participants, there was not much traction on strategies related to the use of low-GWP materials and alternatives. It is possible that this is because the stakeholders present were not those directly working with or responsible for procuring such products. Therefore, it should not be assumed that there is no opportunity for

the State to further explore these strategies. There was also limited interest and/or understanding of opportunities to reduce GHG emissions through waste diversion strategies. This, again, may be reflective of the participants ability to directly influence such strategies within their respective companies/institutions.

The strategies with the most traction among this group's participants were those related to increasing renewable energy generation, particularly in-state or on-site, and also increasing the shift to electric vehicles, with the understanding that the electricity demand for those vehicles should increasingly be met through renewable energy sources. Regarding renewable energy, participants indicated a need for further defining and promoting the business case (economic value) of renewables, a need for provision of solar financing programs, and research into battery storage technology.

Next Steps

The Technical Advisory Workshop provided a unique opportunity to bring together a deeply knowledgeable interdisciplinary and cross-sector group to have robust conversations about the feasibility and prioritization of climate change mitigation strategies that will be critical to achieving the State's GHG emissions reduction goals. All of the input is currently being taken into consideration as the consultant team works with DNREC to refine mitigation strategies and model their potential GHG emissions reduction benefits. Stakeholder input will also help the State understand key issues of concern and guide the state in prioritizing GHG emissions reduction strategies for the Climate Action Plan.

As the State and consultant team continue to refine and develop the Plan, DNREC staff will reach out to Workshop participants to solicit further feedback, including insights on best practices and lessons learned from participants' own efforts. Another workshop will be held early in the Fall to have further discussion on a refined set of GHG emissions reduction strategies and to discuss best pathways and resources needed for implementation of the strategies.

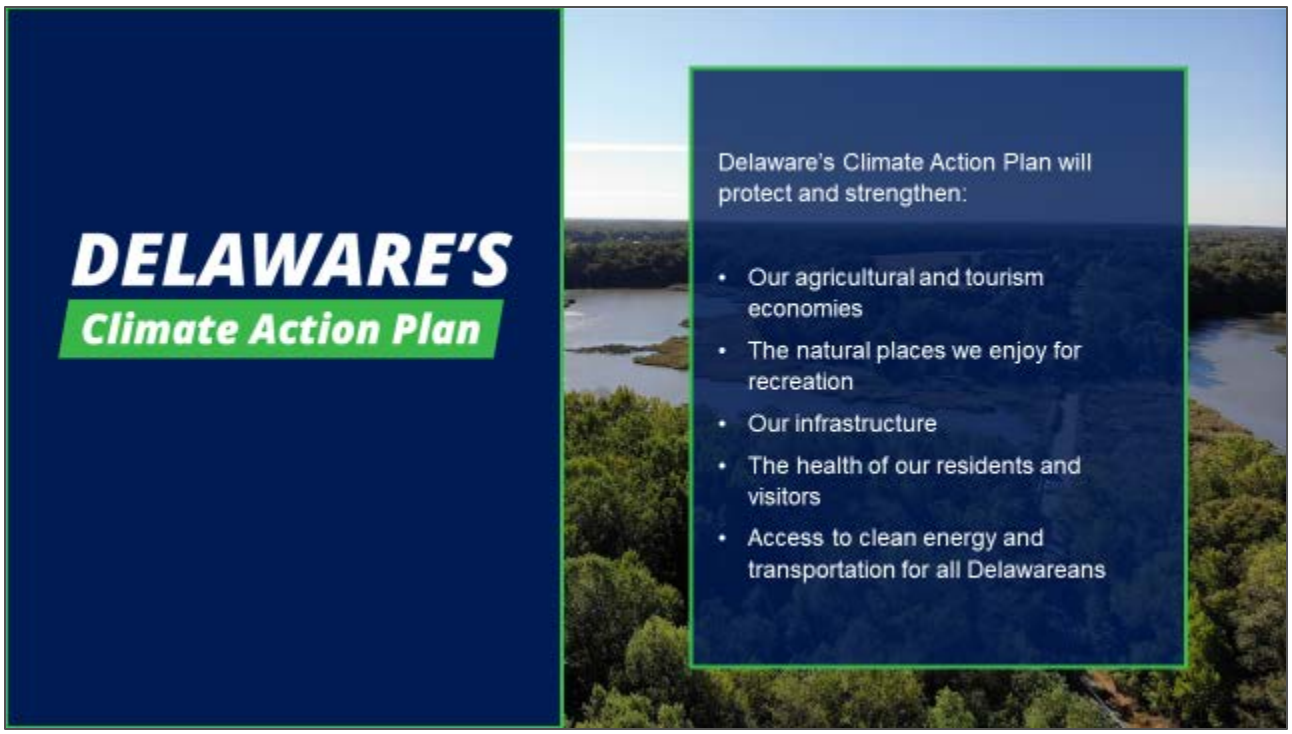
In the meantime, stakeholders should continue to engage discussion on climate change mitigation with each other and their colleagues and networks.

APPENDICES

APPENDIX 1. Delaware Climate Action Plan Overview Presentation

AGENDA

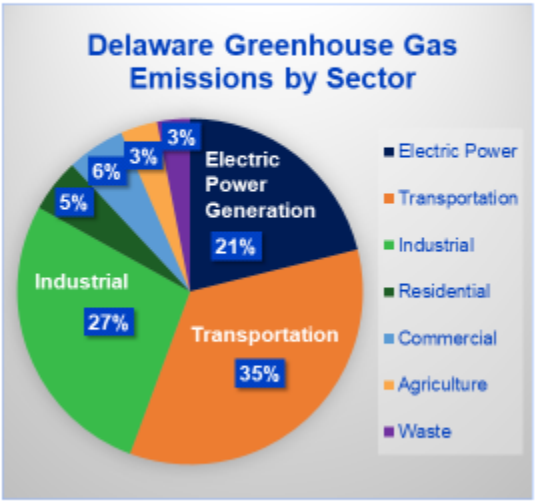
10:00 – 10:40	**Welcome and Opening** **Secretary Shawn M. Garvin, Department of Natural Resources and Environmental Control (DNREC)**
10:00 – 10:40	Introduction
10:40 – 10:45	*Move to break-out rooms*
10:45 – 12:00	Working Session One
12:00 – 12:55	Lunch
12:55 – 1:00	*Move to break-out rooms*
1:00 – 2:00	Working Session Two
2:00 – 2:15	Open Input Opportunity
2:15 – 2:30	Reconvene and Wrap Up of the Day
	• Opportunities for input • Anticipated 2nd round Sessions


DELAWARE'S
Climate Action Plan
Delaware's Climate Action Plan will protect and strengthen:
• Our agricultural and tourism economies
• The natural places we enjoy for recreation
• Our infrastructure
• The health of our residents and visitors
• Access to clean energy and transportation for all Delawareans


The plan will consider solutions in a variety of areas, including:
Renewable Energy (wind and solar)
Agriculture and Conservation
Energy Efficiency and Industrial Refrigerants
Support for local communities (technical assistance, grant funding)
Clean Transportation (public transit, electric vehicles)
Partnerships with other states

Greenhouse Gases

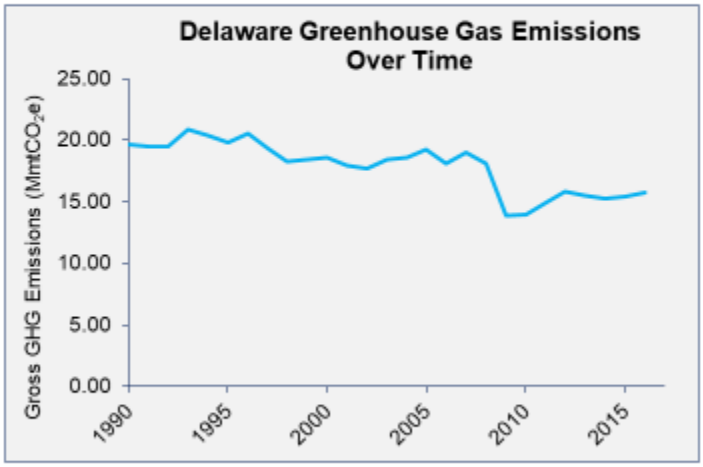
- Greenhouse gases (GHG) are vapors in the atmosphere that trap heat around the earth (like carbon dioxide)
- Since the mid-1800s, humans have released a significant amount of GHGs into the atmosphere
- In the U.S., most GHGs come from burning fossil fuels for electricity, heat, and transportation
- An increased amount of GHGs in the atmosphere has led to rising temperatures and other long-term changes in the climate



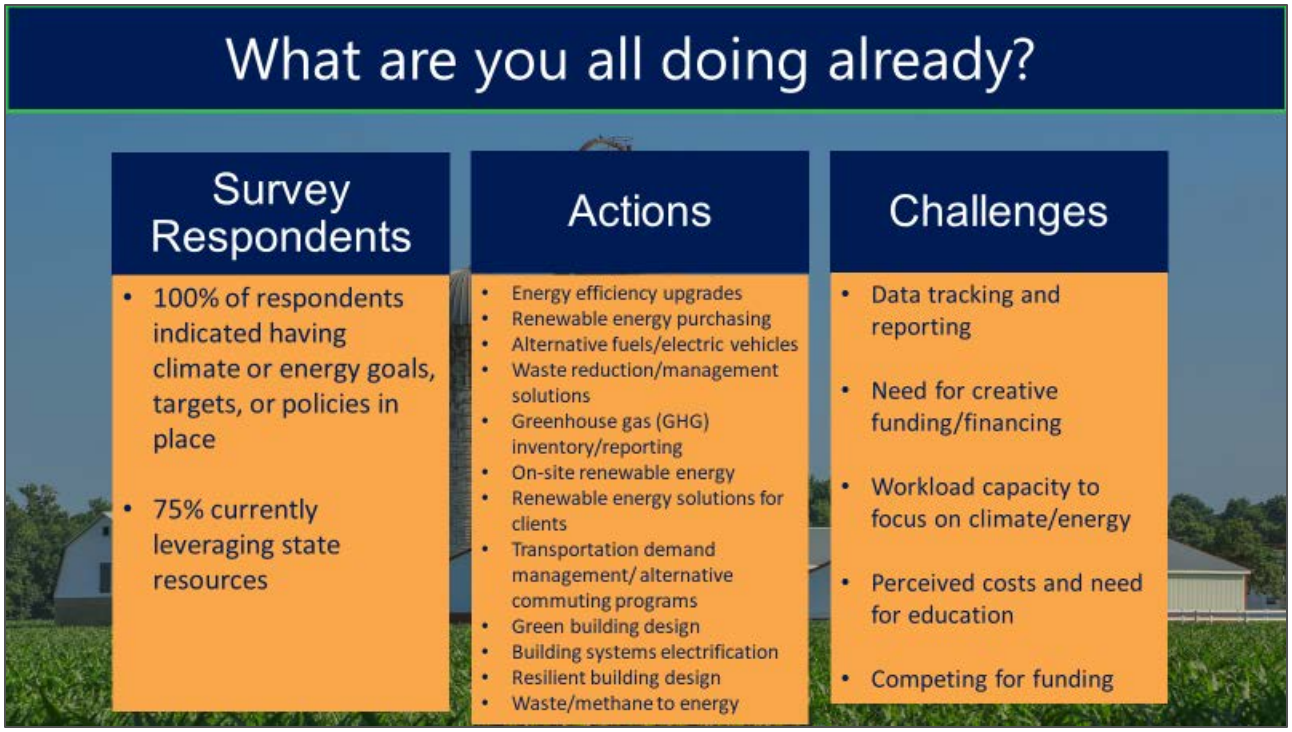
Source: Delaware 2016 Greenhouse Gas Inventory

Greenhouse Gases in Delaware

- Delaware's primary sources of GHGs are from transportation (35%), electric power generation (21%), and industrial (27%)
- Delaware has made a commitment to reduce GHG emissions by 26% below 2005 levels by 2025
- So far, Delaware has reduced GHG emissions by about 18%, the state is looking for solutions to ensure it meets its goal



Source: Delaware 2016 GHG Inventory


What are you all doing already?
Survey Respondents
100% of respondents indicated having climate or energy goals, targets, or policies in place
75% currently leveraging state resources
Actions
Energy efficiency upgrades
Renewable energy purchasing
Alternative fuels/electric vehicles
Waste reduction/management solutions
Greenhouse gas (GHG) inventory/reporting
On-site renewable energy
Renewable energy solutions for clients
Transportation demand management/ alternative commuting programs
Green building design
Building systems electrification
Resilient building design
Waste/methane to energy
Challenges
Data tracking and reporting
Need for creative funding/financing
Workload capacity to focus on climate/energy
Perceived costs and need for education
Competing for funding


MAKE YOUR VOICE HEARD
The success of this plan depends on public involvement.
In person
Attend a public meeting.
Online
Visit declimateplan.org. Engage online.
Word of Mouth
Tell your family, friends, neighbors, and coworkers.


CENTRAL HOT
THANK YOU
DELAWARE'S
Climate Action Plan

APPENDIX 2. Mitigation Strategies Discussed in Breakout Sessions

As noted in the report, breakout groups were tasked with reviewing selected sector-specific mitigation strategies for their potential GHG emissions reduction and/or other benefits. The mitigation strategies discussed in this session were compiled by ICF and reflect GHG reduction actions common in other state and local climate and energy plans. Additional information about each strategy was also provided, including mitigation effectiveness, legislative requirements, initial investment, and potential costs or savings. These strategies were provided to participants to stimulate discussion and were not necessarily a reflection of what any individual mitigation strategy would look like if implemented in Delaware.

The mitigation strategies were provided to participants on a printout specific to their sector. This appendix includes, verbatim, the text from each of the sector-specific printouts used at the workshop.

Transportation Sector Actions for Consideration for the Delaware Climate Action Plan

This document contains a draft list of potential climate actions (i.e., greenhouse gas reduction actions) consideration for the Delaware Climate Action Plan. This document and draft action list were prepared by ICF for discussion in this technical workshop.

Commonly Used Acronyms:

- *GHG emissions* – greenhouse gas emissions (carbon dioxide [CO_2], methane [CH_4], nitrous oxide [N_2O], and others)
- *EE* – energy efficiency; related to programs and policies that conserve energy
- *RE* – renewable energy sources such as solar photovoltaics, wind power, and biomass
- *GWP* – global warming potential; reflects a GHG's capacity for trapping heat in the atmosphere
- *EV* – electric vehicle; uses only electricity in operations
- *PHEV* – plug-in hybrid electric vehicle; uses both electricity from a charging station and fossil fuels
- *ZEV* – zero emission vehicles; vehicles with zero tailpipe emissions or much lower emissions than internal combustion engine vehicles
- *RNG* – renewable natural gas; natural gas from biogenic sources such as biogas

Definitions:

- **Legislation Required** – Is legislation required to implement the actions?
  - Yes – Legislation is required
  - No – Legislation is not required
- **GHG Mitigation Effectiveness** – What relative effect will the action have on GHG emissions?
  - High – will have an effect on a sector with a relatively large portion of GHG emissions and may result in relatively larger reductions
  - Medium – between high and low
  - Low – will have an effect on a sector with a relatively small portion of GHG emissions and may result in relatively smaller reductions
- **Initial Investment by Implementers** – What will the potential scale of the initial investment by implementers be relative to other actions?
  - High – the initial investment for implementers may be relatively high compared to other actions
  - Medium – between high and low
  - Low – the initial investment for implementers may be relatively low compared to other actions
- **Potential Costs or Savings** – Will the total costs represent an overall savings or cost?

Mitigation Action	Legislation Required?	GHG Mitigation Effectiveness	Initial Investment by Implementers	Potential Costs or Savings?
Consumer outreach for expanded adoption of more fuel efficient vehicles	No	Medium	Low	Potential Savings
Incentive programs for expanded adoption of more fuel efficient vehicles	No	High	Medium	Potential Savings
Anti-idling	Yes	Low	Low	Potential Savings
Creating an EV Implementation program that advances EV adoption through increased infrastructure (charging stations, building codes, parking requirements), incentive programs (carpool lanes, purchasing, charging station), charging rate plans (off-peak, vehicle 2 grid), legislation (interoperability, time of use rates, states agencies to charge for charging stations, EV-ready building/parking, MUDs considerations)	Maybe	High	High	Potential Costs
Implementing regulations for requiring vehicle manufacturers to make available specific quantities of ZEVs, including EVs, PHEVs, and hydrogen fuel cell vehicles	Yes	High	High	Potential Costs
Expanded public transit infrastructure, increasing public transit ridership	No	High	High	Potential Costs
Encouraging development of a hydrogen vehicle market on the east coast by developing hydrogen fueling infrastructure, incentive programs for adoption, and other programs/legislation	No	Low	High	Potential Costs
State fleet electrification	No	Low	High	Potential Costs
Expanding public transit infrastructure and ridership in low-income regions	Maybe	Medium	High	Potential Costs
Strategic transportation planning through land-use policies and development to reduce vehicle miles traveled, expand public transit, expand non-motorized transit, etc.	Maybe	Medium	Low	Potential Costs
Low Carbon Fuel Program for assessing carbon intensity of fuels and giving credits for low-carbon fuels - based on California Air Resource Board's program that uses a cap and trade system	Yes	High	Medium	Potential Costs
Implement a Mileage-Based User Fee (MBUF) program	Yes	High	Medium	Potential Costs
Implementing travel demand strategies to changing demand and flow, reduce travel times, and avoid congestion through high-occupancy vehicle (HOV) lanes, traffic signal timing, consumer outreach for changing behaviors, and other alternatives.	No	Low	Medium	Potential Costs
Expanding freight best practices for fuel efficiency and emission reductions: emissions regulations, efficiency standards, mode switching, route optimization	No	Medium	Medium	Potential Savings

Residential and Commercial Buildings Sector Actions for Consideration for the Delaware Climate Action Plan

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- *GWP* – global warming potential; reflects a GHG's capacity for trapping heat in the atmosphere
- *EV* – electric vehicle; uses only electricity in operations
- *PHEV* – plug-in hybrid electric vehicle; uses both electricity from a charging station and fossil fuels
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Definitions:

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- **GHG Mitigation Effectiveness** – What relative effect will the action have on GHG emissions?
    - High – will have an effect on a sector with a relatively large portion of GHG emissions and may result in relatively larger reductions
    - Medium – between high and low
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- **Initial Investment by Implementers** – What will the potential scale of the initial investment by implementers be relative to other actions?
    - High – the initial investment for implementers may be relatively high compared to other actions
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- **Potential Costs or Savings** – Will the total costs represent an overall savings or cost?

Mitigation Action	Legislation Required?	GHG Mitigation Effectiveness	Initial Investment by Implementers	Potential Costs or Savings?
Building energy codes: Net-zero residential and commercial appendices in 2021 International Energy Conservation Code (IECC, continued 16 Del. C. §7602 implementation) projected stringency increases in future IECC and American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) standards, increased code compliance and enforcement to meet goals, increase baseline energy code compliance with model energy codes	Yes	High	Medium	Potential Savings
Expansion of residential EE programs (sustainable energy utility programs [SEU], ongoing evaluation, monitoring and verification, DE State Housing Authority programs)	No	High	Medium	Potential Savings
Development or expansion of commercial building EE programs	No	High	Medium	Potential Savings
Installing renewable energy on-site at residential and commercial buildings	Maybe	High	Medium	Potential Savings
Peak energy demand reduction; especially if electrification increases peak demand	No	Low	High	Potential Costs
Capturing and reusing stormwater on-site	No	Low	Low	Potential Costs
Increasing water conservation in new and existing buildings	Maybe	Low	Low	Potential Savings
Reducing use of high-GWP refrigerants and hydrofluorocarbons (HFCs)	Maybe	Low	Low	Potential Costs
Expansion of low-income housing renewable energy and EE programs: SEU, solar program, Replacing Repairing Heaters and Conserving Energy (RRHACE), Low Income Home Energy Assistance Program (LIHEAP), Weatherization Assistance Program (WAP)	No	Medium	Low	Potential Savings
Building electrification: retrofitting existing buildings	Maybe	High	High	Potential Costs
Building electrification: new building construction requirements	Maybe	High	Medium	Potential Costs
Improved monitoring and evaluation programs for building energy consumption	No	Medium	Medium	Potential Savings
Supporting buildings EE and RE investment through Green Bank and other financing mechanisms, including Property Assessed Clean Energy (PACE) programs and on-bill financing; and bundling financing with buildings EE and RE strategies	No	Medium	Medium	Potential Savings
Commercial and residential energy storage systems, including EVs in vehicle-to-grid applications	No	Medium	High	Potential Costs

Electricity Sector Draft Actions for Consideration for the Delaware Climate Action Plan

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Commonly Used Acronyms:

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- **Potential Costs or Savings** – Will the total costs represent an overall savings or cost?

Mitigation Action	Legislation Required?	GHG Mitigation Effectiveness	Initial Investment by Implementers	Potential Costs or Savings?
Expanded Renewable Portfolio Standard: 100% renewable electricity in grid by 2045, 40% by 2035, 25% by 2025	Yes	High	High	Potential Costs
Creating an EV Implementation program that advances EV adoption through increased infrastructure (charging stations, building codes, parking requirements), incentive programs (carpool lanes, purchasing, charging station), charging rate plans (off-peak, vehicle 2 grid), legislation (interoperability, time of use rates, states agencies to charge for charging stations, EV-ready building/parking, utility considerations)	Maybe	Medium	High	Potential Costs
Increasing demand for EV charging infrastructure	Maybe	Medium	High	Potential Costs
Peak energy demand reduction	No	Low	High	Potential Costs
Installing renewable energy on-site at industrial sites, residential and commercial buildings	Maybe	High	Medium	Potential Savings

Industrial and Related Sector Actions for Consideration for the Delaware Climate Action Plan

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Commonly Used Acronyms:

- *GHG emissions* – greenhouse gas emissions (carbon dioxide [CO_2], methane [CH_4], nitrous oxide [N_2O], and others)
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    - Low – the initial investment for implementers may be relatively low compared to other actions
- **Potential Costs or Savings** – Will the total costs represent an overall savings or cost?

Sector	Mitigation Action	Legislation Required?	GHG Mitigation Effectiveness	Initial Investment by Implementers	Potential Costs or Savings?
Industrial Energy Use	EE improvements: updating siting and permitting regulations that could set GHG emission requirements	Yes	High	Cost Savings	Potential Savings
Industrial Energy Use	EE improvements: lighting systems, motor systems, air compressors, materials handling equipment, process improvements	Yes	High	Cost Savings to consumers, program implementation and support costs to state	Potential Savings
Industrial Energy Use	EE improvements: operational reviews and improvements, e.g. reducing operating hours for specific equipment	No	High	Cost Savings	Potential Savings
Industrial Energy Use	EE improvements: outreach and training	No	Low	Cost Savings	Potential Savings
Industrial Emission Controls	Improved emission controls on-site: carbon capture, scrubbing	Maybe	Low	High	Potential Costs
Industrial Refrigerants	Expand use of low-GWP refrigerants: EPA Significant New Alternatives Policy (SNAP)-like program, incentivizing low-GWP refrigerant use, developing refrigerant management plan based on EPA Section 608	Maybe	Low	Low	Potential Costs
HFCs and High-GWP Materials	Implementing programs to manage hydrofluorocarbons (HFCs) and other high-GWP materials throughout the product lifetime: installation, maintenance, disposal, reclamation	Yes	Low	Medium	Potential Costs
Industrial Energy Use	Expanded combined heat and power (CHP) programs	Maybe	Low	Low	Potential Savings
Industrial Energy Use	Installing renewable energy on-site	Maybe	Low	Medium	Potential Savings
Industrial Energy Use	Expanded renewable energy consumption: programs for support	No	Medium	Medium	Potential Costs
Industrial Emission Controls	Methane emission reductions: improved controls and monitoring, capture for reuse	Yes	Medium	Medium	Potential Costs
Waste	Limiting packaging materials to more recyclable or compostable materials	Yes	Low	Medium	Potential Costs
Waste	Waste diversion from landfills: increased recycling, organic waste diversion (composting, land application, animal feed, etc.)	No	Low	Medium	Potential Costs
Wastewater	Expanding methane capture for flaring or renewable energy use	No	Low	Medium	Potential Costs

APPENDIX 3. Pre-Workshop Survey and Responses

Total Number of Respondents: 13

Question 1. Does your company/organization currently have any climate-or energy-related targets, goals, or policies?

Answer Choices	Responses	
Yes	100%	13
No	0%	0
If yes, describe briefly.		
	Answered	13
	Skipped	0

If yes, describe briefly:

We have goal set for our program through EEAC participation
Our programs are funded by RGGI and so we have energy, emissions and carbon reduction requirements for the majority of the Energize Delaware programs we offer.
We have short and long term goals that will drive to completion identified trails and pathways throughout the State. Additional multi-modal opportunities for recreation and transportation reduce automobile usage.
We are active members of the Delaware EEAC, and Renewable Energy Taskforce. All of DEMEC Members have an energy efficiency program offering for all of their customers with a guaranteed amount of savings at the end of the 3 year program contract. We have adopted a Municipal Renewable Portfolio Standard.
WILMAPCO 2050 Regional Transportation Plan. Reduce VMT, promote clean transportation, support increased density.....
From 2019 onward, we follow our new target of CO2-neutral growth until 2030.
To reduce our carbon footprint by 50% by 2025 using 2005 as a base year.
Reduce emissions while maintaining cost and operating flexibility.
Striving to meet the targets listed in Executive Order 18
Green Building United (GBU) works convenes the Philadelphia 2030 District, a voluntary effort by the city's largest building owners and managers to reduce energy and water use by 50% by the year 2030. GBU calculates baselines for each participating building and tracks progress toward the goals. GBU reports the data publicly in aggregate alongside district-wide transportation emissions and stormwater management data.
Governor Markell's EO18
1. Increase adoption of clean power, specifically solar power statewide 2. Recycle 100% of recycle materials generated during operations 3. Reduce generation of non-recyclable waste
Vehicle fleet converting to alternative fuels, at the moment propane paratransit vehicles and electric buses and staff cars

Question 2. What efforts or actions is your company/organization currently engaged in as it relates to energy or climate action? Select all that apply.

Answer Choices	Responses	
Energy efficiency upgrades in our own facilities	54%	7
Energy efficiency solutions for clients/customers	54%	7
Renewable energy purchasing	38%	5
On-site renewable energy	31%	4
Renewable energy solutions for clients/customers	38%	5
Transportation demand management/ employee alternative commuting programs	31%	4
Alternative fuels/electric vehicles in our fleet/green fleet	46%	6
Green building design in our own facilities	31%	4
Green building design/solutions for our clients/customers	31%	4
Waste reduction/management solutions in our facilities	38%	5
Waste reduction/management solutions for our clients/customers	0%	0
Waste/methane to energy	8%	1
Use of low or no Global Warming Potential (GWP) refrigerants	0%	0
Carbon offset purchasing	0%	0
Resilient building design for our facilities	15%	2
Resilient building design for our clients/customers	15%	2
Building systems electrification	31%	4
Greenhouse gas (GHG) inventory/reporting	38%	5
Other (please specify)	8%	1
	Answered	13
	Skipped	0

Other (please specify):

Working collaboratively with others.

Question 3. What are your current challenges in either setting or achieving climate or energy goals?

Responses	
Answered	13
Skipped	0

Responses:

Where do I start?
Useful and accurate data collection and timeliness of reporting; some programs are behavioral so tracking data is difficult; some programs do not save energy or carbon, but assist in bringing client to the programs that do; having competing programs from other entities offering similar incentives or programs., etc.
Creative funding opportunities for multi-modal facilities
When it is economically viable, DEMEC has consistently diversified our portfolio. In accordance with our MRPS we have 26 MW of solar in the state. Our power supply is 88% low-to-no emissions and we are able to do this by having the local control to accommodate each community's unique needs and wants relating to climate and energy.
Shifting entrenched policies with respect to land development and transportation funding distribution.
not sure
Time and Dollars. Political interference.
End cost to customers.
Workload severely limits my time to learn more about ways to achieve climate and energy goals.
From our member/program participant perspective, perceived cost of building beyond code or retrofitting an existing building is a barrier to some. Education and case study examples help combat this. Deep energy retrofits are more difficult to commit to than picking off low hanging fruit with a shorter payback period (i.e. lighting.) Incentives and financing can help overcome this barrier.
Need for updated policies, funding
Education of our workforce. Solution for recycling of nonstandard sized pallets
Funding, budgetary Electric buses FTA grant applications/competitive process

Question 4. Have you been leveraging any State and/or Federal programs/resources to help meet your climate/energy goals to date?

Answer Choices	Responses	
Yes	77%	10
No	23%	3
If yes, describe briefly.		
	Answered	13
	Skipped	0

If yes, describe briefly:

USDA grants, partner with EEIF, several DNREC partnerships
We receive a Federal RCCP program that leverages additional resources for our Energize Delaware Farm Program; we often partner with DNREC, Div. of Coastal, Climate & Energy to provide programs that fill a gap or need in resources.
Funding for Master Plans
To increase energy savings opportunities, we pair our programs with state programs and resources. Such as the Energy Efficiency Investment Fund and our Efficiency Smart program.
Through power purchase agreements that can take advantage of tax credits.
We have utilized various grant funds primarily through DNREC
GBU connects its members and participants in its programs with state efficiency programs in both DE and PA.
DESEU
Green Energy Fund. SEU Solar loan and lighting rebate programs. Federal Tax Credit for Solar Power, Delaware Renewable Energy Task Force SREC Procurement Program
Governor directives to meet energy efficient goals

Question 5. How would you describe your industry?

Answer Choices	Responses	
Utility	15%	2
Technology	0%	0
Healthcare	0%	0
Government	31%	4
Education	0%	0
Financial	0%	0
Agriculture	0%	0
Other (please specify)	54%	7
	Answered	13
	Skipped	0

Other (please specify):

Non- Profit Energy Efficiency and Renewable Energy Program provider
Non-profit 501(c)3 organization - financial - similar to Green Bank
Non-Profit, Environmental
DEMEC is a political sub-division of the state and wholesale electric provider who is jointly owned by the municipal electric utilities in the State of Delaware.
Chemical
Non-profit membership organization
Construction

APPENDIX 4. Participant List

Name	Organization/Association
Tricia Arndt	Delaware Office of State Planning Coordination
Steve Baccino	Chesapeake Utilities
David Bacher	NRG Energy
Kathryn Bailey	BASF
Bahareh van Boekhold	Green Building United
Dale Davis	Delaware Solar Energy Coalition
Lauren DeVore	Sussex County
Tony DePrima	Delaware Sustainable Energy Utility
Jeremy Firestone	University of Delaware
Mike Fortner	City of Newark
Megan Garrett	DE Office of Management and Budget
Conor Gibbons	New Castle County
Emily Greene	Delaware Municipal Electric Corporation (DEMEC)
Kathleen Grier	RideShare Delaware
Stephanie Johnson	DelDOT
Willet Kempton	University of Delaware
Häly Laasme-McQuilkin	Delaware Department of Health & Social Services
Glenn Moore	Delmarva Power
Sara Parkison	University of Delaware
Chrissy Piechoski	Ashland Inc.
Mary Roth	Delaware Greenways
Suzanne Sebastian	Delaware Sustainable Energy Utility
Bill Swiatek	Wilmington Area Planning Council (WILMAPCO)
Brian Urbanek	DelDOT
Veronica Vanterpool	Delaware Transit Corporation (DART)

APPENDIX 5. Technical Advisory Workshop Detailed Notes

Ideas to Reach Greenhouse Gas Emissions Reduction Goals

Transportation Sector

New Ideas Put Forth
Provide education to high school students on navigation on public transit (can't hold next gen accountable)
Mode shift dates and dedicated goals (SMART goals) and funding--especially green modes of travel
Create a statewide commuter policy
Consider equity component
Free bus
Public private partnerships (PPP)
"Act Now" initiative
Mass CEC for a model
Local land use and growth development overlay district and transfer development rights
Funding and tech/planning assistance to all governments
Fix school bus formula
Research EVs
Experimental pilots of EVs
Address perceived safety (safe for kids program/initiative)
Energy efficiency opportunities for EV charging locations and truck stops (natural gas)
Address freight transportation (i.e. retrofitting trucks for last mile delivery)
MARAMA truck replacement (education and outreach)
Need an education strategy (policy and legislation already there)
Pathways to connect areas and regions (needs to be statewide)
Delmarva, regulatory approval--what role to play
$2 mil EV program (4 stations)--siting process. 2 level 2, 2 level 3 (expensive)
Learn how EV works, significant impact on the grid?
Look at potential EV rates?
Independent operators having a hard time
EV not a monopoly issue
Allow utilities to install charging
Challenge--economic model for stations
Demand charge is key
Buildings to require EV? (connect with Bill)
Highway projects, add infrastructure
$80 for 15 dual chargers
$30k for mod existing structure
Logistics efficiency programs
Commuting app for carpooling, statewide
Think through 2050 crossing bridge goals--actions are not market-based, need to serve investors
Fleet electrification segregated by range requirements, understand before purchase
Limit air travel (work)

New Ideas Put Forth
Training builders and contractors, installers
Building flexibility in programs - allowing things to move locally at decision point
Let individual buildings work with utilities on solar/renewable energy
Don't tie hands to specific technology (let market respond and compete)
Recognition programs (carrot) - leverage national certs, consider regional programs
PACE awareness
Tax credits/financial benefits - education/awareness
Understand rural v urban needs - NRG, pub utilities, water (wells) - education/awareness
Enforcement and verification - County code enforcement officer training
Expand commercial and industrial EE efforts
Increase EE for MF units in construction - all incomes, and major retrofits
For new buildings/development - land use - walkable, community resources (reduce VMT)
Concentrate on EE - consider Net Zero Ready (see 2011 targets, existing tools)
Ensure what is done is affordable, look at impacted populations (especially moderate income/working poor (350% of fed poverty level))
Make info sharing between programs easier
Address issue that all Delawareans contribute to RGGI but not all can access (address market inequity, public benefit charge)
Consider increase to Green NRG fund
Encourage/support grant funding and credits
Alternative energy affordability - include small biz community and agriculture
Make Energize Delaware (sustainable energy utility) a one-stop shop for grants, resources, evaluation, education, promotion
Benchmarking commercial buildings
Set equity policies
Focus on large NRG consumers - assess how EE will affect supply
Explore nuclear power
Look at gas/hydro - be cost conscious
Work with utilizes on realistic RE goals
Update GHG goal
Updates Gov's Lead by Example initiative
Share State best practices and case examples
Incentives for greater EE; going beyond code
Streamlined way to adopt next code (2018/2021 - clarify which) - and enforcement
Incorporate training with the code update - developers, construction, businesses, raters
Building to Net Zero Ready and EV Ready
Regenerative/carbon farming; can it be linked to low/mid income housing - offset market, funding for NRG efficiency and carbon clean - "green bank" concept
Look at federal programs for carbon sequestration
Education is critically important
EE investment Fund (EEIF): large EE investment grants
Discussions with NNREC/ind.
Added or highlight with others DNREC communications
How to target mid/large ind for EE, spending a lot with no ded resource
University/company building EE
U Delaware ind audit app, not always implemented
Heating electrification in buildings (new) and retrofits--does it make sense

New Ideas Put Forth
On-site PV for company or organization
Energy efficiency
Look at university endowment
UDel--look more at PV (new build)--sequestration

Electric Power and Industrial Sectors

New Ideas Put Forth
Change in rate structures to encourage renewables
Time of use metering
Res(?) metering
Incentivize renewables for more favorable ROI
Net zero by 2040
Offshore wind projects
Price externalities in projects, procurement, generation (fold into mandate of PSC)
Broaden the mandate of public advocate/rate council
Graduated rates for electricity ("subsistence rate" for example). Primarily residential, maybe small commercial. "Just transition"
"Balanced" statewide RPS. Who pays vs benefits. True costs
Balanced statewide EE program
Balanced statewide EV incentive program
Expand EV incentives
Better understand the barriers to purchasing EVs
Maximum electrification of State vehicles
Contract solicitation for offshore wind. Competitive bidding, "thoughtful", appropriately sized solicitation
Partner with Maryland (maybe NJ) on offshore wind
Batteries, batteries, batteries
Adaptation/resiliency needs to be considered in any design
EV infrastructure included in any transportation redevelopment
Incentivize telecommuting
Need more incentives for solar
Need to emphasize education on the benefits, not just costs
Maintaining economy needs to by a priority
RPS in DE--include requirements for in-state generation
EE incentives
Utility-clear direction on policy (to many things--spread thin, pick winners/losers)
Green energy, PPA by companies
Company incentives for EV/RE
Statewide educational opportunities. Field techs recognize EE opportunities to educate customers. Educate customers on EE, PV, EV

Mitigation Strategies Discussed

As noted in the report (and in Appendix 2), breakout groups were tasked with reviewing selected sector-specific mitigation strategies for their potential GHG emissions reduction and/or other benefits. Strategies for each sector were provided on individual paper printouts. The mitigation strategies discussed in this session were compiled by ICF and reflect GHG reduction actions common in other state and local climate and energy plans. Additional information about each strategy was also provided, including mitigation effectiveness, legislative requirements, initial investment, and potential costs or savings. These strategies were provided to participants to stimulate discussion and were not necessarily a reflection of what any individual mitigation strategy would look like if implemented in Delaware.

Participants were asked to place each strategy within one of four sections of a matrix that was placed on the table:

(1) Non-starter (or not relevant);
(2) Willing to do it, but need resources (knowledge or funding);
(3) Have done to a certain extent, but hitting major barriers; and
(4) Already doing this, can be a resource/example for others.

The mitigation strategies were provided to participants on printouts specific to their sector. The tables below indicate the sector-specific strategies discussed in each group and the voting results of the strategy placement exercise.

Transportation Sector

Mitigation Strategy	Votes Cast			
	Non-Starter or Not Relevant	Willing To Do It, Need Resources	Have Started, Hitting Barriers	Already Doing, Can Be Resource
Consumer outreach for expanded adoption of more fuel efficient vehicles	1	4	3	3
Incentive programs for expanded adoption of more fuel efficient vehicles	0	1	0	4
Creating an EV Implementation program that advances EV adoption through increased infrastructure, incentive programs, charging rate plans (off-peak, vehicle 2 grid), legislation (interoperability, time of use rates, etc.)	0	8	0	3
Implementing regulations for requiring vehicle manufacturers to make available specific quantities of ZEVs, including EVs, PHEVs, and hydrogen fuel cell vehicles,	6	3	1	0
Expanded public transit infrastructure, increasing public transit ridership	0	0	1	0
Encouraging development of a hydrogen vehicle market on the east coast by developing hydrogen fueling infrastructure, incentive programs for adoption, and other programs/legislation	4	4	1	0
State fleet electrification	1	2	4	1
Anti-idling	0	4	5	5

Mitigation Strategy	Votes Cast			
	Non-Starter or Not Relevant	Willing To Do It, Need Resources	Have Started, Hitting Barriers	Already Doing, Can Be Resource
Implement a Mileage-Based User Fee (MBUF) program	1	0	2	6
Strategic transportation planning through land-use policies and development to reduce vehicle miles traveled, expand public transit, expand non-motorized transit, etc.	0	1	4	3
Low Carbon Fuel Program for assessing carbon intensity of fuels and giving credits for low-carbon fuels - based on California Air Resource Board's program that uses a cap and trade system	4	3	1	0
Expanding public transit infrastructure and ridership in low-income regions	0	7	9	5
Implementing travel demand strategies to changing demand and flow, reduce travel times, and avoid congestion through high-occupancy vehicle (HOV) lanes, traffic signal timing, consumer outreach for changing behaviors, and other alternatives	0	3	4	3
Expanding freight best practices for fuel efficiency and emission reductions: emissions regulations, efficiency standards, mode switching, route optimization	0	8	0	0

Buildings Sector

Mitigation Strategy	Votes Cast			
	Non-Starter or Not Relevant	**Willing To Do It, Need Resources**	**Have Started, Hitting Barriers**	**Already Doing, Can Be Resource**
Expansion of low-income housing renewable energy and EE programs: SEU, solar program, Replacing Repairing Heaters and Conserving Energy (RRHACE), Low Income Home Energy Assistance Program (LIHEAP), Weatherization Assistance Program (WAP)	0	2	1	4
Increased building code compliance and enforcement to meet goals, increase baseline energy code compliance with model energy codes	2	1	2	1
Expansion of residential EE programs (sustainable energy utility programs [SEU], ongoing evaluation, monitoring and verification, DE State Housing Authority programs)	0	0	2	4
Development or expansion of commercial building EE programs	1	0	2	3
Installing renewable energy on-site at residential and commercial buildings	0	2	2	3
Peak energy demand reduction; especially if electrification increases peak demand	0	1	3	1
Capturing and reusing stormwater on-site	1	4	1	1
Supporting buildings EE and RE investment through Green Bank and other financing mechanisms, including Property Assessed Clean Energy (PACE) programs and on-bill financing; and bundling financing with buildings EE and RE strategies	1	0	3	2
Commercial and residential energy storage systems, including EVs in vehicle-to-grid applications	0	5	1	0
Reducing use of high-GWP refrigerants and hydrofluorocarbons (HFCs)	0	5	0	2
Building electrification: retrofitting existing buildings	3	1		1
Building electrification: new building construction requirements	1	2	1	1
Improved monitoring and evaluation programs for building energy consumption	0	3	3	1
Increasing water conservation in new and existing buildings	2	1	2	1

Electric Power and Industrial Sectors

Mitigation Strategy	Votes Cast			
	Non-Starter or Not Relevant	**Willing To Do It, Need Resources**	**Have Started, Hitting Barriers**	**Already Doing, Can Be Resource**
Expanded Renewable Portfolio Standard: 100% renewable electricity in grid by 2045, 40% by 2035, 25% by 2025	3	1	3	4
Peak energy demand reduction	0	1	1	3
Creating an EV Implementation program that advances EV adoption through increased infrastructure (charging stations, building codes, parking requirements), incentive programs (carpool lanes, purchasing, charging station), charging rate plans (off-peak, vehicle 2 grid), legislation (interoperability, time of use rates, states agencies to charge for charging stations, EV-ready building/parking, utility considerations)	1	2	3	1
Increasing demand for EV charging infrastructure	2	4	1	
Installing renewable energy on-site at industrial sites, residential and commercial buildings	0	2	1	3
EE improvements: updating siting and permitting regulations that could set GHG emission requirements	3	2	1	1
EE improvements: lighting systems, motor systems, air compressors, materials handling equipment, process improvements	0	3	2	3
EE improvements: operational reviews and improvements, e.g. reducing operating hours for specific equipment	1	0	0	1
EE improvements: outreach and training	0	3	1	3
Improved emission controls on-site: carbon capture, scrubbing	4	1	1	1
Expand use of low-GWP refrigerants: EPA Significant New Alternatives Policy (SNAP)-like program, incentivizing low-GWP refrigerant use, developing refrigerant management plan based on EPA Section 608	5	1	0	0
Methane emission reductions: improved controls and monitoring, capture for reuse	3	2	1	1

Mitigation Strategy	Votes Cast			
	Non-Starter or Not Relevant	Willing To Do It, Need Resources	Have Started, Hitting Barriers	Already Doing, Can Be Resource
Implementing programs to manage hydrofluorocarbons (HFCs) and other high-GWP materials throughout the product lifetime: installation, maintenance, disposal, reclamation	4	0	0	1
Installing renewable energy on-site	2	0	1	3
Expanded renewable energy consumption: programs for support	0	1	1	4
Limiting packaging materials to more recyclable or compostable materials	2	2	2	1
Waste diversion from landfills: increased recycling, organic waste diversion (composting, land application, animal feed, etc.)	2	1	1	1
Expanding methane capture for flaring or renewable energy use	6	1	0	0
Expanded combined heat and power (CHP) programs	5	0	1	1

Barriers and Resources for "Non-Starter" Strategies

Transportation Sector

Barriers or Resources Mentioned
Would need public education for DE to implement this
ZEVs and EVs would be on discount because have to sell certain amount. Result: have fewer to buy
Chicken and egg scenario
Would this be business friendly or drive out industry?
No foundation to build on
Not a nonstarter, unlikely
Needs more conversation and education
Willing to do it but need resources or knowledge
DE is moving forward on it, good momentum. Need a little more momentum to push us over the tipping point
Need to incentivize it
Education and outreach materials, good incentives for businesses
Zoning standards for charging
Partners/collaborators are essential
Access to charging is a challenge
Need for pilots? Where to implement
Overall: need to figure out what the problem is (e.g. freight)
Low income not powerful political constituent, not respond to them, businesses do not see need to support
Many low-income areas overlap with low-density areas. Need a new response that is efficient and cost effective
Balance needs of all
Affordable housing problem--"not in my backyard"
Need affordable housing because people currently have to live far from where they work which forces up cost of transportation
"Workforce housing" is not a helpful label
We encourage sprawl, but not everyone wants this. Influencing supply and demand will support this solution
DelDOT time utilization--we are doing this
Home-rule, local municipalities override
People think more traffic, but people like economic development
"You're destroying our small town"
Generational differences: mixed development vs. NIMBY, nonstandard family models
Need strategic community planning, not developer-driven practices
Need certain type of developer to do this (most traditional and not intentional and comprehensive with transportation needs
Process barrier
Public input process has to change
Need local group to drive plans
How do we change the mindset of change? Big challenge to reduce GHG emissions
Need to look at more
Port at Wilmington: reduce GHG, small markets, reduce particulates
New Port: Rail v. truck traffic--how do we mitigate that impact?
New Port: How do we put infrastructure there to make it happen?
New Port: New jobs-->opportunity
Education and awareness: students in the mindset push for it
Who do we want to do it? Not going to propel without the strategy. How to get education out there?

Buildings Sector

Barriers or Resources Mentioned
No clear path to adoption/implementation of new code (2018/2021) (has gone to public hearing, draft regulations submitted 11/19, awaiting sec decision)
Perceived barrier from builders - EE levels (need training and case studies)
Perception of EE - getting less value, giving up something
Energy security worries for residential customers, risk planning, disruption - need energy mix, grid reliability, risk analysis and planning
Digital/software investments and tradeoffs - risk, $ diversion
Lack of economic NRG storage solution
Who pays for grid infrastructure
Need to research the risk of climate change itself to development and where to invest (adaptation)
How do we focus on "benefits"/co-benefits - economic, health (turn the message around)
Barriers to cross-sector coordination and communication
Streamlined/easy data collection and reporting (eg carbon tracking and credits)
Issues with historic community - solar legislation
Small but divided state - politics, climate, and RE thoughts
Tie the agencies together - transportation, DNREC, health, econ/biz, tourism - and the sectors (non-profits/private)
Bringing financing to support low/mod income and vulnerable populations
True case management approaches/programs (tech assistance)
State/Fed data sharing
PACE financing for resiliency? (see New Castle adoption example)
Shared practice: master lease options
Buy-in from each sector (utilities, transportation, health, buildings)- lots of sector meetings, review goals; one-on-one commitments
Plan implementability - make it a stick
Make routine/operationalize
$$
Funding for not just admin, but also development and tracking

Electric Power and Industrial Sectors

Barriers or Resources Mentioned
Methane Capture (quality is an issue, but maybe opportunity to further research, chicken waste: not enough to generate at scale (also competition for use as fertilizer)
RPS: need it--40% by 2025 is proposed, a lot of uncertainty about regulation, policy needs to be consistent and statewide
Questions about new peaks with electrification and where battery storage will be in long term modeling/planning. Role of vehicle to grid role
Hard to keep track of programs, opportunities
In-state energy generation: what is the economic case? Who benefits? Question about market for buying power and if investment is worth it--need long term guarantee
Distributed generation: better outreach to res/small businesses, need solar financing programs