

**CLIMATE CHANGE ADVISORY COMMITTEE  
MEETING MINUTES**

**August 23, 2022**

**9 a.m. – 12 p.m.**

**Rachel Carson State Office Building,  
and via WebEx**

**MEMBERS/ALTERNATES PRESENT:**

Chairperson Steve Krug	Greg Czarnecki (for Cindy Dunn)
Vice-Chairperson Marc Mondor	Joseph Sherrick (for Gladys Brown Dutrieuille)
Robert Graff	Adam Walters (for Neil Weaver)
Kim Kipin-McDonald	Gary Merritt
Jaret Gibbons	Rep. Perry Stambaugh
Patrick Henderson	Jennifer Quinn (for Zakia Elliot)
Terry Bossert	Glendon King (for Rep. Daryl Metcalfe)
Rep. Sara Innamorato	Lindsay Baxter
Sam Lehr (for Alissa Burger)	

**MEMBERS ABSENT:**

Paul Morris, Jim Felmlee, Luke Brubaker, Steve McCarter

**PA DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) STAFF:**

Lindsay Byron, Megan Porta, Christopher Nafe, Kerry Campbell, Darek Jagiela, David Althoff, Louie Krak, Michelle Ferguson, Amanda Eyer

**INVITED GUESTS:**

Marilyn Kray

**MEMBERS OF THE PUBLIC:**

Brian Smiley, Robert Barkanic, Alex Charlton, Byran Zicherl, Emily Eyster, Josephine Martin, Griffin Caruso, Josie Gaskey, Robert Routh, Claire Kemick

**MEETING:**

The August 23, 2022, meeting of the Climate Change Advisory Committee (CCAC or Committee) was called to order at 9:03 a.m. by Chairperson Steve Krug. With 11 of 21 seated members present at the start of the meeting, a quorum was established.

**MINUTES:** The minutes of the June 23, 2022, CCAC meeting were presented to the Committee for approval. A motion to approve the minutes was made by Mr. Gibbons and seconded by Mr. Henderson. There were no requests to edit the minutes by any members. The motion to approve the minutes carried by a voice vote and passed.

**MEETING SUMMARY: (This narrative provides a summary of the discussions that took place during the meeting. It is not a transcript of the proceedings.)**

## **Marilyn Kray, Constellation Energy – Electricity Generation: Advances in Nuclear and Future Uses**

Marilyn Kray provided an overview of the current scenario in the U.S. regarding nuclear energy and discussed current and future advancements in nuclear technology. She shared that at present, there is concern over lack of U.S. leadership in the nuclear industry, a continued need for fuel diversity, a need to protect national security, and a need for climate change mitigation. The response to these items has been in the form of federal legislation, Department of Energy (DOE) and Nuclear Regulatory Commission (NRC) funding, increased activity by technology developers, availability of venture capital funding, and coordination of industry initiatives. Ms. Kray stated that the future path of nuclear energy is to have flexible clean energy centers, which consist of nuclear energy bundled with renewable energy sources, that output to various loads. She continued that nuclear technology is shifting towards light water reactor (LWR) small modular reactors (SMRs), which are generally 300 megawatts or less versus the roughly 1000-megawatt LWR units currently in operation. More advanced nuclear designs include reactors that use helium instead of water to transfer heat energy away from the reactor, molten salt reactors, and lastly, fusion reactors. Ms. Kray stated that key considerations for SMRs/advanced reactors are: a wide field of developers; benefits, including lower overall cost, reduced construction risk due to modularization, enhanced safety features, ability to produce more than electricity, greater agility on the grid, and flexible operations to serve as enabling foundation for renewables; and challenges, such as lack of accurate cost estimates, uncertain regulatory approval timeline, and funding streams for developers to finalize designs. Constellation's immediate focus is on sustaining the existing LWR fleet with motivation for adopting a SMR strategy. These motivations include the ability to influence future designs by providing operational perspectives, ensure available technology alternatives for the future, create business opportunities to provide operational services to new entrants in nuclear ownership, communicate their long-term commitment to nuclear energy, and upholding their role as an industry leader. Ms. Kray explained the hydrogen hub concept, as funding for this type of technology is included in the Inflation Reduction Act. It encompasses a holistic and integrated view associated with the different phases of a hydrogen economy, including generation, storage, transport, and end users. Constellation was awarded a DOE grant to demonstrate an integrated hydrogen production strategy and they have selected to install a Proton Exchange Membrane (PEM) electrolyzer at the Nine Mile Point plant, which should be completed in 2023. Constellation has another DOE demonstration project that is a front-end engineering study called the Byron Direct Air Capture project. This project is set to conclude in 2023 and will essentially determine how the technology would work in order to capture 250,000 tons of CO<sub>2</sub> per year. Ms. Kray concluded by stressing the importance of state policy initiatives to support nuclear power, including clean energy legislation, zero emission credits, carbon mitigation credits, clean energy standards and carbon reduction, SMR initiatives, repealing nuclear moratoriums, and hydrogen development opportunities.

### *DISCUSSION:*

Mr. Merritt asked [about] the water consumption in the electrolyzer and if water availability would be an issue in this technology. Ms. Kray responded that water use would be a function of hydrogen output, but that she doesn't have those specific statistics available at the time.

Mr. Czarnecki asked if smaller modular reactors are currently being used by any industries and municipalities and if not, when can we expect that to happen. Ms. Kray stated that they are not currently being used commercially but the entire U.S. nuclear submarine fleet runs on small modular reactors. There is one design approved by the regulator but currently, none are under construction; the target is the end of the decade.

Mr. Mondor asked how molten core/other designs minimize the risk of the spent fuel disposal issue. Ms. Kray said that the new designs have these same challenges but are looking at reprocessing this fuel. Also, with more efficient plants there becomes a lower volume of spent fuel. One current design is geared toward reprocessing to put into a new reactor.

Mr. Smiley asked if small reactors can be run individually (co-located). Ms. Kray stated that they are designed as standalone units but two could be co-located, or a new reactor could be co-located to an existing fleet. Also, security is being considered into the design of the reactors, including being located underground. Existing plants are good candidates for a new SMR due to the existing infrastructure.

Mr. Walters asked for distinction between these new technologies and more traditional reactors. Ms. Kray explained that fusion is the biggest distinction; fission is traditional, and all the other technologies previously discussed, aside from fusion, are fission-based.

Mr. Althoff asked if the current strategy in PA's Climate Action Plan of maintaining nuclear energy generation levels is realistic. Ms. Kray stated that at a minimum, nuclear energy generation needs to be maintained. As coal plants are being retired, this energy generation needs to be made up somewhere. Renewables and nuclear can make up this generation gap (i.e., a minimum of the current output is required). Nuclear energy efficiency has greatly increased (currently around 93%) near the maximum levels of efficiency, so any increase in demand would need to be generated in other ways.

Mr. Krug asked about upgrading outputs of plants. Ms. Kray explained that units can be improved, and designs reflect this. They have also extended the license for their fleet from 40 years to 60 years. They want to keep existing plants effectively operational for as long as possible, but they also recognize that eventually they will need to be retired.

**Dr. Melissa Lott, Columbia University – Gas Utilities Energy Efficiency & Conservation: Getting to Net-Zero Power**

Dr. Lott was not able to join due to illness; she provided a prerecorded video presentation. She discussed the focus on a net-zero team for the future. In 2019, about 37% of electricity in the U.S. was from zero-carbon sources; if we continue in the current trajectory, this should be close to 50% by 2035. She presented several scenarios that can be pursued to reach zero-carbon by 2035. All scenarios need additional action to achieve results. To get to a net-zero economy, greater efficiency and use of electricity are needed. Dr. Lott stated that there is a need for zero marginal cost variable power plants (solar/wind); energy storage technologies (short duration batteries and long duration storage such as zero carbon hydrogen); and firm dispatchable zero-carbon power plants. All three are necessary for affordability, reliability, and resilience. Nuclear energy scenarios show continued use of existing power plants with adoption of new technologies and have a lot of variables, including how long the plants will stay online and what, if any, types of new nuclear technology will be incorporated into the existing system. Dr. Lott discussed that long-duration energy storage capacity costs must be equal or less than \$20/kWh to reduce costs by greater than or equal to 10%. She reviewed her key takeaways, including: the need to keep existing zero-carbon technologies operating as long as possible; frame policies to support 100% zero-carbon power; support research, development, and deployment of new and improved zero-carbon technologies across all three technology pillars; support investments in the transmission and distribution grid to advance the efficient movement of zero-carbon electricity from power plants to communities; and explore and establish regional collaborations.

*DISCUSSION:*

As Dr. Lott was not available, Ms. Byron asked that any questions be submitted to her via email or emailed directly to Dr. Lott.

**PUBLIC COMMENT:** No public comments were presented at this meeting.

**CCAC Officer Election:** Every 2 years, elections are held for chair and vice-chair. Mr. Krug, current chair, expressed interest in maintaining his office. Nominations were taken from the floor for chair; Mr. Krug was nominated by Mr. Graff. Mr. Mondor seconded the nomination. Mr. Krug accepted the nomination and a verbal acceptance of the nomination was taken. The floor was opened for vice-chair nominations. Mr. Krug nominated Mr. Mondor; Mr. Graff seconded the nomination. Mr. Mondor accepted nomination, and there were no objections.

#### **DEP UPDATES:**

Lindsay Byron discussed the draft 2022 GHG report. The 2019 data shows a small net increase in GHG from 2018 in industrial, transportation, and electricity production. Decreases occurred in residential, commercial, and agricultural sectors. There was a notable change in the waste management sector. Industrial is the main sector for GHG emissions, followed by electricity production and transportation. The largest decrease of emissions is from electricity production (largely from coal to a natural gas shift). There is a small decrease in electricity consumed in PA; exports increased by a significant amount, causing an increase in the total electricity generated (NJ, DE, and MD receive a lot of the exports). Natural gas generation continues to increase, oil is nearly phased out, and coal continues to decrease. Coal is still the main source of GHGs (50.7% in 2019). Extraction activities for both gas and coal are not included in these numbers (included in the industrial sector). Industrial sector emissions continue to rise (fugitive emissions from abandoned/orphaned wells not included). GHGs emissions from combustion of fossil fuels decreased slightly from 2018-2019. Mr. Sherrick stated that he believes coal mining/abandoned mine emissions are increasing due to coal being mined but not being consumed in PA, to which Mr. Walters agreed. Mr. Althoff pointed out that, essentially, the industrial sector has maintained emissions per source from 2010-2019. There was discussion regarding alternative ways to report emissions, such as per capita and emissions correlated with production outputs. The residential sector has been fairly steady (this does not include electricity; the sources are primarily heating fuels). All electricity use is reported in the electricity production sector. Residential emissions by type: coal is nearly phased out and natural gas has increased. Mr. Graff offered that it would be beneficial to consider looking at degree days and including electric heating and there was subsequent discussion regarding other ways to report residential emissions. The commercial sector has been fairly steady with similar sources of emissions as residential. Transportation sector emissions have leveled over the last several years; most emission come from motor gasoline, followed by diesel and jet fuel and natural gas. The waste management sector has remained stagnant; in the agricultural sector, most emissions are from agricultural soil management, enteric fermentation, and manure management and have remained relatively constant. A summary by GHG emissions shows that most are from CO<sub>2</sub>, followed by CH<sub>4</sub>. Methane associated w/natural gas extraction has increased slightly. Ms. Byron asked for comments on the draft report by the second week of September. Mr. Krug noted that the conclusion should include a focus on the industrial sector and how it is a continued challenge. Ms. Kilpin-McDonald offered that there may be opportunities to engage the industrial sector regarding what types of emissions targets they are considering. Mr. Althoff suggested looking at rates from 2017-2018 forward to assist with action planning.

Dave Althoff provided an update on DOE funding. There is an Infrastructure Investment and Jobs Act (IIJA) link on the DEP webpage that is broken down into various categories, such as the Chesapeake Bay, clean energy, water infrastructure, etc. The IIJA link and news includes information on a public meeting

to be held on 8/31 regarding DEP's application to DOE for funding to improve the strength of PA's electric grid. He reviewed other various funding available and what funding the Energy Programs Office (EPO) intends to pursue. The IIJA provides \$60 billion in clean energy funding, while the Inflation Reduction Act provides \$369 billion. Other funds include: the EPA greenhouse reduction fund, which adds 7 billion in assistance; the climate pollution reduction grants; the climate justice block grant for higher learning and community groups, and a methane emissions reduction program. There are also two programs of note providing \$8.8 billion for residential programs: a home energy performance-based whole house rebate program and a high efficiency electric home rebate program, both administered by the EPO.

Lindsay Byron discussed the forthcoming project, Climate Action for Disadvantaged Communities. Energy Programs Office will hire a contractor to facilitate community engagement to develop climate strategies that will benefit disadvantaged communities. The outcomes of this project will help inform the 2024 Pennsylvania Climate Action Plan, as well as other programs developed by EPO.

Lastly, Ms. Byron provided an update to the Committee on DEP's climate outreach activities since the last Committee meeting.

### **Next Meeting**

Ms. Byron reminded the Committee that the next meeting will be held October 25, 2022, and received some good speaker recommendations. She encouraged members to provide additional recommendations for the meeting. The next meeting will focus on industrial and fuel supply. She proposed expanding topics to include additional topics on electricity production. Ms. Kipin-McDonald stated that she will look into a speaker from her company potentially in December as well as having someone from CDP present. Mr. Walters stated that Team PA will have a report available that may be of interest for discussion in the next meeting. Dave Althoff emphasized adding diversity, equity, and inclusion in these meetings.

Mr. Krug discussed DEP's upcoming request for proposal for the Climate Action Plan and that any corresponding topics may make for discussion in upcoming meetings.

Mr. Althoff discussed the GreenGov event on 10/3, which focuses on United Nations sustainability initiatives and how PA is helping to meet those goals.

### **Adjournment**

A motion to adjourn was made by Mr. Jaret Gibbons and seconded by Mr. Joe Sherrick. The motion carried, and the meeting was adjourned at 12:04 p.m.