MINUTES OF THE CLIMATE ACTION COUNCIL MEETING

HELD ON OCTOBER 1, 2021

Pursuant to Notice and Agenda, a copy of which is annexed hereto, a meeting of the Climate Action Council ("Council") was convened at 10:00 a.m. on Friday, October 1, 2021.

The following Members attended, and a quorum was present throughout the meeting:

Council Co-Chairs

- Doreen Harris, President and CEO, New York State Energy Research and Development Authority
- Basil Seggos, Commissioner, New York State Department of Environmental Conservation

Council Members

- Richard Ball, Commissioner, New York State Department of Agriculture and Markets (Brian Steinmuller, Designee)
- Donna L. DeCarolis, President, National Fuel Gas Distribution Corporation
- Marie Therese Dominguez, Commissioner, New York State Department of Transportation (Ron Epstein, Designee)
- Gavin Donohue, President and CEO, Independent Power Producers of New York
- Dennis Elsenbeck, President, Viridi Parente, Inc.
- Thomas Falcone, CEO, Long Island Power Authority
- Vacant, Commissioner and President and CEO-designate of Empire State Development (Kevin Hansen, Designee)
- Rose Harvey, Senior Fellow for Parks and Open Space, Regional Plan Association
- Rory Christian, Chair and CEO, New York State Public Service Commission
- Dr. Bob Howarth, Professor, Ecology and Environmental Biology at Cornell University
- Peter Iwanowicz, Executive Director, Environmental Advocates of NY
- Gil C. Quiniones, President and Chief Executive Officer, New York Power Authority
- Roberta Reardon, Commissioner, New York State Department of Labor
- Anne Reynolds, Executive Director, Alliance for Clean Energy New York
- Rossana Rosado, Secretary of State, New York State Department of State (Kisha Santiago-Martinez, Designee)
- Raya Salter
- Dr. Paul Shepson, Dean, School of Marine and Atmospheric Sciences at Stony Brook University
- RuthAnne Visnauskas, Commissioner and CEO, New York State Homes and Community Renewal
- Howard A. Zucker, Commissioner, New York State Department of Health (Henry Spliethoff, Designee)

Also present were various State agency staff and members of the public. Mr. Seggos and Ms. Harris, Co-Chairs of the Council, welcomed all in attendance. Co-Chair Harris welcomed Rory Christian, the newly

appointed Chair of the New York State Public Service Commission, and also extended a sincere thank you to Commissioner John Howard for his efforts on the Council.

Consideration of the Minutes of the September 13, 2021 Meeting

The next item on the Agenda was to advance the minutes from the September 13, 2021 Meeting. Upon hearing no further changes or objections, upon motion duly made and seconded, the minutes were adopted.

Co-Chair Remarks and Reflections

Co-Chair Seggos presented some of the State's Climate Week announcements, including:

- the New Resilient NY Agenda that includes major investments in water infrastructure for resiliency and flood protection and a $4 billion Clean Water, Clean Air and Green Jobs Environmental Bond Act;
- the Community Air Monitoring Program that includes hyperlocal air quality assessments in communities historically overburdened by pollution; strategies to reduce air pollution and climate-altering greenhouse gases in disadvantaged communities; and community air monitoring capacity building grants to environmental justice organizations; and
- Governor Hochul's announcement of eleven newly certified Climate Smart Communities.

Co-Chair Harris continued by adding the following Climate Week announcements:

- An expansion of the NY-Sun Program to achieve at least 10 gigawatts of solar energy by 2030;
- The announcement of major green energy infrastructure projects (the Clean Path New York and the Champlain Hudson Power Express) to power New York City with wind, solar and hydropower from Upstate New York and Canada with new transmission lines that will create approximately 10,000 jobs and bring about $8.2 billion in economic development investments, including within disadvantaged communities;
- A $36 million "Regional Clean Energy Hubs Initiative" to provide clean energy solutions and opportunities at the community level; and
- A $59 million "Clean, Green Schools Initiative" to improve air quality and reduce carbon emissions in Pre-K through 12 schools.

Presentation and Discussion: Climate Justice Working Group

Co-Chair Seggos welcomed the members of the Climate Justice Working Group to provide feedback and discuss the recommendations advanced by the Waste Advisory Panel, the Energy-Intensive and Trade-Exposed Industry Advisory Panel, and the Just Transition Working Group.

Advisory Panel/Working Group Recommendations Feedback: Just Transition Working Group

Rahwa Ghirmatzion, Executive Director, PUSH Buffalo, began the presentation discussing the Just Transition Working Group, stating that, overall, the Working Group recommendations were well received. It was suggested that there needs to be additional clarity around the definition of "low carbon energy"

manufacturing, given concerns that "low carbon energy" could include biofuels or renewable natural gas. Also, a "best in class" framework should be implemented when public subsidies are allocated. She further stated that the Working Group has not sufficiently considered the definition of renewable energy sources in the context of a Just Transition framework and that more time must be spent exploring jobs analysis and energy generation in a holistic manner. She also suggested that a workforce assessment plan would help ensure that workers impacted or displaced through the implementation of the Climate Act contribute to the process and remain informed of possible job loss or job creation. The workforce assessment plan should include a dignified retirement plan for those workers who do not wish to retrain.

In discussing business opportunities and strategies, Ms. Ghirmatzion suggested that legally-binding Community Benefits Agreements between manufacturers, unions, and impacted communities should be created to ensure that the individual needs of displaced fossil fuel and power plant workers are assessed during the creation of retraining programs and future planning. She reiterated a recommendation to explore the re-use of manufacturing plants for clean energy production and manufacturing to minimize disruption of the existing workforce or to transition to other clean energy opportunities.

Ms. Ghirmatzion advocated for hiring practices that explicitly acknowledge and name efforts to eliminate implicit bias during the workforce search and hiring process, and that financial support will be offered for business to address justice, equity, diversity, and inclusion (JEDI) to ensure that best practices are used to recruit and retain an excellent and diverse workforce. She stressed the needs of frontline organizations for multiple strategies in workforce development, particularly for low-income communities and communities of color. These strategies should include several layers of on-boarding for new workers and strategic coordination and collaboration with State agencies, employers, businesses, workers, and employee unions to ensure that "JEDI" efforts are dynamic and adaptive.

Advisory Panel/Working Group Recommendations Feedback: Energy-Intensive and Trade-Exposed Industries

Abigail McHugh-Grifa, Executive Director of the Climate Solutions Accelerator of the Genesee Finger Lakes Region, presented feedback on the Energy-Intensive and Trade-Exposed Industries Advisory Panel. She stated that the Working Group supports the emphasis on green job creation in disadvantaged

communities, as well as the proposed data collection and reporting requirements to provide a more accurate understanding of how industrial facilities impact disadvantaged communities. The collection and public availability of robust data will allow for meaningful evaluation of progress and challenges faced during implementation of the Climate Act. Further, the recommendations that the State procurement of low-carbon building materials can encourage less energy intensive manufacturing in some sectors was well received. However, the Working Group suggested that the focus on economic development and State assistance for businesses should instead be focused on the regulations necessary to achieve reducing industrial emissions as close to zero as possible rather than on methods such as carbon capture, storage and low carbon fuels.

Ms. McHugh-Grifa recommended a strong emphasis on demand-side changes, such as process efficiency, materials recycling and substitution, waste reduction, and improved product longevity. Fossil fuel combustion must be reduced and replaced by electrical heating methods, whenever feasible, such as heat pumps. Ms. McHugh-Grifa stated that it is critically important that members of disadvantaged communities are included in the creation of workforce development programs to ensure they meet the communities' needs and are culturally appropriate.

Ms. McHugh-Grifa turned to environmental justice concerns related to carbon capture, storage, hydrogen, and offsets, that the Working Group believes warrant further consideration, and should not be promoted as climate change solutions under the Climate Act as they encourage the continued extraction and combustion of fossil fuels. She cited research that substantial costs and risks are also associated with carbon capture and sequestration and even if effective, could still increase local pollution and could violate the standards set forth in the Climate Act. Regarding hydrogen, she stated that, while it is a potential replacement for high-heat industrial processes such as cement production that cannot be electrified, currently, hydrogen is almost entirely produced from fossil fuels, and could result in net increases in nitrogen oxide emissions as compared to burning fossil fuels or coal, emissions that are higher still when hydrogen is combined with natural gas and combusted than combustion of fossil fuels.

Lastly, Ms. McHugh-Grifa emphasizes that the Climate Act restricts the use of offsets, such as waste-to-energy projects, in an alternative compliance mechanism.

In response to a clarifying question by Commissioner Reardon regarding defining workforce assessment plans, Ms. Ghirmatzion responded that there needs to be a collective shifting of the mindset to think about the issues more holistically, to ensure the right individuals and stakeholders are included as the

challenges are unique, ensuring that the solutions reached are measured, multi-layered, and achieve an effective and equitable outcome. Commissioner Reardon agreed with the layered approach being advocated and looks forward to the results of the Jobs Study to obtain a better understanding of what is really needed in the labor landscape and the individual needs of different types of workers – those who need immediate employment versus those who are able to be trained, while still making sure the job they seek awaits them upon training completion. Co-Chair Harris agreed with evolving programs, the inclusion of "wrap around" services, and the need to plan holistically for the workers and the future of the facilities themselves, which can become the future hubs of renewable and clean energy.

In response to an inquiry by Kevin Hansen, Empire State Development, Senior Vice President and Head of Public Policy, regarding preferred technological approaches or other solutions that the Working Group could recommend for powering high-heat industrial temperature processes, Ms. McHugh-Grifa acknowledged there may be a limited application for green hydrogen if projects are assessed individually to ensure that any technology applied does not place an undue burden on environmental justice communities. She noted that here is a marked difference between green, blue, and gray hydrogen, so it is important to make the distinctions while reducing emissions as much as possible.

Dr. Bob Howarth agreed with the points made by Ms. McHugh-Grifa, specifically regarding hydrogen, stating that hydrogen use should be very limited, cautioning that heating with hydrogen is an inherently inefficient process when compared to electrical alternatives, such as heat pumps. As to high-heat industry needs, the technology is changing rapidly and there may be future industrial advancements that may allow for complete or near-complete electrification. Dr. Howarth provided an example of a steel plant in Sweden using mainly electricity for its energy needs, and only 2% of the hydrogen they initially estimated to use in their high heat application.

Raya Salter thanked Dr. Howarth for clarifying the lens through which hydrogen power is viewed and thanked others, including Commissioner Reardon, for reinforcing the value of collaboration on and the transformation of the workforce. She thanked Ms. McHugh-Grifa for addressing the Climate Act regarding offsets. Ms. Salter asked Elizabeth Yeampierre, Executive Director, UPROSE, to amplify the notion of environmental justice guard rails and how they may be hardened in a "do no harm" approach for disadvantaged communities. Ms. Yeampierre stated that the foundation of the environmental justice movement over the past twenty-five years is a consensus that programs must focus on health, specifically the health of those faced with a legacy of toxic exposure. The precautionary principle at the center of the movement will ensure that the correct solutions will result in transformative recommendations not just for

New York, but for the rest of the world. Ms. Yeampierre urged everyone to consider that if a process, policy, regulation, or path is likely to do harm, how it can be prevented.

Dennis Elsenbeck expressed concern about how workforce development is characterized and that it needs to be defined by the benefits as it relates to worker activities and must be tied to the Council recommendations in the Scoping Plan. He asked that the Council consider the efficiency and sustainability of the workforce and consider how to work together within a framework of a community on training and wrap-around services that go beyond the Council and how to address that much of the workforce is out of state and is attracted to New York by the subsidies offered.

In response to an inquiry by Mr. Elsenbeck about the notion of too much focus on economic development, Ms. McHugh-Grifa clarified that her statement was intended to emphasize that the focus of the Council should not only be on economic development, but also on the larger picture of reducing emissions and advancing climate justice embodied in the Climate Act, even if that leads to unpopular or politically difficult decisions.

Peter Iwanowicz supported statements made by Raya Salter and Dr. Bob Howarth, and particularly those by Dr. Paul Shepson regarding carbon capture and storage as not being clean. He also emphasized the importance of adhering to the goals of the Climate Act and reducing emissions and implementing renewable energy technologies as quickly as possible. Mr. Iwanowicz stated that he hopes the State can do better than ensuring that 40% of the benefits of the Climate Act go to disadvantaged communities, rather that the State should be spending 40% of clean energy funds in those communities.

Donna DeCarolis encouraged the Council to include an expansive view on the studies considered in accomplishing the goals of the Climate Act.

In addressing the earlier comment by Mr. Elsenbeck regarding the status of the out-of-state workforce, Ms. Reynolds stated that there are State residents employed in the jobs of building and retrofitting existing buildings for energy efficiency, installing renewable energy projects, and more to meet the standards of the Climate Act. She added that the State may need assistance in the supply chain to meet the Climate Act goals and was excited by the Climate Week announcement of a solar manufacturing facility in the Binghamton area that will bring the supply chain to New York. The Council is working not only for climate reduction, but to also bring more jobs to New York, and to ensure that the individuals who fill those jobs are displaced fossil fuel workers and individuals from disadvantaged communities who

are residents of New York. Mr. Elsenbeck stated that her key phrase is that the jobs "will be" filled by New Yorkers, but are not yet here, to which Ms. Reynolds added that there are approximately 14,000 individuals in the State currently working on solar installations, as well as building, retrofitting, and installing other renewable projects.

Advisory Panel/Working Group Recommendations Feedback: Waste Panel

Eddie Bautista, Executive Director, New York City Environmental Justice Alliance, began his presentation by stating that, it is believed by the Working Group that the Waste Panel was heavily dominated by industry despite the intent to include other stakeholders. It is believed that the Waste Panel rejected many of the environmental justice and waste reduction priorities while supporting solutions that benefited the existing framework and industries.

Mr. Bautista stated that the new greenhouse gas accounting now attributes substantially more emissions to the waste sector, yet the recommendations which reduced methane emissions from landfills would be preferred, with far less consideration given to recommendations that would reduce material production and transportation that would ultimately lead to less refuse in landfills. Further, Mr. Bautista stated an extended producer responsibility proposal was included which, by itself, does not reduce waste or greenhouse gas emissions, but instead is a legislative funding mechanism where the producer takes some financial responsibility for the waste that will still be generated. The Working Group believes that these programs should not originate from industry, but rather community members and independent researchers.

Mr. Bautista stated that some positive recommendations were included, such as waste-reduction strategies submitted by members of the Advisory Panel, phasing out organic waste in landfills, reuse and recycling, reducing methane and carbon dioxide emissions from landfilling and combustion of organics, and others. While some waste generation is unavoidable, the Working Group was very disappointed in the overall lack of emphasis on waste reduction and local scale diversion practices. While the working group acknowledged that the Waste Panel discouraged the most audacious industry- generated proposals, a long list of alternative initiatives encouraging reduction of waste materials was generated rather than identifying the top five priorities that would provide the biggest climate benefits. The Working Group prioritized the following advisory panel recommendations: (1) ending the disposal of food scraps, and yard waste at landfills and incinerators to reduce greenhouse gas emissions and produce nutrient rich soil supplements and fertilizers through composting; (2) controlling of landfill, sewage, industrial plants, and

other sources that emit fugitive emissions; (3) enactment of an extended producer responsibility law to reduce the waste stream; (4) advancing domestic recycling; and (5) making New York the leading state in the nation for food rescue, as edible food that does not become waste cannot create methane emissions.

Mr. Bautista concluded his presentation by stating the recommendations included the use of biogas and anerobic digestors, and while these may have a role to play in a more environmentally sound waste disposal system, but one must ensure that these processes do not intentionally or inadvertently lead to the extended use of fossil fuels. If these processes are used and energy is generated, it should be used on site to reduce the need for new pipelines.

Co-Chair Seggos thanked Mr. Bautista for the valuable feedback and asked that this feedback, along with any of the recommendations referred in the presentation, are made available to the Council.

Ms. Salter stated that most individuals who care about the environment know that waste reduction is key and wondered how this is not front and center and represents the bare minimum of what must be done in this area.

Ms. Salter asked Co-Chair Seggos for clarification on which recommendations did not make it into the Integration Analysis, to ensure transparency. In response to an inquiry by Ms. Salter about what process can be used to resolve the substantial differences in the recommendations of the Waste Panel, Mr. Bautista stated that recommendations such as a greater ambition to reduce emissions from waste, could have been addressed in the Integration Analysis if they had been included earlier in the initial recommendations. Mr. Bautista then stated that omitted recommendations could be provided through participants, as well as through New York State Assembly testimony that presented the missing recommendations. Co-Chair Seggos thanked Mr. Bautista for his observations stating that the purpose of the Working Groups is to identify gaps in the Council's work to ensure they are filled.

Gavin Donohue appreciated the input and stated that he believes that the Staff team worked diligently to review the recommendations in all of their complexity as they were presented. He highlighted the lack of consideration given to the avoidance of truck traffic given that it is a prominent greenhouse gas emitter.

Mr. Donohue stated that waste-to-energy is recognized under State law as a renewable resource and very much agreed with the need to reduce organics in landfills, citing efforts in Onondaga County. Mr. Bautista responded that he is simply relaying observations from the Working Group and that the information is retained in the written record. Mr. Bautista then stated that while truck traffic was not stated specifically, over one-half of the recommendations would reduce truck traffic. Finally, Mr. Bautista stated that he was unsure if incineration, or waste-to-energy, was considered a renewable energy source. Jared Snyder, Deputy Commissioner, Air Resources, Climate Change and Energy, New York State Department of Environmental Conservation, stated that he believes Mr. Bautista is referring to the Climate Act, where waste-to-energy is not considered a renewable resource for achieving the goals.
Co-Chair Harris stated that waste-to-energy is considered a renewable resource under State Energy Law but is not considered a renewable resource under the Public Service Commission's Clean Energy Standard program.

Mr. Snyder stated that there was substantial debate within the Waste Panel and the recommendations presented to the Council reflected only those that received sufficient support among the members, with other views noted within the recommendations. However, if there were additional ideas that are not reflected in the records, the Staff team welcomes additional ideas.

Mr. Iwanowicz believes that the State should be moving away from combustion and embrace the equity and justice provisions of the Climate Act.

Presentation and Discussion: Updated Climate Assessment

Co-Chair Harris introduced Amanda Stevens, Senior Project Manager, Environmental Research, NYSERDA, to present on the work updating the State's climate impact assessment work, focusing on understanding and preparing for a changing climate. This topic was raised in previous Council discussions regarding the Land Use and Local Government Advisory Panel recommendations on adaptation and resilience.

Ms. Stevens provided information on the key findings of the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report (AR6), particularly the results of Working Group 1, the physical science basis, which emphasized that climate change is happening more strongly than any previous report and concluded, among other things that:

- Human influence on the climate system is "unequivocal";
- Extreme events are "unprecedented" and will continue;

- More CO_2 is emitted today than in any other period and 81-91% is from fossil fuels combustion; However, every ton of emissions reduced will have an effect on the climate going forward;
- Methane growth is faster in the past six years. In 2019, methane concentrations were higher than any time in the previous 800,000 years and have increased by 156% since 1750;
- There is a potential for warning to exceed 1.5 degrees by 2040 even in the low-emissions scenario; and
- Warming increases linearly with emission levels, and emission levels must be reduced and stabilized at net zero CO_2.

Ms. Stevens explained that NYSERDA's Environmental Research Program efforts seek to increase the understanding and awareness of the environmental and public health impacts of energy choices and emerging energy options and to provide a scientific foundation for creating effective and equitable energy-related environmental policies and resource management practices. The work covers everything from air quality to acid rain, mercury deposition and climate change. She also provided examples of the current climate research projects that include areas of equitable cooling; preliminary building energy modeling under climate change; climate impacts on renewable resources; and climate migration modeling.

Regarding the ongoing climate assessment vision and goals, Ms. Stevens defined the effort as using the most up-to-date science and information to assess the projected impacts of climate change on New York State, as well as providing actionable information on preparing for and adapting to these impacts. Overall, this provides a scientific foundation for climate policy and decisions by allowing for a mechanism to incorporate diverse concerns and perspectives and provide useful information in more engaging and useful ways. She stressed that this is not an adaptation plan or a policy effort but is mission-driven and grounded in science.

Ms. Stevens provided an overview of other State efforts in this area and focused on the NYSERDA ClimAID Report, originally issued in 2011, with projections updated in 2014. ClimAID was the State's first comprehensive climate change impact assessment that addressed all seven regions of the State, eight consumer sectors, and included projections, impacts, and adaptation strategies. The new, ongoing effort builds on the ClimAID effort by updating the projections and assessments; develops in-depth economic analysis; will provide more diverse perspectives and decision-maker and stakeholder engagement and will result in more products and outputs for wider use by others. There will be more emphasis on adaptation strategies and case studies, as well. Thus far, the draft core projections have been completed, such as for average and extreme temperature and precipitation and are likely to be released later this year. Additional projections will come later, such as for sea level rise.

Ms. Stevens stated that the economic impacts of climate change on different sectors and under a few different emissions scenarios will be modeled, but there will be some aspects that are unable to be modeled. Adaptation strategies will also be modeled, to the extent that they can. Technical working

groups are examining eight main sectors and the working groups are comprised of approximately 80 diverse individuals from 60 different organizations, from universities to businesses to state and local government and community focus groups. Each working group also has the benefit of additional sector advisors. Four particular cross-cutting topics are being emphasized with the input of additional experts: disadvantaged communities; municipal perspectives; marine coastal zones; and Great Lakes coastal zones.

The final outputs will be comprised of multiple products, rather than one large report. A Statewide summary, multi-sector topical reports, regional reports, digital reports and data will all be produced and targeted for different audiences and needs. The working groups kicked off their work earlier in the week and technical information is expected to be drafted by the end of 2022.

In response to an inquiry from Raya Salter regarding any precedent in other jurisdictions for work on this topic, Ms. Stevens confirmed that the project team considers activities in other jurisdictions (such as California, Washington and Indiana) and particularly highlighted the assessment work being undertaken by the state of Indiana. She expressed enthusiasm for the New York effort in terms of the scope and degree of involvement by the participating experts and in the types of products that are anticipated to be developed.

Presentation and Discussion: Integration Analysis Scenario Planning

Co-Chair Harris introduced Carl Mas, Director, Energy and Environmental Analysis, NYSERDA to present further information on the Integration Analysis scenario planning, including scenario runs, measure adoption, and the resulting emission reductions. As with previous presentations, this presentation continues to build upon the previous. Co-Chair Harris stressed that the Integration Analysis is not synonymous with the Scoping Plan but one tool that feeds into it to assess greenhouse gas reductions, benefits, and costs.

Mr. Mas acknowledged the presentation by Amanda Stevens, stating that it is a reminder of what brings the Council to the table in the first instance and that there is a need to accomplish two things simultaneously: mitigate and adapt. Mr. Mas also thanked the Staff team, the Advisory Panel Members, the Council Co-Chairs, academic and national laboratory experts, and a number of consultant teams from across the country who have all contributed to the Integration Analysis effort thus far. He provided information as to where interested parties could access the information provided today, as well as more detailed materials and workbooks.

Mr. Mas began his presentation with a review of the current estimated greenhouse gas emissions by sector and the composition of those emissions by type of gas. To recap, the transportation and

buildings sectors continue to be the largest sources of greenhouse gas emissions, with passenger vehicles and space heating comprising the largest portions, respectively. He noted that, due to the new accounting methodology, electricity and waste have risen to the top four sources and, together, these four sectors account for over 75% of the State's carbon footprint. As for the emissions, carbon dioxide accounts for about 60% of the emissions (down from over 80% under previous accounting methodologies), while methane has grown to about 35%, with hydrofluorocarbons comprising about 4%.

Mr. Mas provided a review of the scenarios, including the reference case and three new scenarios (Scenario 2: Strategic Use of Low-Carbon Fuels, Scenario 3: Accelerated Transition Away from Combustion, and Scenario 4: Beyond an 85% Reduction). The foundational themes across all mitigation scenarios based on Advisory Panel findings and supporting analysis include: zero emission power by 2040; enhancement and expansion of transit and vehicle miles traveled reduction; more rapid and widespread end-use electrification and efficiency; higher methane mitigation in agriculture and waste; and end-use electric load flexibility reflective of high customer engagement and advanced technology.

Mr. Mas presented a qualitative dashboard illustrating the level of transformation by mitigation scenario. In sum, Mr. Mas stated that there is no modest approach and high levels of ambition are required to achieve any of the three scenarios, but Scenarios 3 and 4 require even further action to accelerate those transitions. In discussing the role of low carbon fuels, he stressed that it is an indicator of the level of transformation and not that there is anticipated to be a large quantity of low carbon fuels used.

New findings presented include:

- The achievement of emissions reductions to meet State law requires action in all sectors, especially considering New York's novel emissions accounting; Every sector will see high levels of transformation over the next decade and beyond, requiring critical investments in the economy;
- Energy efficiency and end-use electrification will be essential parts of any pathway that meets the State's emission limits. This includes:
    - Zero-emission vehicles and heat pumps becoming the majority of new purchases by the late 2020s, and fossil-emitting cars and appliances no longer sold after 2035;
    - Approximately 1 to 2 million efficient homes electrified with heat pumps by 2030;
    - Approximately 3 million zero-emission vehicles by 2030;
    - An unprecedented rate of adoption of novel and potentially disruptive technologies; and
    - Consumer decision-making playing a large role through the next decade;
- A substantial reduction in vehicle miles traveled while increasing transportation access; an expansion of transit services structured around community needs; smart growth inclusive of equitable transit-oriented development; and transportation demand management.
- Wind, water and sunlight will power the majority of New York's economy in 2050 in all pathways;
    - Even with aggressively managed load, electric consumption doubles and peak nearly doubles by 2050, and the State becomes winter peaking by 2050;
    - About 20 gigawatts of offshore wind, 60 gigawatts of solar and 20 gigawatts of 4 and 8-hour battery storage will be needed by 2050;

    - Firm, zero-emission resources, such as green hydrogen or long-duration storage, will play an important role
- Low-carbon fuels such as bioenergy or hydrogen may play a critical role in helping to decarbonize sectors that are challenging to electrify;
- Required transition to a low-global warming potential refrigerants and enhanced refrigerant management by 2050;
- Large-scale carbon sequestration opportunities include lands and forests and negative emissions technologies and strategic land use planning will be essential to balance needs;
- Necessary methane emissions mitigation in waste and agriculture will require transformative solutions;
- Additional innovation will be required in areas such as carbon sequestration solutions, long-duration storage, flexible electric loads, low-global warming potential refrigerants, and animal feeding in concern with Federal action; and
- The largest of three remaining sources of emissions in 2050 (landfills, aviation and animal feeding) will need to be addressed.

Mr. Mas presented each of the scenarios "at a glance" to illustrate how the curves can be foundationally bent under each by sector and technology, and further illustrated the additional assumptions used in accelerating the transition from one scenario to another.

Dr. Howarth observed the importance of addressing the building heating and transportation sectors, particularly the buildings sector, given the limitations at the federal level for addressing transportation issues, and suggested a near-term focus on the funding mechanisms that might be used to address buildings.

In response to a clarifying question by Anne Reynolds regarding the notion of a limited reuse of capturing methane, Mr. Mas explained that is intended to suggest an examination of the places where methane is generated due to some other process, such as waste management or agriculture, and potentially reusing it for on-site heating or electric generation.

In response to an inquiry by Chair Christian regarding whether the penetration of bus sales and purchase of new vehicles assumes that all new purchases will be electric and not necessarily that existing fleets will be completely decommissioned, Mr. Mas confirmed that was the assumption.

In response to an inquiry by Chair Christian regarding the electrification as you move from one scenario to the next and whether a commensurate increase in the availability of renewable energy is modeled in along with the increased adoption of heat pumps, Mr. Mas confirmed that was the case, stating that an integrated modeling platform is used that addresses every part of the economy that could have a carbon footprint and the parts that feed no carbon energy into it. Chair Christian also agreed with the comments Dr. Howarth made regarding the importance of addressing the buildings sector.

In response to an inquiry by Dennis Elsenbeck as to whether the modeled increase in the use of heat pumps by 2030 includes examining the impact on the distribution network and the impact on home energy costs as a result of shifting, Mr. Mas explained that total societal benefits and costs will be examined and decisions about who pays is translated as policies are implemented.

In response to an inquiry by Dennis Elsenbeck as to whether long duration storage is referred to as supply side or demand side, or both, Mr. Mas stated that there will be applications on either end of the electric system, but the prototypes have a fairly large physical footprint and more likely to be grid scale, although some short-duration technologies will be customer-sited. Mr. Mas also added that there are resilience implications for using these technologies.

Mr. Elsenbeck also advocated for a more proactive approach to transmission and distribution planning, suggesting that past regulatory frameworks created generation issues that now need to be resolved and, going forward, different regulatory changes may be needed to address interconnection requirements. Mr. Mas stated that the Staff team has examined marginal cost of service studies for the utilities and have included both the distribution and bulk transmission in the infrastructure buildout, as well as the costs and benefits.

In response to an inquiry by Mr. Elsenbeck as to how this roadmap translates to labor studies, Mr. Mas stated that the jobs study needs to be sequenced and the resultant scenarios will feed into that work to ascertain the make-up of the evolving workforce and identify future training needs.

In response to an inquiry by Raya Salter regarding the decommissioning of the fossil fuel infrastructure, Mr. Mas explained that all scenarios will need to include some level of decommissioning over time, with some scenarios being more aggressive than others. The modeling will also include certain sensitivity analyses.

In response to an inquiry by Raya Salter about whether a risk and co-dependency analysis had been undertaken that justifies the achievement of the last 15% when there is so much to do to achieve the initial reductions given that current plans are not ambitious enough to achieve them, Mr. Mas agreed that while there may be a disproportionate amount of time spent examining that 15% due to the complexity, he believes that there is a lot of commonality and the Scoping Plan should articulate the appropriate emphasis. He also explained the approach taken regarding portfolio management and how the scenario building reflected the input of the Advisory Panels weighed against the new accounting requirements, which then determines which options remain feasible for modeling.

CEO Falcone thanked Mr. Mas for the detailed effort in illustrating the results of the work thus far. In agreeing with comments made by Mr. Elsenbeck on the importance of focusing on the build out of the transmission and distribution infrastructure, he mentioned several ongoing efforts at both the Federal and State levels, including an identified need for another export cable to accommodate offshore wind. In response to his inquiry regarding the current estimated order of magnitude for long duration storage, Mr. Mas stated that somewhere on the order of 20 gigawatts of zero-emission, firm resource.

CEO Quiniones suggested that the Staff team reach out to the Utility Consultation Group, the New York Independent System Operator, the Electric Power Research Institute (EPRI) and national laboratories, in order to model how the electric grid will need to evolve, or modernize, under each of the scenarios. He further suggested that under any scenario, the maintenance of grid reliability (grid performance under normal conditions) and resiliency (grid performance under abnormal conditions) is paramount and working with the partners he identified will increase the robustness of the analysis.

In response to an inquiry by Peter Iwanowicz regarding to what extent the analysis reflects vehicle counts into the future, Mr. Mas stated that mode shifting was observed in a much more significant way than in the past, but he would have to further investigate how that shift translates into vehicle ownership. In response to Mr. Iwanowicz's observations about the potential for vehicle to grid technology and how this may be captured in the modeling, Mr. Mas acknowledged a significant amount of vehicle flexibility and exploration of how they may serve the grid, and this will be reflected in a modeling sensitivity.

In response to an inquiry by Donna DeCarolis as to whether the dual fuel or hybrid heating solution is included in the modeling, Mr. Mas confirmed that it was contained in Scenario 2.

In response to an inquiry by Ms. DeCarolis regarding the pace of the electrification and how to match the pace of transition with the readiness of local systems, Mr. Mas stated that the scope and scale of distribution needs will be quantified at a high level and zonally, but this is not a detailed utility-by-utility plan. He agreed with the need for continued engagement with the Utility Consultation Group.

In response to an inquiry by Ms. DeCarolis regarding consumer affordability along with reliability and resilience, Mr. Mas agreed that both stock turnover in appliances as well as the cost to the system will need to be examined, as well as how quickly and where the transition is happening, whether it will be in the urban centers or in the more disparate rural communities. The near-term emphasis is on incentivizing consumer choice, with the panel recommendations having mandates being called for later. He added that examining net, incremental costs and how to apply them needs to be considered, as well as how it affects each household and what specific rate designs might look like.

Mr. Mas continued the presentation by illustrating the greenhouse gas emissions by mitigation scenario. He then illustrated the total energy by fuel for each of the scenarios, both in actual units and also by percentage of the final fuel portfolio. The overall observation is that, by electrifying – which is an inherently efficient means of using energy – final energy can be cut in half across all scenarios. This is a result of a combination of overt actions along with a more inherently efficient system overall.

Regarding end-use gas demand, Mr. Mas explained that, given the overall accounting, the modeling shows a substantial downward shift under each scenario. Across all scenarios, natural gas demand is likely to be filled by at least fifty percent with hydrogen, and with a small, very specific use of renewable natural gas. He also presented an annual electric load forecast by scenario, noting the acceleration over time. He addressed the implications of increased electricity use for hydrogen and the potential for flexibility in its production which could help balance the electric grid and be timed to coincide with the availability of inexpensive solar. Heat pumps will result in the State becoming a winter-focused system. In discussing the peak load forecast, Mr. Mas asserted that flexible load lends itself to innovation and creating market structures to better manage peak load and the use of low carbon fuels may be able to reduce the cost of building out transmission lines.

Mr. Mas presented a comparison of installed capacity for the year 2050, with the vast majority of the wind resources will be built in and by New Yorkers. In 2050, the electric system is anticipated to be dominated by wind and solar, which can be complementary in their generation production with hydroelectricity playing a role, along with zero carbon resources.

In his presentation on the bioenergy analysis framework, Mr. Mas explained the methodology used in the analysis, including reliance on various potential studies and ongoing work, Advisory Panel input, and academic partners. Cost, ability to abate emissions, feedstock availability, and how biofuels would be substituting for other fossil fuels are all principles that were examined. He presented information on bioenergy by feedstock and final fuel in 2030 for Scenario 2 and low-carbon fuel utilization for 2030 and 2050 and how the fuel portfolio changes among scenarios.

Next Steps

Sarah Osgood, Executive Director, Climate Action Council, presented the next steps through the end of 2021 by highlighting the Draft Scoping Plan approach by stating that it will include multiple scenarios, along with full costs and benefits, to achieve the emission reductions. The scenarios build on the recommendations from the Advisory Panels and Working Groups and are informed by the feedback from the Council and the Climate Justice Working Group. A public input period will be offered when the

draft Scoping Plan is released where the public will be able to weigh in the presented scenarios and that feedback will be considered by the Council in its deliberations in advance of the release of the final Scoping Plan in January 2023.

Regarding the schedule for near-term Council activity, Ms. Osgood provided the upcoming meeting schedule through the end of 2021, along with intended meeting topics and action items, including additional small group sessions to garner Council feedback on the initial draft Scoping Plan that is planned to be distributed to Council members in late October.

In response to an inquiry by Raya Salter regarding how the criterion articulation of the disadvantaged communities portion will flow into this timeline, Ms. Osgood stated that she will be further engaging with the Climate Justice Working Group to understand if the draft criteria will be released in time to be incorporated into the draft Scoping Plan.

In response to a concern expressed by Peter Iwanowicz regarding the potential for the public to lose the dialogue regarding any additional Council Member questions and responses on the Integration Analysis, Ms. Osgood offered to accept and aggregate some questions in advance which will then be reflected back, along with any additional feedback, at future meetings.

With that, the meeting was adjourned.

NEW YORK STATE OF OPPORTUNITY.

Climate Action Council

KATHY HOCHUL
GOVERNOR

DOREEN HARRIS
CO-CHAIR

BASIL SEGGOS
CO-CHAIR

Meeting Agenda

October 1, 2021

- Welcome
- Consideration of September 13, 2021 Minutes
- Presentation and Discussion: Climate Justice Working Group
    - Advisory Panel/Working Group Recommendations Feedback – Waste, Energy-Intensive & Trade-Exposed Industries, and Just Transition
- Presentation and Discussion: Updated Climate Assessment
- Presentation and Discussion: Integration Analysis Scenario Planning
- Next Steps