



1	AGENDA	
2	<u>PRESENTATION</u>	<u>PAGE</u>
3	<b>Welcome and Opening Remarks</b>	11
4	Commissioner Dan M. Berkovitz	11
5	Chairman Heath P. Tarbert	18
6	Commissioner Rostin Behnam	20
7	Commissioner Dawn D. Stump	21
8	<b>Panel I: The Global Energy Transition: Evolving</b>	
9	<b>Standards Impacting Physical Markets</b>	24
10	Tyson T. Slocum	24
11	Jenny Fordham	32
12	Sue Kelly	40
13	Vincent Johnson	46
14	<b>Panel II: Exchange-Traded Environmental</b>	
15	<b>Derivatives Contracts</b>	78
16	Daniel Scarbrough	78
17	Michael Kierstead	90
18	Richard Sandor	96
19		
20		
21		
22		

1	AGENDA (Continued)	
2	<u>PRESENTATION</u> (Continued)	<u>PAGE</u>
3	<b>Panel III: The Impact of the Global Energy</b>	
4	<b>Transition on Market Participants' Use of the</b>	
5	<b>Energy and Environmental Derivatives Markets</b>	132
6	Matthew Picardi	132
7	Lopa Parikh	147
8	Paul Hughes	158
9	William F. McCoy	172
10	Jackie Roberts	181
11	<b>Closing Remarks</b>	
12	Commissioner Rostin Behnam	199
13	Commissioner Dawn D. Stump	201
14	Commissioner Dan M. Berkovitz	203
15		
16		
17		
18		
19		
20		
21		
22		

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P R O C E E D I N G S

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MS. KNAUFF: Good morning. As the Secretary

of the Energy and Environmental Markets Advisory

Committee, it is my pleasure to call this meeting to

order. This is the second meeting for Commissioner

Berkovitz as the sponsor of the committee and the

second EEMAC meeting of 2019. EEMAC Member Dena E.

Wiggins will serve as the Chair of today's meeting.

I would like to welcome all of our new and

returning Members and Associate Members to the

committee. We have six new Associate Members at

today's meeting. So let's have each Member and

Associate Member state his or her name, the

organization that he or she represents on the EEMAC,

and whether he or she is a Member or an Associate

Member of the committee. When you introduce yourself,

please press the silver button at the base of your

microphone, wait for the red light to indicate that it

is on, and keep the microphone only a few inches away

1 as you speak so that the webcast and teleconference  
2 audiences can hear you.

3 Please note that the meeting is being  
4 recorded on the phone. So it is important that the  
5 microphones capture the entirety of your remarks.  
6 Please turn off your microphone after you speak and  
7 refrain from placing mobile devices near the  
8 microphones as this may cause interference.

9 We will begin with Matthew.

10 MR. AGEN: Good morning. My name is Matthew  
11 Agen. I am the Assistant General Counsel at the  
12 American Gas Association. The American Gas Association  
13 represents over 200 natural gas utilities throughout  
14 the United States. And I am happy to be here. We are  
15 an Associate Member of the committee.

16 MR. ALLISON: I am James Allison, JCA  
17 Advisory Services, LLC, which is a boutique consulting  
18 firm. Previously I was with ConocoPhillips. So I know  
19 many of you from that capacity. And I will confess I  
20 don't know whether I'm a Member or Associate Member.  
21 So, Abigail, if you can enlighten me on that point?

22 MS. KNAUFF: Associate Member.

1                   MR. CICIO: My name is Paul Cicio. I am  
2 President of the Industrial Energy Consumers of  
3 America. We represent energy-intensive manufacturing  
4 companies that are substantial consumers of natural gas  
5 and electricity. Associate Member.

6                   MR. COTA: I am Sean Cota, President and CEO  
7 of NEFI, which is an organization that represents  
8 retail home heating oil and heating fuels marketers,  
9 including renewable fuels, which is a very significant  
10 part of what we do. We heat about 6 and a half million  
11 homes, of which 82 percent are in the Northeast sector  
12 of the United States.

13                  MR. DUNLEAVY: Dan Dunleavy with Ingevity  
14 Chemicals, a new Associate Member. We are based in  
15 Charleston, South Carolina. Most of our products are  
16 considered biorenewables. We are a large consumer of  
17 natural gas and electricity.

18                  MR. HEINLE: Erik Heinle, new Associate  
19 Member as well. D.C. Office of the People's Counsel.  
20 We represent residential ratepayers and small  
21 businesses in the District of Columbia.

22                  MR. HUGHES: Paul Hughes. I am the

1     Generation Policy Manager at Southern Company. We are  
2     an electric and natural gas utility holding company in  
3     the Southeast. [Associate Member]

4             MR. CREAMER: Rob Creamer. I am with FIA  
5     PTG, which is an association that represents the  
6     principal trading community. [Member]

7             MR. DURKIN: Hello. Bryan Durkin, President  
8     of the CME Group. [Member]

9             MR. JACKSON: Ben Jackson, President of  
10    Intercontinental Exchange. Member.

11            MR. SLOCUM: Tyson Slocum. I direct the  
12    Energy Program of Public Citizen, an organization  
13    representing household consumers. [Member]

14            MS. FORDHAM: I am Jenny Fordham. I am with  
15    the Natural Gas Supply Association. [Guest panelist]

16            MS. KELLY: I am Sue Kelly. I am the  
17    President and CEO of the American Public Power  
18    Association. We represent the interests of  
19    approximately 2,000 government-owned utilities, state  
20    and local governmental units, in the United States. I  
21    am an Associate Member.

22            MR. JOHNSON: Hello. Vincent Johnson. I am

1 with BP. I am the Head of Commercial Advocacy and  
2 Regulatory Affairs for BP Supply and Trading Program.  
3 And I am an Associate Member.

4 MR. McCOY: Bill McCoy. I am with Morgan  
5 Stanley. And I am a Member.

6 MS. PARIKH: Lopa Parikh, Senior Director of  
7 Federal Regulatory Affairs at the Edison Electric  
8 Institute. We represent all of the investor-owned  
9 utilities in the United States. And I am a regular  
10 Member.

11 MS. ROBERTS: Jackie Roberts. I am the West  
12 Virginia Consumer Advocate. I am charged by law to  
13 represent the interests of retail customers in state  
14 and Federal courts, which includes the state  
15 commission, the Federal FERC, and I do a lot of RTO  
16 work. And I am a Member.

17 MR. MALIK: Kaiser Malik with the Calpine  
18 Corporation. We are a power generation company with  
19 assets in all of the major markets with a large retail  
20 footprint. I am an Associate Member and happy to be  
21 here. Thank you.

22 MR. MORK: I am Robert Mork. I am working



1 with the National Association of Utility Consumer  
2 Advocates, representing utility consumers. [Associate  
3 Member]

4 MR. PARSONS: I am John Parsons from MIT  
5 Sloan School of Management and here as a Special  
6 Government Employee as an Associate Member.

7 MR. PICARDI: I am Matt Picardi. I am here  
8 on behalf of the Commercial Energy Working Group, which  
9 is a diverse group of energy companies that supply  
10 various products to commercial, residential, industrial  
11 customers. [Associate Member]

12 MR. PROKOP: Good morning. Mike Prokop with  
13 Deloitte and Touche, LLP. I am an Associate Member.

14 MS. PRUDENCIO: Good morning. Malinda  
15 Prudencio. I am the Chief Risk Officer for the Energy  
16 Authority. We are based out of Jacksonville, Florida,  
17 but we do risk management for 50 public power  
18 utilities. [Associate Member]

19 MR. SANDOR: I am Richard Sandor, CEO of AFX,  
20 which is developing an alternative to LIBOR and also  
21 the Aaron Director Lecturer in Law and Economics at the  
22 University of Chicago. [Associate Member,

1 Environmental Financial Products, LLC]

2 MS. SIDHOM: Noha Sidhom, the Executive  
3 Director of the Energy Trading Institute. We represent  
4 medium- to large-sized trading firms that transact in  
5 the power and gas markets. And we are a new Associate  
6 Member.

7 MS. KNAUFF: Thank you. I would also want to  
8 confirm that we have an Associate Member, Timothy  
9 McKone of Citigroup Energy, on the phone.

10 MR. MCKONE: Yes. I am here. Hi, Abigail.

11 MS. KNAUFF: Excellent. Thank you.

12 We look forward to today's discussions and  
13 full participation by all of the EEMAC Members and  
14 Associate Members. If you would like to be recognized  
15 during today's discussion, please place your name card  
16 vertically on the table before you speak. Please  
17 identify yourself and your organization that you  
18 represent on the EEMAC. For EEMAC Members or Associate  
19 Members participating by phone, please keep your phone  
20 on mute until you are ready to speak and identify  
21 yourself beforehand.

22 With the logistics out of the way, we will

1 now hear from Commissioner Berkovitz, the EEMAC  
2 Sponsor, who will give his opening remarks.

3 COMMISSIONER BERKOVITZ: Thank you, Abigail.

4 Good morning, and welcome to all of the  
5 Members and Associate Members of the Energy and  
6 Environmental Markets Advisory Committee.

7 I would like to begin by welcoming our six  
8 new Associate Members, who have introduced themselves,  
9 but I would like to recognize them: Dr. John Parsons  
10 from MIT; Sean Cota, the President and CEO of New  
11 England Fuel Institute; Noha Sidhom, CEO of TPC Energy,  
12 LLC and the co-founder and Executive Director of the  
13 Energy Trading Institute; Kaiser Malik, Vice President  
14 and Assistant General Counsel for Calpine's wholesale  
15 power, natural gas, and environmental trading and  
16 marketing operations; Erik Heinle, from the District of  
17 Columbia Office of People's Counsel; and Dan Dunleavy,  
18 Manager of Energy Strategy for Ingevity Corporation. I  
19 would like to welcome each of you and look forward to  
20 hearing from your diverse perspectives.

21 I would like to thank also all of our  
22 returning Members and Associate Members for joining us

1 today. The insights you share with the Commission  
2 through your participation in the EEMAC are very  
3 valuable and much appreciated.

4 I would also like to thank Dena Wiggins for  
5 her continued service to the committee as the EEMAC  
6 Chair. Ms. Wiggins is the President and CEO of the  
7 Natural Gas Supply Association and has over 25 years of  
8 experience representing energy clients in Federal  
9 regulatory matters. This is Dena's third meeting as  
10 EEMAC Chair. And we are grateful for your volunteering  
11 and leadership in this capacity.

12 I am pleased to recognize our Chairman and  
13 fellow Commissioners here today: Chairman Tarbert,  
14 Commissioner Behnam, Commissioner Stump to my left, and  
15 appreciate their participation and support for this  
16 committee.

17 I would also like to thank the Commission  
18 staff that made today's meeting possible, including  
19 Abigail Knauff, our EEMAC Secretary; Margie Yates and  
20 Altonio Downing of the Commission staff; Lucy Hynes and  
21 Erica Quinlan on my staff; Michelle Ghim in the Office  
22 of General Counsel; and everyone else who worked so

1 hard behind the scenes to prepare for this meeting. I  
2 came down yesterday afternoon as they were going  
3 through a run through a final setup. And everything  
4 that you see so neat and organized and working together  
5 was in a total state of flux yesterday. These panels  
6 were open. The mikes were being plugged in. The  
7 nametags were put in the appropriate place. All of the  
8 packets were organized. So what you see today -- and  
9 the organization looks easy and looks simple, but it  
10 was actually really hard. And I think the fact that it  
11 looks easy and looks simple is a testament to how hard  
12 and difficult and how much work they put into it. So,  
13 again, I would like to thank everybody for all of the  
14 work they put into facilitating today's meeting.

15 I now would like to recognize Sue Kelly,  
16 President of the American Public Power Association.  
17 Sue announced that she will be leaving us at the end of  
18 this year. And this will be your last meeting on this  
19 advisory committee?

20 MS. KELLY: That is correct. And I very much  
21 appreciate the opportunity to provide this service.

22 COMMISSIONER BERKOVITZ: Thank you. My

1 relationship with Sue goes back many years: my  
2 previous service here at the Commission as General  
3 Counsel, worked together with Sue in the APPA on the  
4 Dodd-Frank legislation and implementing regulations.  
5 Shortly after I left the agency, I recall Sue's  
6 invitation, going out to Seattle to an APPA meeting,  
7 providing a tutorial on the Commission's new  
8 regulations. Both then and now, Sue has been a  
9 tireless -- perhaps a better word would be  
10 "relentless" -- advocate for APPA in the interest of  
11 public power utilities here at the Commission. You  
12 have been a true leader in this industry. And your  
13 strong voice will be sorely missed here at the CFTC.  
14 So thank you.

15           The CFTC established this committee in 2008  
16 as the Energy Markets Advisory Committee to advise the  
17 Commission on developments in energy markets that raise  
18 new issues for the CFTC and to recommend appropriate  
19 regulatory responses to ensure market integrity and  
20 protect consumers. In 2009, under former Commissioner  
21 Bart Chilton's leadership, the Commission expanded the  
22 scope of the committee to include environmental

1 markets.

2           Like the committee's inaugural meeting in  
3 2009, we will focus today's presentations on the  
4 environmental markets. But in the intervening 10  
5 years, the landscape of energy generation has changed  
6 dramatically, in ways that nobody could have foreseen  
7 or did foresee 10 years ago. New technologies have  
8 enabled the U.S. to be the world's largest producer of  
9 natural gas and crude oil. And energy generation from  
10 renewable sources, such as solar and wind, has doubled.  
11 As the mix of energy sources continues to diversify and  
12 firms continue to innovate, we can expect further  
13 changes in the physical markets, which may lead to  
14 corresponding changes in how market participants use  
15 derivatives to hedge their risks.

16           Today's meeting will focus on how the  
17 evolving mix of energy generation resources, which  
18 includes coal, natural gas, nuclear, oil, and various  
19 renewable energy sources, is impacting the physical  
20 markets and may subsequently impact the energy and  
21 environmental derivatives markets that are regulated by  
22 the CFTC.

1           Our first panel will explore the evolving  
2 state, Federal, and global regulations that impose  
3 various renewable energy mandates and goals for energy  
4 production and procurement. Tyson Slocum from Public  
5 Citizen will begin by discussing how regulation and  
6 market forces are affecting the deployment of renewable  
7 energy and suggest ways in which the Federal Government  
8 can assist in the growth of renewable energy. Jenny  
9 Fordham from the Natural Gas Supply Association, Sue  
10 Kelly from APPA, and Vincent Johnson from BP Energy  
11 Company will discuss some of the challenges of and  
12 opportunities for incorporating renewables into the  
13 power supply, including the shifts in capital  
14 investment, maintaining affordable prices, and managing  
15 risk.

16           Panel II, "Exchange-Traded Environmental  
17 Derivatives Contracts," we will hear from Daniel  
18 Scarbrough of IncubEx, a partner of Nodal Exchange and  
19 EEX Group, and Michael Kierstead of ICE. Dan and Mike  
20 will give us an overview of the current state of CFTC-  
21 regulated environmental futures markets, including  
22 emissions trading and renewable energy certificate



1 futures. Dr. Richard Sandor, who is a global leader in  
2 successfully creating new financial products and  
3 markets, will explain how new products and markets are  
4 created.

5 Our third and final panel will discuss the  
6 effect of the energy transition on how market  
7 participants hedge risk using exchange-traded and OTC  
8 derivatives. Our panelists include Matt Picardi of the  
9 Commercial Energy Working Group, Lopa Parikh of Edison  
10 Electric Institute, Paul Hughes of Southern Company,  
11 Bill McCoy of Morgan Stanley, and Jackie Roberts of the  
12 Consumer Advocate Division of West Virginia. The  
13 panelists will describe how they use CFTC-regulated  
14 exchanges and OTC markets to manage risks for renewable  
15 energy commodities and project financing as well as  
16 limitations presented by those markets.

17 We look forward to hearing from our Members  
18 and Associate Members on these issues.

19 With that, I will turn it back to Abigail.

20 MS. KNAUFF: Thank you, Commissioner  
21 Berkovitz.

22 I now recognize Chairman Tarbert to give his

1 opening remarks.

2 CFTC CHAIRMAN TARBERT: Thank you very much,  
3 and good morning. I am very pleased to be attending my  
4 first EEMAC meeting as CFTC Chairman.

5 Our energy markets are the bedrock of our  
6 economy. The United States is the world's largest  
7 producer of both natural gas and oil. The United  
8 States is the second-largest generator of electricity.  
9 So one of my strategic goals as Chairman is to regulate  
10 our derivatives markets to promote the interests of all  
11 Americans. And this is critical for the energy sector  
12 in particular. Energy derivatives markets affect the  
13 pocketbook of every American, from the price of  
14 gasoline at the pump to the cost of heating our homes.

15 To achieve this goal, the Commission needs  
16 insight from all of you. That makes today's EEMAC  
17 meeting especially important. I want to thank  
18 Commissioner Berkovitz and his staff for sponsoring  
19 this meeting. Thanks also to Abigail, our Designated  
20 Federal Officer, for organizing it. And I am also  
21 grateful to Dena and to all the Members and the  
22 Associate Members that are here today, both those of

1 you that have served that are stepping down and those  
2 of you that have joined. And I have gotten a chance to  
3 meet a number of you during my first 100 days here at  
4 the CFTC, and I look forward to meeting the rest of you  
5 in due course. And it is really important for us to  
6 really hear your views because we find it incredibly  
7 insightful.

8           Many of the CFTC's core agenda items directly  
9 touch on the energy markets. The Commission's  
10 forthcoming position limits rule proposal is one  
11 example. And the proposal is intended to provide an  
12 appropriately flexible bona fide hedging exemption.  
13 This will allow energy producers, merchandisers, and  
14 distributors to better manage the many risks of your  
15 businesses.

16           Another example is the Commission's swap data  
17 reporting rules. The changes we will propose are going  
18 to be designed to streamline reporting. This should  
19 reduce regulatory burdens and also make it easier to  
20 use swaps data, increasing transparency in our energy  
21 swaps markets. These and other efforts will help  
22 promote America's energy derivatives markets through

1 sound regulation.

2 I look forward to working with all of you to  
3 ensure that these markets continue to serve our  
4 participants and consumers. And thank you very much  
5 again for being here.

6 MS. KNAUFF: Thank you, Chairman Tarbert. I  
7 now recognize Commissioner Behnam to give his opening  
8 remarks.

9 COMMISSIONER BEHNAM: Good morning. Welcome,  
10 everyone. Good to see you here in Washington at the  
11 CFTC. First off, thank you to Commissioner Berkovitz  
12 for sponsoring the EEMAC and holding this important  
13 meeting. And thanks to Abigail, the DFO; and Dena as  
14 Chair.

15 I want to emphasize Commissioner Berkovitz's  
16 comments, obviously, about the work that goes into  
17 these meetings and the staff-level sort of  
18 prioritization of all of the work that has to be put  
19 together to make the meetings easy and helpful and  
20 productive for all of us. So all of these individuals  
21 do deserve a big thanks.

22 Looking forward to the agenda, as the

1 Chairman noted. As America and the energy production  
2 that we produce is so important for our citizens and as  
3 we begin to transition energy sources, these  
4 discussions become ever more important. I think from  
5 the CFTC's perspective, as we think about as a  
6 community of market participants and regulators, to  
7 think about what energy products, what risk management  
8 products our consumers can use to help them mitigate  
9 risk and ultimately provide consumers with the most  
10 affordable and productive energy sources. So certainly  
11 looking forward to today's conversation.

12           Again, thank you to Commissioner Berkovitz  
13 for his sponsorship and convening this meeting. And I  
14 look forward to the discussion.

15           MS. KNAUFF: Thank you, Commissioner Behnam.  
16 I now recognize Commissioner Stump to give her opening  
17 remarks.

18           COMMISSIONER STUMP: Someone always has to go  
19 last. So I won't repeat what has been said, but I am  
20 very grateful to everyone who worked hard to pull the  
21 meeting together.

22           There is no space in the markets that we work

1 in where it is more obvious that the markets we  
2 regulate are very dynamic than in the energy space.  
3 They are constantly changing. Conversations that we  
4 were having 15 years ago, some are still relevant.  
5 Position limits comes to mind. Others we have moved  
6 past, and we have built upon successes and lessons  
7 learned. And so thank you all for being willing to  
8 help us as we look at today's structure and today's  
9 needs in the regulated derivatives markets such that we  
10 can build upon our successes and complete the work that  
11 is left yet to be completed. So thank you.

12 MS. KNAUFF: Thank you, Commissioner Stump.

13 Dena, I am going to turn the meeting over to  
14 you now. Thank you.

15 CHAIRPERSON WIGGINS: Thank you. Thank you,  
16 Commissioner Berkovitz, Mr. Chairman, and all of the  
17 CFTC Commissioners, and also a special thanks to  
18 Abigail for all that she has done to get us ready for  
19 today.

20 I am honored to be a Member of the EEMAC and  
21 to continuing serving as the Chair of the EEMAC. The  
22 committee serves as an important vehicle to discuss

1 matters of concern to exchanges, trading firms, end-  
2 users, energy producers, and regulators within our  
3 energy and environmental markets as well as the  
4 Commission's regulations of these markets. A well-  
5 informed regulatory environment that understands and  
6 fosters open, transparent, competitive, and financially  
7 sound energy markets is critical to our energy and  
8 environmental derivatives markets. It is also critical  
9 to the hedgers and consumers that rely on our markets  
10 to power our homes and businesses, fuel our  
11 transportation, and generate jobs and economic growth.

12           As Chair, I look forward to facilitating the  
13 discussion today of Associate Members' perspectives to  
14 the EEMAC and working with EEMAC Members to provide the  
15 Commission with feedback and recommendations that  
16 assist the agency in its oversight of the markets.

17           To ensure that our discussion today is  
18 consistent with EEMAC charter, which prohibits  
19 Associate Members from providing reports and  
20 recommendations directly to the Commission, we will  
21 first take questions and comments from the EEMAC  
22 Associate Members after the panelists have made their

1 presentations and prepared remarks on each of the  
2 panels. And then we will turn to the EEMAC Members for  
3 their questions and comments on the panelists'  
4 presentations, prepared remarks, and any feedback  
5 provided by the Associate Members.

6           So, with that out of the way, let's turn to  
7 our first panel, which will provide a primer on the  
8 recent evolution of environmental regulation and the  
9 increased use of biofuels and renewable energy sources.  
10 The panel will consist of statements from Tyson Slocum  
11 of Public Citizen, Jenny Fordham of the NGSA, Sue Kelly  
12 of APPA. And the primer will conclude with a  
13 presentation by Vincent Johnson of BP Integrated Supply  
14 and Trading. Tyson, we will begin with you.

15           MR. SLOCUM: Great. Thank you so much,  
16 Commissioner Berkovitz, for being such a great sponsor  
17 of this committee and for all of the other members of  
18 the Commission and especially to staff, who I always  
19 enjoy working with so much, in helping to put this  
20 together.

21           So it is remarkable what we -- in this  
22 country and around the world, we are in the midst of a



1 disruptive transition in energy. And it is exciting to  
2 be a part of it.

3           On the electricity side, there are really  
4 three factors that are driving these disruptive changes  
5 that we are seeing in power markets. In the United  
6 States, it is access to cheaper natural gas because of  
7 the explosion of hydraulic fracturing. It is the  
8 result of increasingly inexpensive and abundant  
9 renewable energy led by utility-scale wind and solar,  
10 where prices continue to drop and are cost-competitive  
11 or cheaper in many power markets in the United States.  
12 And, finally, because of flatlining demand, essentially  
13 since 2007, U.S. electricity demand has remained  
14 relatively flat. And so without large annual  
15 increases, there isn't as much pressure in many U.S.  
16 power markets to bring on large new sources of  
17 generation. And so these disruptive changes are  
18 rendering a lot of existing baseload power,  
19 particularly coal and nuclear, to become as, as those  
20 industries call it, prematurely uneconomic. And so we  
21 are seeing these changes, and they are happening fairly  
22 rapidly.

1                   On the transportation side, the  
2   transportation fuel network is still almost all  
3   petroleum, but we are starting to see changes based  
4   upon market forces and consumer preferences and the  
5   need to address climate change. But the transition in  
6   transportation has been slower, and there are more  
7   challenges, logistical and infrastructure challenges,  
8   present. But just last year, a relatively smaller  
9   automobile manufacturer by the name of Tesla pretty  
10  much single-handedly shook up the global auto-  
11  manufacturing market when Wall Street and its stock  
12  price was valued at higher market capitalization than  
13  well-established and much larger rivals. And that is  
14  because the market understood that the future of the  
15  automobile is moving away from the internal combustion  
16  engine and towards the electrification.

17                  I think headwinds persist in these trends  
18  that we are seeing in the electric power sector and  
19  eventually what we are going to see in the  
20  transportation sector towards cleaner renewable sources  
21  of energy in the electrification and the transportation  
22  sector. We are seeing persistent regulatory and market

1 barrier to the full deployment of some of these more  
2 disruptive technologies.

3           Now, on the electric power side, a lot of the  
4 changes that helped bring renewable energy into the  
5 marketplace were the nearly 30 states that had mandates  
6 to utilities to produce or procure a certain amount  
7 of their electricity from renewable resources. And  
8 these mandates created robust compliance markets for  
9 tradeable renewable energy certificates. Now, some  
10 states have been moving forward in response to Federal  
11 inaction on climate change where states are assuming  
12 more of a leadership mantle than we have seen in  
13 Washington, D.C. and are implementing more aggressive  
14 targets, some moving towards 100 percent renewable  
15 electricity generation by certain targets. And so  
16 while some of these compliance markets are growing,  
17 absent a Federal mandate where we would have more  
18 uniform REC markets and larger national standards, I  
19 think there is going to be a cap on growth for some of  
20 these.

21           And especially what we are seeing is some  
22 pushback in the form of some Federal Energy Regulatory

1 Commission and regional transmission organization  
2 proposals that are trying to counter the rise of  
3 renewable energy. We have seen some specific market  
4 proposals in New England and in PJM, which is the  
5 largest market in the United States, stretching from  
6 Illinois to here in Washington, D.C. And we have seen  
7 formal proposals accepted by FERC in New England, for  
8 example, that force what FERC and the RTOs call state-  
9 sponsored energy resources, like renewables, to force  
10 them to bid into capacity markets at a higher price  
11 than they normally would because according to FERC and  
12 these private market operators, the renewables are  
13 unfairly bidding at cheaper prices.

14           There is a pending order for PJM that would  
15 replicate what is going on in New England. And, in  
16 addition, PJM is trying to put together something  
17 called price formation, which would reorder dispatch to  
18 move certain types of baseload coal and nuclear ahead  
19 in the order, even if they submit higher bids than some  
20 renewable energy. Some of that is being driven by  
21 concerns that renewables don't offer the same  
22 resilience or reliability attributes, but the fact of

1 the matter is, is that the impacts of these market  
2 changes are having real impacts on slowing the growth  
3 of renewable energy in our markets, even though they  
4 are increasingly cheaper.

5           On the transportation side, while the longer-  
6 term future is absolutely going to be a transition to  
7 more electrification, in the meantime, congressional  
8 mandates from 2005 and 2007 require oil refiners to  
9 blend in certain amounts of biofuels into motor  
10 gasoline, but this market recently has been quite  
11 volatile.

12           And there are a number of serious problems  
13 with the RIN market because of some actions taken by  
14 the current administration that respond to concerns by  
15 Carl Icahn and some other oil refiners that are forced  
16 to purchase their needed RINs because they can't blend  
17 the biofuels themselves. And this has led to  
18 instability in the RIN market. And so the outlook for  
19 biofuel and RIN market is limited long-term because as  
20 we have more electric vehicles penetrating the market,  
21 liquid petroleum and liquid biofuels are going to have  
22 a shrinking share of market. But in the short-term, I

1 think some of the political instability introduced by  
2 an inability to find a compromise between the ethanol  
3 producers and the oil refiners that are doing the  
4 blending is leading to some problems in the RIN market.

5           And while most people do believe that  
6 electrification is the future, the rise of EVs is  
7 contingent on the deployment of charging  
8 infrastructure. And absent comprehensive Federal  
9 action on climate change, right now most of the  
10 activity to promote electrification infrastructure is  
11 being done through state utility commissions, where  
12 electric utilities have been offering to build into  
13 their rate bases investments for charging stations. In  
14 almost every state proceeding where this is happening,  
15 representatives of the oil industry have intervened and  
16 have opposed these efforts. And so the outcome for the  
17 needed infrastructure investments is stymied by the  
18 lack of Federal action but also the uncertainty due to  
19 regulatory challenges that are happening at the state  
20 level.

21           And so I think in order for the United States  
22 to fully realize clean energy potential, we need to

1 have aggressive action at the Federal level to address  
2 climate change. The science tells us that we have  
3 to -- the 2007 Supreme Court decision *Massachusetts v.*  
4 *EPA* doesn't give the Federal Government a lot of  
5 options other than to regulate greenhouse gas  
6 emissions. And I think only when we have got  
7 comprehensive Federal action will we see  
8 correspondingly robust environmental commodity markets.

9 I remember that in the wake of the passage of  
10 the Waxman-Markey cap-and-trade legislation that passed  
11 the House of Representatives in 2009, Goldman Sachs  
12 produced a research report predicting that upon passage  
13 and upon integration with existing cap-and-trade  
14 systems in Europe and elsewhere, that emission trading  
15 credit markets would become bigger than crude oil  
16 markets globally. And so, obviously, that hasn't  
17 happened, but we at Public Citizen continue to support  
18 efforts to grow these environmental markets by having  
19 robust Federal action on climate change.

20 Thanks a lot.

21 CHAIRPERSON WIGGINS: Thank you, Tyson.

22 Jenny?

1                   MS. FORDHAM: Policies are being put into  
2 place before key questions are asked. These policies  
3 run the gamut, stemming from U.S. state legislative,  
4 regulatory, and local actions, corporate actions in  
5 global regulatory decisions, particularly those related  
6 to financial markets.

7                   In October 2019, Citi Global Perspectives and  
8 Solutions Report identified two financial risks of  
9 climate change: the risk of stranded assets and the  
10 costs of doing nothing. These two risks have been  
11 identified by many others over the last several years.  
12 A third risk has yet to garner the attention, although  
13 it is rapidly surfacing as climate policies emerge  
14 around the world and in the United States. It is the  
15 risk of no innovation.

16                  Before we dive in, let's start with what we  
17 know. First, addressing climate change is a global  
18 complex challenge that we all share. Second, we know  
19 that companies are investing billions in research and  
20 development, new technologies, and new assets. Third,  
21 we know that these investment decisions are based on  
22 the evaluation of many factors and viable alternatives.



1           Taking energy as an example, investment  
2   considerations include load requirements; geographical  
3   proximity; fuel availability; production  
4   characteristics; capital and O&M costs; greenhouse gas  
5   emissions; the asset's useful life; access to other  
6   resources, like water; and the stage of the technology,  
7   just to name a few. The point is this. Investment  
8   decisions are based on many factors that are unique to  
9   the investor and the investment. Importantly, these  
10   factors are also unique to the point in time when the  
11   decision is based, even though the investment decision  
12   has an impact on the market for many years to follow.

13           Energy investment decisions made today will  
14   impact subsequent energy investment decisions and  
15   energy markets for decades. Like a pebble thrown into  
16   a pond, there is a ripple effect.

17           Since the Paris Agreement, cities and states  
18   representing more than half of the U.S. economy have  
19   declared support. According to Bloomberg  
20   Philanthropies, if these cities and states formed a  
21   single country, its economy would be the third largest  
22   in the world. Bloomberg Philanthropies also notes that

1 more than 1,000 businesses operating in the United  
2 States and representing \$25 trillion in market  
3 capitalization have voluntarily adopted greenhouse gas  
4 emissions' reduction targets.

5           According to the Center for Strategic and  
6 International Studies, 51 carbon pricing initiatives  
7 exist today, covering 20 percent of global greenhouse  
8 gas emissions. Further, more than half of U.S. states  
9 have adopted renewable portfolio standards or fuel  
10 source goals for their energy utilities. In some  
11 instances, the fuel source goals are economy-wide,  
12 extending beyond the energy utilities.

13           The Paris Agreement is intended to adjust the  
14 flow of capital. Responding to the Paris Agreement,  
15 the Financial Stability Board created the Task Force  
16 for Climate-Related Financial Disclosures to develop  
17 voluntary, consistent financial risk disclosures for  
18 use by companies to provide climate-related risk  
19 information to lenders, insurers, investors, and other  
20 stakeholders. Since that time, several banks announced  
21 changes to their lending portfolios. Development banks  
22 adopted frameworks to screen assets for investment.

1 And corporate credit rating agencies announced plans  
2 for how climate risks will be assessed.

3           These actions, especially when viewed  
4 alongside the growing trends of state laws and  
5 regulations, share a common theme: a narrow focus on  
6 carbon emissions with a prescription for those  
7 investments that are to be deemed suitable. In some  
8 instances, the investment prescriptions are intended to  
9 drive a policy agenda. While investment decisions are  
10 appropriately motivated by many perspectives, the risk  
11 lies here.

12           Even with a variety of environmental goals,  
13 different approaches, and time horizons, the targets  
14 tend to focus on the year 2050. Although perspectives  
15 differ on whether the year 2050 seems distant or near,  
16 let's put 30 years into perspective by looking back at  
17 natural gas markets. Within the last 30 years,  
18 wellhead decontrol was adopted, paving the way for  
19 market forces to establish the price for natural gas.  
20 The natural gas market has weathered two gas-fired  
21 power generation development booms, an industrial  
22 sector recession, recovery, and growth. The size of

1 the physical natural gas market has nearly doubled.  
2 And the U.S. has emerged as the world leader in the  
3 production of natural gas.

4           In short, in the time span of less than 30  
5 years, the most transparent and liquid physical  
6 commodity market on the planet sprang to life. That is  
7 a market that delivers \$85 to \$100 billion in physical  
8 commodity market value to millions of customers in the  
9 U.S. and abroad annually. Market-driven capital  
10 allocation achieved these results.

11           If the 1966 natural gas resource estimate had  
12 remained static, the U.S. would have run out of natural  
13 gas in 2005. Innovation made the thinking of 30 years  
14 ago obsolete. Today, natural gas production is  
15 geographically diversified and abundant, with natural  
16 gas consumers having access to vast amounts of pricing  
17 and fundamentals data on which to base a sound  
18 investment decision. Natural gas paved the way for  
19 electric power sector CO<sub>2</sub> emissions reductions below  
20 1990s levels and more than \$100 billion in industrial  
21 sector investments in the U.S. within the last decade  
22 alone.

1           Just as diversity mitigates risk in a stock  
2 portfolio and builds resisting companies, a diversity  
3 of paths is key to attaining our world's environmental  
4 objectives. Policies surrounding capital investments  
5 are falling victim to conforming bias. Investment  
6 decisions once based on a variety of competing market  
7 factors are, instead, increasingly limited to a  
8 prescribed list of acceptable technologies, a narrow  
9 time window in the single perceived environmental  
10 externality of carbon emissions.

11           As IHS described in an April 2017 report,  
12 capital market distortions translate to energy market  
13 distortions. As policies increasingly direct capital  
14 investment based on a narrow set of criteria that is  
15 informed by today's technologies, the underlying market  
16 ceases to respond to the ever-changing and evolving  
17 push and pull of competition and diversity of thought,  
18 objectives, and alternatives.

19           We only need to look at the last 30 years to  
20 understand the dramatic change that innovation borne of  
21 competing and diverse ideas can create. Yet, today,  
22 purse strings are held in the hands of prescriptive

1 capital investment policies that are replacing at  
2 breakneck speed the existing rigorous and multifaceted,  
3 diverse capital investment decisions. It is the  
4 investment equivalent of putting all of our eggs into a  
5 single basket.

6 Rules that stipulate and limit investment  
7 also limit the market's ability to innovate. If  
8 physical energy market investments are driven by a  
9 predetermined narrow set of guidelines, instead of  
10 competing ideas, how do we make sense of the underlying  
11 market, and how do we assure that the markets are sound  
12 for consumers? Perhaps even more importantly, if  
13 investments are prescribed or channeled to a narrow set  
14 of ideas, how does the market create game-changing  
15 innovation? Do policies that channel investment  
16 protect consumers from the market and from systemic  
17 risk?

18 The CFTC has a role to play. Systemic  
19 financial risk is mitigated when commodity markets are  
20 diverse and regulatory frameworks ensure that all our  
21 eggs are not in a single basket. Yes, there is a  
22 stranded-cost risk and the cost of doing nothing, but

1    there is another risk.  The third financial risk of  
2    climate change is the missed innovation stemming from  
3    capital policies that override the market and narrowly  
4    conform investment.

5                   Thank you, Chairman Tarbert; Commissioners  
6    Behnam, Stump, and Berkovitz.  If energy investments  
7    are driven by a predetermined view of what is  
8    acceptable or not and physical market investments are  
9    channeled by regulatory forces as if an umpire is  
10   calling balls and strikes, both physical and financial  
11   market distortions are inevitable.  Sound financial  
12   commodity markets stem from sound underlying physical  
13   markets.

14                  CHAIRPERSON WIGGINS:  Thank you, Jenny.

15                  And so we are going to turn it over to you,  
16   but I also want to echo the comments that Commissioner  
17   Berkovitz made earlier.  We really will miss your many  
18   contributions in the energy space.  We appreciate  
19   everything that you have done in this space in the last  
20   however many years it has been that you have been  
21   working in this area.  And we wish you well in your  
22   next phase, whatever that may be.  Over to you.

1 MS. KELLY: Thank you so much.

2 On behalf of the American Public Power  
3 Association, I appreciate the opportunity to speak to  
4 public power's future focus in the face of changing  
5 customer preferences and regulations. And I want to  
6 especially thank Commissioner Berkovitz for both the  
7 invitation and the kind words. I am going to choose to  
8 accept "relentless" as a compliment. Thank you very  
9 much.

10 The drive to reduce carbon emissions to  
11 address climate change has caused public power  
12 utilities, indeed all electric utilities, to support  
13 electrification of new loads, such as transport, and to  
14 diversify our generation resources with renewable  
15 generation. One very practical reason we are doing  
16 this is because the demand for electricity has been  
17 flat or declining from traditional loads. So many  
18 electric utilities see electrification as a way forward  
19 in the future. From all-electric homes to electric  
20 heating and transport, we are seeing new opportunities  
21 for increased use of electricity while reducing overall  
22 carbon emissions and saving money if we can do it



1 right.

2           The growth in use of electricity is hard to  
3 predict. Forecast very widely, recent reports have  
4 projected that in 30 years, anywhere from 8 to 80  
5 percent of cars will be electric. That is a big  
6 spread. Electric utility loads could grow anywhere  
7 from 13 to 52 percent, also a wide spread. But even  
8 the most conservative estimates show that growth and  
9 demand will outpace any reductions from energy  
10 efficiency.

11           Going forward, the Electric Power Research  
12 Institute, or EPRI, believes that electricity demand is  
13 expected to grow in most states, especially with  
14 environmental policies and goals that are favorable to  
15 electrification. But encouraging adoption of new  
16 electric technologies requires a customer focus.

17           Public power utilities are reaching out to  
18 our communities and promoting the use of electric  
19 vehicles, heat pumps, and stoves. For example, my  
20 association has negotiated a discount with Nissan on  
21 the LEAF that is available to our utility members and  
22 the retail customers of our utility members through

1 January 2, 2020. Hurry up and get it while you can.

2 Utilities are also working to better support  
3 their commercial and industrial customers with  
4 renewable generation, energy storage, microgrids, and  
5 other new technologies. Many of these customers are  
6 seeking renewable power and carbon reduction to support  
7 their own corporate green strategies. And we need to  
8 provide that. We need to be responsive to our  
9 customers because they will find another way to do it  
10 if we don't help them.

11 DOE's Energy Information Administration notes  
12 that overall power sector CO<sub>2</sub> reductions declined 24  
13 percent between 2005 and 2017. And I am proud to say  
14 the public power CO<sub>2</sub> emissions have decreased 33  
15 percent in that period. And we no doubt will do more.

16 Many state environmental goals call for  
17 increases in renewable energy sources, as has been  
18 pointed out by the prior speakers. At this time, 29  
19 states and the District of Columbia have a renewable  
20 energy mandate. And five other states have a renewable  
21 goal. Five states, including New York and California,  
22 have goals to use 100 percent renewable energy and

1 achieve zero net carbon emissions by 2050.

2           We know of at least 15 public power utilities  
3 that have 100 percent renewable goals set locally. And  
4 some have already reached those goals. Aspen,  
5 Colorado; Burlington, Vermont; Greensburg, Kansas;  
6 Rockport, Missouri are a few to announce that they have  
7 met that goal.

8           But the move to incorporate greater  
9 renewables into the power supply is not without  
10 challenge. While the cost of wind and solar  
11 technologies is certainly declining. They are not  
12 always the lowest overall cost alternative, especially  
13 when they have to be supplemented with other resources  
14 to meet capacity requirements and resource adequacy  
15 requirements.

16           Some carbon-free sources, such as nuclear and  
17 hydro, are not always viewed as clean in certain  
18 quarters for portfolio requirement purposes. And,  
19 therefore, some of the states' requirements exclude  
20 nuclear and hydro. And this can lead for compliance  
21 issues for utilities that are already fully sourced  
22 with those kinds of carbon-free resources. And some

1 areas of the country are going to need a longer glide  
2 path to get to a cleaner energy future because they  
3 have historically relied on fossil fuels, such as coal  
4 or natural gas.

5           So what does increased electrification  
6 changing demand and changing generation mixes to what  
7 you call commercial end-users? In our world, that has  
8 a totally different meaning, but I am adopting your  
9 terminology for today.

10           We use derivative products to hedge both our  
11 ultimate physical product, electricity, and the price  
12 of fuels that produce it, such as natural gas. And as  
13 customer-owned utilities, public power utilities are  
14 committed to keeping our rates reliable and affordable  
15 and our communities thriving. Therefore, we will be  
16 continuing to hedge fuel costs and electricity purchase  
17 costs and financing costs in the form of interest  
18 rates.

19           Our future demand for hedging products is  
20 going to depend upon a number of factors that are very  
21 hard to predict. As I noted, the overall demand for  
22 electricity is projected to increase, but we don't know

1 by how much. Use of renewables with no actual fuel  
2 cost to be hedged, such as wind and solar, is going to  
3 increase, but power supply variability will also  
4 increase from hour to hour, if not minute to minute, as  
5 reliance on intermittent renewables increases. That is  
6 a much harder job for us to manage as electric  
7 utilities. This is going to require increased use of  
8 flexible generation, such as natural gas-fired  
9 generation, and demand-side resources that can ramp up  
10 and down quickly to take into account intermittency on  
11 the supply side.

12           Public power utilities will also have to  
13 manage two-way flows because customers are going to  
14 start to produce their own power and sometimes send  
15 excess power to us on the grid, which we are going to  
16 have to deal with. These changes are going to require  
17 increasingly complex hedging strategies and potentially  
18 new hedging products to maintain affordable electric  
19 service to our retail customers.

20           So thank you again for the opportunity to  
21 participate. And I stand ready to answer any questions  
22 you might have or at least to attempt to do so.

1 Thank you.

2 CHAIRPERSON WIGGINS: Thank you, Sue.

3 Vincent?

4 MR. JOHNSON: Good morning. First, I want to  
5 thank Commissioner Berkovitz for the opportunity to  
6 have this discussion as well as the Chairman who left  
7 and Commissioner Behnam and Commissioner Stump and  
8 Abigail for all of your work in helping providing  
9 guidance.

10 So as the world demands more energy to fuel  
11 increasing prosperity and provide people with a better  
12 quality of life, it also demands energy delivered in  
13 new ways with fewer emissions. To support this  
14 transition, there needs to be unprecedented  
15 collaboration between governments, companies, and  
16 markets, a so-called private-public partnership and,  
17 crucially, realism about the challenges ahead. It  
18 requires a transformation in the way energy is  
19 produced, distributed, and used. The derivatives in  
20 financial markets are vital because capital investments  
21 measured in trillions of dollars over decades will be  
22 necessary to finance both new sources of energy and to

1   adjust existing infrastructure.

2                   The International Energy Agency has estimated  
3   that up to \$53 trillion of investment is required by  
4   2035 to meet projected energy demand within a critical  
5   emissions framework.

6                   Energy is such a key and perhaps  
7   underappreciated driver of prosperity around the globe  
8   that the practicalities of moving to a low-carbon and  
9   greener economy will be challenging. But as part of  
10   the development for low-carbon energy to reduce  
11   greenhouse gas emissions, the U.S., Europe, Singapore,  
12   China, among other nations, have developed emission-  
13   trading schemes, some with related derivative contracts  
14   to support carbon financing and carbon pricing.

15                  Renewables, many based on the traditional  
16   derivative contracts, and something I will talk about  
17   later, are now the fastest growing energy source in the  
18   world today. So with the expected rise in energy  
19   consumption over the next few decades and the need to  
20   comply with environmental regulations due to low-carbon  
21   transition, this means simultaneously there will be a  
22   shift in the markets towards alternative energy

1 sources.

2           Without a doubt, efficient derivative markets  
3 will be a great help in making the right investments.  
4 They help provide the right forward-looking price  
5 signals, assess future volatility levels, and provide  
6 instruments, now and in the future, to manage energy  
7 exposure on both the production and consumption sides.  
8 As new low-carbon energy products develop, the physical  
9 products or underlying must be defined very exactly in  
10 price formation must be the result of fairly active  
11 trading to make derivative products viable to support  
12 this low-carbon transition.

13           I was going to mention in kind of switching  
14 here -- and we have talked about projections. So I  
15 have a slide on here. I don't know if it is going to  
16 pop up here for the 2040 projections. And if you look  
17 at this slide, if you took a baseline of 2017, in 2017,  
18 the way we see it at BP, the energy mix, 34 percent was  
19 oil, 23 percent natural gas, [and] 28 percent coal.  
20 Then you have got a 4 percent on nuclear, 7 percent  
21 hydrogen, 4 percent on renewables. If you go into the  
22 evolving transition that we talked about where you



1 basically stay on the same path as we are on now, we  
2 foresee a 7 percent increase in CO<sub>2</sub> emissions. And oil  
3 gets reduced only down to 27 percent. Natural gas only  
4 goes up to 26 percent. You reduce coal from 28 to 20  
5 percent. Nuclear and hydro stay the same, but you do  
6 have a 15 percent increase in renewables.

7 But if you go through the rapid transition --  
8 and I think this is something that Tyson had  
9 mentioned -- you go through a rapid transition, which  
10 basically is following the Paris climate agreement, by  
11 2040, you would have a reduction of oil to 23 percent.  
12 You would have the natural gas still around 26 percent.  
13 You would have a decrease in coal from 28 percent to 7  
14 percent. You would have a slight increase in nuclear  
15 and hydrogen, but the big increase would be renewables,  
16 from 4 percent to 29 percent.

17 So next I was going to jump on and talk a  
18 little bit about some of the products that are out  
19 there that we at BP have been working on to help with  
20 the low-carbon energy transition. So the first one is  
21 biofuels. We talked about biofuels, converting biomass  
22 directly into liquid fuels to help transportation fuel

1 needs. So one idea of it is that biofuels are being  
2 produced from sugar cane, which has lifecycle  
3 greenhouse gas emissions around 70 percent lower than  
4 conventional transport fuels.

5 Another product is bio-isobutanol. It is an  
6 alcohol produced from renewable organic material  
7 including corn, wheat, and sugar cane. It can be  
8 blended with gasoline at higher concentrations than  
9 ethanol. And even in 2018, the EPA granted two  
10 registrations to two companies to allow blending of 16  
11 percent of bio-isobutanol into the gasoline pool. It  
12 has a much lower carbon footprint, lower emissions than  
13 regular fossil fuel gasoline.

14 The next one which is dear to my heart,  
15 renewable diesel, something we have been working on.  
16 So renewable diesel is the process where you can take  
17 biomass-based feedstocks to create a much lower carbon  
18 diesel. So what we have been working on is with  
19 tallow. Tallow is cow fat. So we take what is left  
20 over after you make the steaks, the hamburgers, and  
21 stuff from cows, which would become waste. You take  
22 that cow fat. You mix that into diesel. And you come

1 up with renewable diesel. What is the important part  
2 about that is it has a 70 percent lower carbon  
3 footprint compared with petroleum-based diesel. And it  
4 is from a waste product. So that is something we are  
5 doing. We are excited about that.

6           And next I want to mention biojet. So, even  
7 with biojet, we have been taking used cooking oil. And  
8 you take -- and I will move the slide over if I can.  
9 Thank you. Here is the slide for that one, but on  
10 here, you see we are taking used cooking oil. You  
11 collect it. You take the used cooking oil. And you  
12 convert it to synthetic jet fuel. The synthetic jet  
13 fuel is blended with standard aviation fuel to make it  
14 suitable for aircraft. This biojet reduces greenhouse  
15 gas emissions by more than 60 percent compared with  
16 standard fossil jet fuel. And as emissions from  
17 airlines is increasing -- and I noticed an article I  
18 think on Tuesday in the Wall Street Journal about the  
19 increased emissions from airlines -- and you can get a  
20 60 percent reduction because of renewables, it works.  
21 And I would also say this is in play because there are  
22 three airports in Norway and Sweden that are using this

1 as well as Chicago O'Hare, one of the busiest airports  
2 in the world.

3           Next slide. Another one I wanted to mention  
4 is biogas. So biogas is produced from various organic  
5 wastes, such as you see on the slide here you take  
6 landfills. You take cow manure. You take the biomass  
7 from corn. You take food waste. You take sewage.  
8 This is a competitive renewable alternative to  
9 conventional fuels.

10           And what biogas is, there is a biogas that is  
11 processed. And it is processed, and it is purified to  
12 become pipeline-quality biomethane, which is known as  
13 renewable natural gas. You take that renewable natural  
14 gas, and you compress it or liquefy it. And you send  
15 it to a fuel pipeline grid. And from there, you take  
16 the renewable natural gas, and you route it to  
17 compressed natural gas or liquid natural gas commercial  
18 fueling stations. So you will see. You will see in  
19 Washington, D.C. You will see in New York. You will  
20 see a ton of them. In California, you will see these  
21 natural gas buses. And they are running off of natural  
22 gas, and they are running off of this renewable natural

1 gas. And, again, it is a way to lower the carbon  
2 footprint.

3 Now, the potential for biogas production is  
4 significant. Nationwide, there are over 2,400  
5 municipal solid waste landfills. Only 632 currently  
6 have operational landfill gas projects. The EPA states  
7 that there are an additional 470 sites that are good  
8 candidates for landfill gas projects to produce biogas.

9 Another, there are over 17,000 wastewater  
10 treatment facilities. Only 1,200 wastewater treatment  
11 facilities have either anaerobic digesters on site or  
12 send their waste to an alternate location for  
13 aggregation and digestion to make biogas production, so  
14 a long way to go there. And, in addition, biogas  
15 recovery systems are technically feasible at over 8,000  
16 large dairy and hog operations in the U.S. However,  
17 currently only 260 agricultural facilities have  
18 operational anaerobic digesters. So, again, if you  
19 see, there is a great room to grow and help produce  
20 biogas with the less carbon footprint.

21 The last thing I want to mention is MARPOL.  
22 Now, for those who do not know, MARPOL stands for

1 marine pollution. MARPOL came about in 1973, but the  
2 MARPOL Convention, this slide here, there was a MARPOL  
3 Convention that was amended in 1997 to address sulfur  
4 emissions from ships by introducing a global cap on  
5 sulfur content of marine fuel oil.

6           So effective January 1, 2020, the United  
7 Nations International Maritime Organization will  
8 require all ships to switch from fuels with 3.5 percent  
9 sulfur content to fuel that contains no more than 0.5  
10 percent sulfur content or have so-called scrubbers  
11 installed in the exhaust stacks that strip the sulfur  
12 from emissions. As a result, the International Energy  
13 Agency forecast that the demand for high-sulfur fuel  
14 oil will fall by more than 2 billion barrels a day next  
15 year. The change is expected to boost demand, instead,  
16 for cleaner fuel, including marine gasoil, a distillate  
17 akin to diesel and low-sulfur fuel oil.

18           As part of this and as is going to be  
19 discussed further today, this is not possible without  
20 the futures exchanges launching contracts to kind of  
21 help support the financing of low-sulfur fuel marine  
22 oil.

1                   And, finally, implementation of this latest  
2   stage of MARPOL Convention we believe will reshape the  
3   marine fuel landscape. As well, we hope it helps lead  
4   to lower-carbon fuel in other, whether it is  
5   transportation or whether it is airlines, to reduce the  
6   footprint.

7                   Thank you.

8                   CHAIRPERSON WIGGINS: Thank you. Thank you  
9   all for your presentations.

10                  I would like to open the floor now for  
11   questions and discussions regarding the panelists'  
12   remarks and presentations. And we are going to begin  
13   with questions and comments from the Associate Members  
14   of the EEMAC to the Members of the EEMAC. And, again,  
15   as Abigail said earlier, if you would like to be  
16   recognized, if you would turn your tent card up, and we  
17   will see how we can go here. Jim, would you like to  
18   begin?

19                  MR. ALLISON: Thank you.

20                  The question I think is first for Tyson, but  
21   I think each of the panelists spoke to the issue. And,  
22   Tyson, if you will excuse me turning back. So it is

1 either you or the microphone. Tyson spoke about the  
2 technological developments we have seen to date in  
3 generation and transmission. To that, let me add  
4 industrial-scale storage.

5 I would like to think about how the  
6 technologies are going to develop into the future  
7 because when I think about the future of the  
8 technological developments, I see this cloud of  
9 uncertainty about how those technologies might develop.  
10 And it is unclear to me what development path I would  
11 prefer and what development path I would predict.  
12 Those are two different things.

13 So, Tyson, what is your view on the  
14 uncertainty about those future technological  
15 development paths? And how should that uncertainty  
16 affect regulatory philosophy going forward?

17 MR. SLOCUM: Great question. So I think if  
18 you talk to anyone in industry, especially in the  
19 electric power industry, where you have got capital  
20 investments that are supposed to last a significant  
21 amount of time, they need guidance in the form of  
22 regulatory certainty about how to make those investments.



1 And right now on environmental and climate change, we  
2 have no regulatory certainty. Right? We have had very  
3 modest programs that were put together by the Obama  
4 Administration on the electric power side, the Clean  
5 Power Plan, which was a compromise among environmental  
6 goals and what utilities thought that they could  
7 achieve.

8 And almost every utility was publicly quoted  
9 as saying, "We can work with this program." And then  
10 that was the regulatory program that the Obama  
11 Administration then was able to successfully negotiate  
12 the Paris Climate Accord, which, if you remember, was a  
13 voluntary system, which is why it didn't need Senate  
14 ratification under the Constitution because it placed  
15 literally no binding elements on U.S. participation.

16 So my point here is that we had a plan for  
17 the electric power sector that was modest in scale,  
18 that the utility industry felt that was achievable and  
19 that would guide their investments for the next  
20 generation or two, and it was scrapped by the current  
21 administration.

22 And right now the industry is reeling. They

1 have no guidance from the Federal Government. They are  
2 dealing with multiple different state initiatives.  
3 Their desire is to see uniform Federal action. And  
4 what would be helpful would be to hear more companies  
5 talk about the fact that we need more Federal action  
6 because too often, in my conversations in Washington,  
7 D.C., industry is either denied that climate change is  
8 a problem or actively funded efforts to stop modest  
9 activities to address climate change.

10           So I think, to answer your question, the  
11 investments we need to see are going to have to be  
12 guided by Federal regulations or programs. And right  
13 now, we don't have those. And so we are in a state of  
14 flux that I don't think serves anyone's interests  
15 productively.

16           I don't know if that answers your question.

17           MR. ALLISON: It answers my question. And  
18 your answer seems to me in sharp contrast with some of  
19 the points that Jenny made during her presentation. So  
20 I would be interested in hearing whether the other  
21 panelists have comments on the same question.

22           MS. FORDHAM: So I will give a perspective.

1 I think we are seeing a lot of different actions  
2 related to climate. Right? So companies are taking  
3 matters into their own hands along with state and local  
4 regulators, financial market regulators.

5           And to answer your question, Jim, the -- I  
6 think it is going to be really hard for a regulator to  
7 pick the right technology. And the real risk that we  
8 have stems from this prescriptive approach that is  
9 being laid out. And so the concern I have is  
10 without -- you know, figuring out where we are 30 years  
11 from now becomes really difficult if everyone is  
12 calling balls and strikes on investment decisions based  
13 on today's knowledge. And channeling, you know,  
14 sending all of our dollars, or our eggs, into this  
15 single basket based on today's view I think is risky.  
16 So I think one of the biggest challenges we have is in  
17 having a framework that allows this diversity of  
18 thought and innovation to really continue to be at play  
19 in the marketplace. And without it, there is vast risk  
20 to market participants as well as risk to derivatives  
21 markets that are the ultimate connector of all of these  
22 physical markets that are today very interrelated.

1                   CHAIRPERSON WIGGINS: Matt, I saw your card  
2 up next, but, Sue, are you going to participate in that  
3 part of the conversation? Matt, if you don't mind, we  
4 will go to Sue. And then we will go to you if that is  
5 okay.

6                   MS. KELLY: Thank you.

7                   I want to kind of bridge the gap between  
8 Jenny and Tyson a little bit. It is true that there  
9 has been Federal uncertainty, but it is not so much  
10 that there has been nothing. It is just there has been  
11 this whole series. You know, we had Waxman-Markey.  
12 That did not happen. Then we had the Clean Power Plan,  
13 where the EPA set our energy policy. That got  
14 appealed. I lost a bet when the Supreme Court stayed  
15 it.

16                  Then we had a new administration. Then the  
17 Clean Power Plan is gone. Now we have the affordable  
18 clean energy rule. That is now in court. When we look  
19 at this, it is really hard to plan where you are going  
20 to go when you see this. Every two or three years,  
21 there is a flip.

22                  So we would like some certainty. That is

1 absolutely true. But I would also say that we would  
2 like to have -- if there is a Federal policy, we would  
3 like it to be in terms of what we need to do, not how  
4 we need to do it, because I do believe that there is  
5 room for new technologies.

6           And, also, different regions have different  
7 strengths and different current resource mix to bring  
8 to the table. If you go to the Pacific Northwest,  
9 there is a huge amount of hydro that our members have.  
10 It is a clean renewable resource. It can back  
11 intermittent renewables. I mean, I call it the Rodney  
12 Dangerfield of renewable resources. It gets no  
13 respect. So, I mean, each region has a different  
14 resource mix. And we want to be able to work forward  
15 to meet our carbon goals, whatever they may end up  
16 being. But we need the diversity, and we need the  
17 flexibility to do it in the way that maintains  
18 reliability and maintains affordability. So to me, it  
19 is really important. I guess if I left you with a  
20 bumper sticker, it would be "What, not how."

21           CHAIRPERSON WIGGINS: Matt?

22           MR. PICARDI: Yes. Thank you to the panel, a

1 very nice setup for the discussion today. I am Matt  
2 Picardi for the Commercial Energy Working Group.  
3 Associate Member, by the way. I think I forgot to  
4 announce that in the beginning. I apologize.

5           Interesting discussion. I kind of wanted to  
6 maybe step back a little bit from one of the  
7 discussions in terms of some of the organized markets  
8 where some of the issues I think that Tyler (sic.)  
9 raised have been touted for a while as having saved  
10 consumers a lot of money in terms of the way they have  
11 operated. And they were kind of set up, if we recall,  
12 under the proposition that a megawatt is a megawatt.  
13 And so now we have a situation where the fuel mix is  
14 changing. And I think you have touched on all of the  
15 great points about why we have had these problems.

16           But my question is, do you think it is the  
17 job of which agency? Is it the FERC, whose job is to  
18 administer markets and make sure rates are just and  
19 reasonable to start getting involved with some of these  
20 issues, or should they just be looking at technical  
21 issues about what makes markets work and what is best  
22 for consumers?

1                   MR. SLOCUM: Great questions. So, first and  
2   foremost, I think we need to understand that the  
3   Federal Energy Regulatory Commission has delegated a  
4   lot of its authorities and responsibilities to these  
5   private regional transmission entities, who, in turn,  
6   have developed really complex internal, what they call  
7   stakeholder processes, where within these internal  
8   stakeholder processes of the private markets, these  
9   market reform proposals are developed, deliberated, and  
10  voted upon. And the problem is, is that there is  
11  little to no transparency with this process.

12                  Groups like mine actually are banned from  
13  voting within PJM; whereas, owners of power plants and  
14  transmission lines are free to actually cast multiple  
15  votes according to how many subsidiaries they have at  
16  the table. So it is not a democratic process. And so  
17  it shouldn't be a surprise that the resulting market  
18  designs coming out of this convoluted privatized  
19  process is not producing just results. So I think,  
20  first and foremost, Federal regulators need to get a  
21  much clearer and bolder set of activity to more  
22  directly oversee this process.

1           I do think that market reforms can benefit  
2 consumers and market participants if we have all people  
3 equally seated at the table. And right now the way  
4 that our electric power markets are being designed and  
5 developed, that is not the case at all. It is whoever  
6 can hire the most lobbyists and pull together the most  
7 votes in this sort of behind-closed-doors situation.  
8 So it is kind of a crazy situation that we find  
9 ourselves in the United States, where policy is being  
10 driven by organizations that most Americans have never  
11 even heard of. And so we need transparency and  
12 accountability in that process. And so I think we  
13 could do it if FERC takes more of a direct role in  
14 doing this comprehensively.

15           I don't know if that answers your question.

16           CHAIRPERSON WIGGINS: Jenny?

17           MS. FORDHAM: I will take a stab at this. So  
18 I think you asked the million-dollar question. Which  
19 agency takes the lead or where does this rest? And  
20 that is really part of the challenge of all of this.

21           I laid out what I see as a systemic risk  
22 issue, but it crosses. The reason it has been such a



1 challenge for us over the last several years to get our  
2 head around it is because it crosses environmental  
3 products, energy markets, you know, gas, electric.  
4 There is an investment component. There is a financial  
5 risk, an insurance element to it. It crosses so many  
6 different agencies.

7 I think derivatives markets is perhaps --  
8 that is where some of this can start to come together  
9 in the financial space, but that is the ultimate  
10 challenge. I mean, markets are messy. Right? We are  
11 seeing it evolve right now. And when they are  
12 evolving, do they evolve and say, "Hey, I am going to  
13 be FERC-jurisdictional" or "I am going to be CFTC-  
14 jurisdictional." No. It is messy. And the market  
15 sorts it out. And I think that is part of the  
16 challenge that we have, but I think one of the key  
17 issues relates to this channeling of investment and  
18 what that does to systemic risk.

19 Senator Murkowski actually issued a  
20 discussion draft kind of flagging this issue for  
21 Treasury a few months ago. But, anyway, I see it as  
22 systemic risk.

1                   CHAIRPERSON WIGGINS:   Sue?

2                   MS. KELLY:   I just want to briefly add that I  
3   think you said something really important.   Right now,  
4   the wholesale markets that -- they call them organized  
5   markets.   That drives me crazy because it implies that  
6   every other market is disorganized.   So I am going to  
7   call them centralized in the same style as the Soviet  
8   five-year plan was centralized, but I would just note  
9   that those markets treat every megawatt as fungible  
10   with every other megawatt.   That is the way they were  
11   designed when they came in.   And, as we now know,  
12   especially if you are putting an environmental lens on  
13   this, not every megawatt is created equal.   And each  
14   one has different attributes.   And that requires much  
15   more mixing and matching than we had in the past.   So  
16   thank you for making that very valid point.

17                  I am hampered by the fact that I was a  
18   Federal Power Act lawyer for many years.   And that says  
19   generation is not in FERC's purview.   They do  
20   transmission interstate commerce and sales for resale.

21                  So the choice of the generation mix is really  
22   not a FERC jurisdictional activity.   It has become that

1 through the back door because of the operation of some  
2 of these centralized markets.

3           The other thing is, is that those markets  
4 don't support a diversity of business models. And we  
5 have found that out the hard way because our model is  
6 still bundled in regions of the country such as PJM in  
7 New England, where most other entities are unbundled.  
8 And, as a result, we have been accused of subsidizing  
9 our generation resources because of our business model.

10           So I would just note that there are a lot of  
11 issues with those markets. And there are some  
12 jurisdictional questions about them as well.

13           CHAIRPERSON WIGGINS: Sean?

14           MR. COTA: I, too, forgot to mention that I  
15 was an Associate Member of the group.

16           My industry is rapidly going to renewable  
17 fuels. And the dilemmas that we have are the dilemmas  
18 of what are standards. And we generally know what a  
19 megawatt is. We generally know what a gallon is or a  
20 bushel or a metric ton. When you are talking about  
21 CO<sub>2</sub>E -- right? -- greenhouse gas, carbon dioxide  
22 equivalence because different gases have different

1 impacts, there are standards, but there are about 10 of  
2 them currently. And there is no consensus from state  
3 to state or regulatory entity to regulatory entity  
4 about which standard you use for measuring what the  
5 cost is. So if you are talking about introducing for  
6 the first time in the world markets carbon as a cost,  
7 well, what carbon are you talking about? And what is  
8 the impact?

9           So, for example, in some markets, hydro  
10 plants that were built many years ago do not qualify as  
11 a renewable fuel. Right? But new ones do. That is  
12 just one of the weird aspects you get. In different  
13 liquid fuels, you measure the different contents  
14 differently. Right? Renewable diesel, as an example,  
15 is fungibly pretty close to the regular diesel to the  
16 point where you have to actually measure the  
17 radioactivity of the carbon in it to determine whether  
18 or not it is renewable or not. Right? So it is great  
19 in one side. And the other side really is often how do  
20 you measure what those impacts are? What is the  
21 source? Did it come from a full waste product? Did it  
22 come from a product that would be mostly waste? So all

1 of these different methodologies go into what the  
2 scoring mechanisms are, which then gets built into the  
3 pricing mechanism.

4           So my question for the experts -- and this is  
5 I think one of the thorniest problems -- is we have  
6 every state and every regulatory entity coming up with  
7 their own standards. How do we get to a standard?

8           CHAIRPERSON WIGGINS: And if I could ask the  
9 panel to keep your answers pretty brief because we have  
10 one more Associate Member comment. I want to make sure  
11 that we stay on time here.

12           MR. SLOCUM: I have already said that I think  
13 the preferred path forward is to have a Federal  
14 approach on addressing climate change. And that would  
15 put together national uniform standards for the kinds  
16 of things you are talking about.

17           CHAIRPERSON WIGGINS: Vince?

18           MR. JOHNSON: I was just going to quickly say  
19 I completely agree with your comments. And, as Tyson  
20 said, you have a Federal program, but you have  
21 something like with the RFS, you had a Federal program.  
22 And that seems to have fallen apart.

1                   I think last Friday, I was in the Court of  
2 Appeals here in D.C. listening to an argument about the  
3 whole small refinery exemptions, but I think we look at  
4 it as it would be nice for a Federal program, but we  
5 are trying to take advantage of what the states are  
6 doing. You have cap-and-trade and LCFS in California,  
7 and you try to use those to help finance. A lot of  
8 small companies are trying to finance that. You have  
9 Oregon, State of Washington. You had the RGGI in the  
10 Northeast. And you have this new transportation carbon  
11 initiative coming out of Northeast. So it is a  
12 hodgepodge, and it takes a lot of resources. But I  
13 think from the -- we hope to get there, a Federal  
14 program but just trying to take advantage of what is  
15 out there and see how it works.

16                   CHAIRPERSON WIGGINS: Sue?

17                   MS. KELLY: I will just say I share your pain  
18 about the hydro. It makes no sense to me why existing  
19 hydro doesn't and new small hydro does. And, again, I  
20 would try, if possible, to stay out of the definitional  
21 battles and go to what kind of reductions do you want  
22 us to achieve in what timeframe and let us figure out

1     how and with what resources.

2                   CHAIRPERSON WIGGINS:   Jenny?

3                   MS. FORDHAM:   I think the environmental  
4     products markets, the financial markets can be the link  
5     between all of these different goals.

6                   CHAIRPERSON WIGGINS:   Erik?

7                   MR. HEINLE:   Thank you.   I will be real  
8     brief.   Erik Heinle, D.C. OPC.

9                   I want to hit back on something that Sue  
10    said.   And she made a really good point that under the  
11    FPA, states and districts have the right to choose  
12    their generation makeup.   And that is not a FERC  
13    responsibility.   That is a state responsibility.   And  
14    states have the right to develop RPSs and so forth.  
15    Many of us have chosen to join these organized markets,  
16    and these are common markets.   And, as Tyson said  
17    earlier, it has led to some friction, especially with  
18    capacity markets.

19                  And so I wanted to see what you all thought,  
20    ways that, say, environmental derivatives, energy  
21    derivatives could sort of ease that friction between  
22    state policy preferences, which are guaranteed under

1 the FPA, and sort of still meeting some of these common  
2 market goals.

3 MS. KELLY: I don't necessarily think that  
4 those products can remedy the fundamental problem.  
5 That would be just another Band-Aid in a long series of  
6 Band-Aids. I think there needs to be fundamental  
7 reform of those markets. And we have a proposal. I am  
8 just like Elizabeth Warren. We have a plan. So I am  
9 happy to talk to you about that offline.

10 CHAIRPERSON WIGGINS: Commissioner?

11 COMMISSIONER BERKOVITZ: Thank you.

12 I just had a follow-up question for Vince.  
13 You mentioned the marine fuel and the MARPOL and said  
14 that the derivative market there was absolutely  
15 necessary for the success of that transition. I was  
16 wondering if you could just expound on that. The last  
17 question -- it is a much bigger question than we have  
18 time for in a couple of minutes -- is like, what value  
19 is derivatives markets? Many of the markets we are  
20 talking about, there are not derivative markets. There  
21 is a lot of regional markets and incentives. And we  
22 don't have derivatives in a lot of these environmental



1 markets. But you specifically mentioned that the  
2 derivatives market was integral to the success of this  
3 product. And I was wondering if you could just expand  
4 on that. And why is that?

5 MR. JOHNSON: Thank you, Commissioner  
6 Berkovitz.

7 And I will be short here. So we have the  
8 derivative markets, the future contracts on I would say  
9 the high-sulfur fuel oil that is out there. I mean,  
10 for basic hedging, we are moving ships across the  
11 globe. And you are locking in prices and all the  
12 components to blend that. Because of the derivative  
13 markets and working with the industry to create  
14 additional contracts for the low-sulfur fuel oil, that  
15 kind of helps as we prepare for January 1, 2020 and the  
16 buildup of low-sulfur fuel oil, allowing companies like  
17 BP to hedge that marketplace and, really, more just a  
18 traditional trading I would say mechanisms. That goes  
19 along with just whether it was RBOB, whether it was  
20 crude oil. You have companies that like to lock in the  
21 price. We like to lock in the components. And we can  
22 kind of prepare where we have been preparing for six

1 months looking at the market to see supply/demand  
2 curves and where it is going to go. And we lock in --  
3 I don't know if it helps, but it is just that whole  
4 traditional part. We want to hedge that product and we  
5 want to lock in those prices.

6           And if you didn't have the derivative  
7 markets, I don't think it would have moved forward  
8 because it would have stuck with the high-sulfur fuel  
9 oil and maybe used the scrubbers that I mentioned. But  
10 because of the derivative markets, I think a lot of the  
11 energy companies supplying marine fuel felt more  
12 comfortable in moving forward with the low-sulfur fuel  
13 oil in going from your kind of traditional operations.

14           CHAIRPERSON WIGGINS: Do we have any comments  
15 or questions from people on the phone? There is at  
16 least one Associate Member on the phone.

17           MR. MCKONE: No, I have no questions. Thank  
18 you.

19           CHAIRPERSON WIGGINS: Okay. Thank you. All  
20 right.

21           MR. JOHNSON: Can I say one other thing?  
22 Sorry.

1                   CHAIRPERSON WIGGINS:   Sorry.

2                   MR. JOHNSON:   I'm sorry.   It is also the --  
3   and I mentioned this.   The derivative markets also help  
4   with the price signals for when you have that market  
5   out there and what everybody will be paying for that  
6   product when you get to January, February, March, down  
7   the road.   So we have our analytics team.   And they are  
8   advising the traders for that market that those price  
9   signals are a big component of the way we trade.

10                  CHAIRPERSON WIGGINS:   Thank you.

11                  Do we have any Members who would like to  
12   raise a question or make a comment?   Please?   Go ahead.

13                  MR. DURKIN:   Just to add on -- and it is  
14   Bryan Durkin.   I am also a Member of the Committee.   I  
15   failed to mention that -- I apologize -- earlier.   But  
16   to follow on to Vincent's comments, we working with the  
17   community have developed and have been working on  
18   products to address the International Maritime  
19   Organization sulfur fuel standards that take effect in  
20   2020.   So we do offer a slate of ultra low-sulfur fuel  
21   contracts to allow risk management to occur in  
22   anticipation of these requirements taking effect.   And

1 our recent launch of products has been of smaller  
2 contract sizes to enable a variety of different market  
3 participants to effectively hedge and have an  
4 opportunity to hedge in this evolving standard. So I  
5 think it goes to the innovation, all of us working  
6 together identifying solutions to these issues that we  
7 are confronting. And I just wanted to underscore the  
8 importance of what is happening in this committee  
9 today.

10 CHAIRPERSON WIGGINS: Please? Go ahead.

11 MR. CREAMER: Rob Creamer. I also failed to  
12 mention I am a Member as well.

13 So I just wanted to make a comment on  
14 markets. And we certainly interact in the markets that  
15 you are hedging in as liquidity providers. One area of  
16 frustration to me and I think many others in our  
17 industry could be seen in the RIN market. The  
18 interrelationships between the various products that we  
19 trade and how we actually hold an inventory risk has  
20 this variable out there that is an opaque market that  
21 we can actually transact in. And so we would build in  
22 inventory large positions in these products and have a

1 very opaque market that is not heavily traded that  
2 would define the price of what was very liquid vital  
3 markets.

4           And I would just throw it out as a comment  
5 that I think the market model and market instruments  
6 are very important, but I think that there should  
7 always be a focus on making sure that those markets are  
8 transparent and accessible and as liquid as they  
9 possibly can be.

10           CHAIRPERSON WIGGINS: Any other comments from  
11 the EEMAC Members?

12           [No audible response.]

13           CHAIRPERSON WIGGINS: Hearing none and seeing  
14 no cards turned up, I want to thank the first panel for  
15 your comments and participation. I really appreciate  
16 you all being here. And we will excuse you and call up  
17 the second panel, please.

18           [Pause.]

19           CHAIRPERSON WIGGINS: Thank you very much.  
20 Let's turn to our second panel, in which we will hear  
21 an overview of exchange-traded environmental  
22 derivatives. Daniel Scarbrough of IncubEx will present

1 on the historical development of environmental markets  
2 and current environmental derivatives products listed  
3 on IncubEx's partner, Nodal Exchange. Michael  
4 Kierstead will present on environmental products listed  
5 by Intercontinental Exchange. And Dr. Richard Sandor  
6 will present on the market evolution of new products  
7 with a focus on environmental markets.

8 With that, I will turn this over to Dan.

9 MR. SCARBROUGH: Hi. Thank you, everyone.  
10 Thank you to the Commission and also to the Energy and  
11 Environmental Markets [Advisory] Committee.

12 My name is Dan Scarbrough. I am Co-founder  
13 and President of IncubEx. I have been in the  
14 environmental markets derivatives space for the last 14  
15 years, starting with working with Richard Sandor at the  
16 Chicago Climate Exchange, later at the Intercontinental  
17 Exchange as Climate Change was acquired in 2010 and  
18 most recently with IncubEx.

19 Really, today, just quickly about IncubEx.  
20 We are an incubator for exchange-traded products with a  
21 focus on global environmental markets. We work in  
22 conjunction with our partners, both exchanges [and],

1 technology service providers, to develop and innovate  
2 new financial products. We partnered with the EEX  
3 Group in 2017, including Nodal Exchange. And I would  
4 like to thank our partners at Nodal Exchange for  
5 including us here today in this conversation.

6 Our team is comprised of many of the former  
7 Climate Exchange executives and was founded in 2016.  
8 We have offices in Chicago and London. Actually, it  
9 seems a little bit awkward for me to talk about the  
10 history of environmental markets when we actually have  
11 one of the pioneers of the environmental markets here  
12 on the panel, Dr. Richard Sandor, but I think what we  
13 would like to achieve here is just to give you a little  
14 bit of context about the environmental markets over the  
15 last 60 years and, in particular, the last 15 years as  
16 the markets have really developed and expanded on a  
17 global basis. And a lot of this really dates back to  
18 Dr. Ronald Coase's theory of social cost in 1960 and  
19 some of the principles that were adopted in some of the  
20 later environmental markets, really probably most  
21 notably starting with the Acid Rain Program of 1990,  
22 adopted under the Clean Air Act amendments that year, a

1 very successful environmental program addressing acid  
2 rain, and really set the precedent for global expansion  
3 of environmental markets and the proliferation of cap-  
4 and-trade as a successful policy tool to address  
5 environmental issues.

6           In the last 15 years, we have obviously seen  
7 the markets expand quite rapidly. Carbon as an asset  
8 class going back to 2003 on a voluntary basis, Chicago  
9 Climate Exchange, where you had over 400 members that  
10 actually took a voluntary reduction commitment of their  
11 greenhouse gas emissions before it was federally or  
12 state-mandated on a mandatory basis. And then with the  
13 implementation of the E.U., European Union, emission-  
14 trading scheme in 2005, we saw the first mandatory cap-  
15 and-trade program for carbon and phase I of that  
16 program commencing in 2005.

17           I think, as was previously mentioned, the  
18 renewable fuel standard dates back to 2005 as well  
19 under the Energy Policy Act and was expanded again  
20 under the RFS2 in 2008. We saw the California cap-and-  
21 trade system evolve under A.B. 32 in 2006. As many of  
22 these environmental markets do, it took significant



1 time for that market from the time of legislation,  
2 regulation, to program implementation, as we saw the  
3 first compliance year in California really starting in  
4 2013, due to start in 2012 and ended up starting in  
5 2013. So many of these markets take significant time  
6 to develop based on the underpinning of regulatory  
7 policy and legislation required to enact these markets.

8           On the REC market side, or renewable energy  
9 certificate, market really predicated based on the  
10 previously mentioned 29 states plus D.C. that actually  
11 have renewable portfolio standard programs in place,  
12 the tradeable instruments behind those programs are the  
13 REC, renewable energy certificates. In total, they are  
14 probably approaching 100 different REC markets in the  
15 United States right now. Only a subset of those are  
16 traded on exchange. And we will talk about some of  
17 those in a minute.

18           Really, again, we think that, obviously, many  
19 of these environmental markets look to previous  
20 programs and some of the successes that have been  
21 achieved, most namely the Acid Rain Program. This  
22 chart does a good visual depiction of the elimination

1 of acid rain, which in large part was due to the  
2 market-based mechanism of the Acid Rain Program of  
3 1990.

4 Just really generally on the growth of  
5 environmental markets and what we have seen and sort of  
6 the global landscape at the moment, approximately three  
7 billion tons of carbon emissions are currently covered  
8 under an emission-trading scheme at the moment relative  
9 to roughly 40 billion tons of global carbon emissions.  
10 So although we have significant tons under emissions-  
11 trading schemes, the opportunity for expansion of those  
12 programs is certainly there.

13 Again, we have a federally mandated renewable  
14 fuel standard, which creates a standard for ethanol and  
15 other biofuels. The underpinnings of that and, really,  
16 the tradeable instruments are, as Rob mentioned I  
17 believe earlier, the renewable identification numbers,  
18 or the RIN, markets, really dating back to being  
19 actively traded since 2008.

20 On the exchange side, really, product  
21 innovation in the derivative space, you know, we have  
22 seen the markets grow pretty significantly, both in the

1 U.S. and in Europe. Despite the fact that we don't  
2 have a Federal cap-and-trade program for carbon or  
3 federally mandated renewable portfolio standard, as was  
4 previously mentioned earlier today, we have seen open  
5 interest increase just in the last 10 years. In  
6 European carbon and the United States combined, there  
7 are about 650,000 contracts of open interest back in  
8 2009. Now we see open interest at about 2.8 million  
9 contracts between Europe and the U.S.

10           Probably maybe even more surprisingly is that  
11 the U.S. environmental markets, though regional and  
12 state-based in most cases, open interest has increased  
13 nearly 10X, from 100,000 contracts at the time in 2009,  
14 and will likely approach a million contracts by the end  
15 of the year.

16           So, despite the fact that we don't have a  
17 Federal cap-and-trade program, again, or a renewable  
18 portfolio standard, the regional and state-based  
19 markets have continued to advance. And some of the  
20 derivative instruments that have been listed as a  
21 result have also -- we have seen liquidity increase in  
22 those.

1           I think the first panel touched on some of  
2   the macro trends that we are seeing on the power  
3   generation side. This chart depicts coal versus  
4   renewables. Obviously, there are other fundamental  
5   reasons for the growth of renewables and the decline of  
6   coal on a relative basis, including low natural gas  
7   prices, but markets have played a role. In particular,  
8   the state-based renewable portfolio standard markets  
9   have played a significant role in advancing renewables  
10   in the U.S.

11           The next chart really depicts global CO<sub>2</sub>  
12   trading. And going back to 2005, that is the first  
13   year on the chart. That is just purely the European  
14   Union emission trading scheme in their cap-and-trade  
15   program for carbon.

16           Over the years, we have seen other programs  
17   develop: the California cap-and-trade program. In  
18   2009, we had the first multistate regional carbon-  
19   trading program in the U.S., the Regional Greenhouse  
20   Gas Initiative, which started as 10 states in the  
21   Northeast, and in 2012 was reduced to 9 when New Jersey  
22   withdrew from the program. They are actually

1 officially rejoining RGGI to start 2020. Virginia,  
2 Pennsylvania, and other states have been under  
3 discussion of joining RGGI as well. On a global basis,  
4 we have seen emission-trading programs develop in South  
5 Korea, New Zealand, [and] China is obviously a very  
6 large emitter. And the Chinese ETS is due to go in  
7 force at the start of 2020, which if you look at the  
8 last bar here, you will see a significant increase in  
9 the covered emissions under mandatory emission-trading  
10 schemes, to approach 14 percent of global emissions at  
11 that point.

12           We touched on the RPS, renewable portfolio  
13 standard, markets, but this chart is just showing on a  
14 state-by-state basis, you know, where those markets  
15 exist and what some of the renewable targets are in  
16 those markets.

17           You know, really, these are still on a  
18 relative basis very young markets. The first RPS  
19 markets didn't develop until the late '90s, with New  
20 Jersey and Texas being, really, first movers in  
21 developing RPS markets. Now we have 29 states plus  
22 D.C. So those markets are certainly expanding. And,

1 as some of the previous panelists mentioned as well,  
2 the targets themselves are becoming more aggressive in  
3 nature.

4 Just quickly on the current universe of  
5 environmental derivatives in the United States or North  
6 America generally, we have carbon-trading markets in  
7 both California and RGGI, the Regional Greenhouse Gas  
8 Initiative. So you have futures contracts and options  
9 contracts that trade based on those carbon-trading  
10 systems. You also have numerous renewable energy  
11 certificate markets that are actually listed as futures  
12 contracts and options contracts. I mentioned roughly  
13 100 different tradeable over-the-counter underlying REC  
14 markets in the United States. About two dozen of those  
15 now are listed on a regulated futures exchange. In  
16 particular, the product slate that we have listed on  
17 our partner exchange with Nodal is about two dozen  
18 different REC products.

19 And so, actually, the broadest slate of  
20 renewable energy certificate markets listed on any  
21 futures exchange, this slide really gives you an idea  
22 of some of those markets and how they are classified

1 typically on a state-by-state basis. What we have seen  
2 in the secondary market on the derivatives side is that  
3 liquidity also has tended to evolve over the years. So  
4 now we see things like a PJM tri-qualified REC  
5 contract, which is a futures contract that calls for  
6 delivery of RECs that qualify in Pennsylvania, New  
7 Jersey, and Maryland. So the secondary market and,  
8 really, product innovation and starting as an over-the-  
9 counter product has now evolved into an exchange-traded  
10 product and showing some evolution in those markets as  
11 well based on common underlying attributes in those REC  
12 markets. There is also an example of a NEPOOL dual-  
13 qualified REC that qualifies in both Connecticut and  
14 Massachusetts.

15           Just quickly on specifically the growth of  
16 environmental derivatives volume at Nodal Exchange,  
17 which these products are still relatively new, just  
18 launched just under a year ago, in November of 2018.  
19 But we have seen trading volumes in those products.  
20 Approaching 100,000 contracts in the first year, open  
21 interest is now approaching 50,000 contracts across REC  
22 and carbon markets in the U.S. So again, those are

1 relatively new products, but liquidity is developing in  
2 those markets.

3           Just to give you an idea of overall open  
4 interest, I think we touched on the overall numbers  
5 approaching over 925,000 contracts now in the U.S.  
6 Just two years ago, it was about half that amount. So  
7 the markets, just in a short period of time, open  
8 interest has increased pretty significantly in U.S.  
9 environmental products.

10           On a relative basis, as I mentioned, there is  
11 a mandatory emission-trading program in Europe that has  
12 existed since 2005. Open interest, there is about 1.9  
13 million contracts. That is really predominantly on the  
14 two major exchanges that are in that market: ICE and  
15 EEX, European Energy Exchange.

16           On a relative basis, if you look at the pie  
17 chart on this slide, you will see that you have about,  
18 an equal split nearly between the open interest and REC  
19 products in the U.S. and carbon products in the U.S.  
20 And, then, the blue piece of the pie chart is actually  
21 Europe. So while the U.S. is still a smaller piece of  
22 the exchange-traded derivative products on the



1 environmental side, it is significant and growing.

2           This slide here is really just pointing to  
3 the environmental products on ICE that qualify for the  
4 commitment of trader report currently in the U.S. That  
5 is obviously a subset of the products and about 600,000  
6 contracts of the 925,000 of total open interest, but it  
7 gives you a good idea of sort of the universe of  
8 participants and the number of participants in these  
9 markets, the largest of which being the California cap-  
10 and-trade market, where you see in some of the vintage  
11 products approaching 65 participants that have  
12 reportable levels of open interest in the market. On a  
13 relative basis, if you look at natural gas or oil  
14 markets, you are looking at 200 to 400 participants in  
15 those markets. So the universe of participants, while  
16 similar in nature, is still evolving and still a subset  
17 of the overall energy markets.

18           Those are really the end of my remarks, but I  
19 look forward to taking any questions that anyone has.  
20 Thank you.

21           CHAIRPERSON WIGGINS: Thank you, Dan.

22           Michael?

1                   MR. KIERSTEAD: Thank you. Just give me one  
2 moment to bring up my presentation. Thank you.

3                   [Pause.]

4                   MR. KIERSTEAD: Thank you.

5                   My name is Michael Kierstead. I am the Head  
6 of Environmental Products at the Intercontinental  
7 Exchange. I would like to take a moment to thank the  
8 CFTC as well as the EEMAC for hosting us today. The  
9 CFTC, thank you for your oversight and your commitment  
10 to the futures market.

11                  Intercontinental Exchange. We are a market  
12 operator of a global network of clearinghouses and  
13 exchanges. This is no different than the environmental  
14 markets based in the U.S. and in Europe. We also  
15 provide our customers with a robust data offering,  
16 which helps in price discovery and transparency.

17                  So there has been significant discussion this  
18 morning on the decarbonation and what we are seeing  
19 next in energy markets. So I won't spend too much time  
20 here, but what we are seeing is an increase in  
21 renewable energy generation. We are seeing an increase  
22 in interest in global cap-and-trade markets. Depending

1 on the jurisdiction, we are seeing a decrease in coal,  
2 obviously in OECD countries as well as Asia is seeing  
3 an increase in coal. So it all depends on the region  
4 and the policies put in place in those regions.

5 Biofuels and the electrification of  
6 transportation. This is EVs. This is blending  
7 ethanol, biodiesels into the fuel stack. These are  
8 some of the macro energy trends we are seeing.

9 So what is energy today? How is it used?  
10 Who is using it? I think it is interesting to look at  
11 this through this lens as we move forward and discuss  
12 some of the environmental markets that trade on an  
13 exchange, notably in electricity generation, natural  
14 gas and coal, nuclear, and renewables; and in  
15 transportation, oil, natural gas, electricity, as well  
16 as biofuels.

17 This is a snapshot of today. What will the  
18 future look as we look through these different types of  
19 energy?

20 So the global environmental complex at ICE is  
21 made up of three pillars. The first is the cap-and-  
22 trade programs. That is the European ETS; the WCI,

1    which is California and the Province of Quebec; as well  
2    as RGGI, which is the Northeast U.S. Renewable energy  
3    markets as well would be the second pillar. And last  
4    would be the low-carbon fuel standards, LCFS, in  
5    California; as well as the Federal RIN mandate.

6                So when we take a look at the North American  
7    environmental markets, just zoning in on North American  
8    specifically, this is what our customers are telling  
9    us. The open interest has increased drastically, as  
10   you can see by the chart; volumes as well if you take a  
11   look at early days in 2013 versus what we are seeing in  
12   2019. The interest has increased significantly.

13               Now, the way the open interest is broken down  
14   using the three pillars, for this slide, it is actually  
15   two of the three. So we have the cap-and-trade  
16   programs, RGGI, California cap-and-trade and Province  
17   of Quebec, as well as the REC markets. And you can see  
18   the different color schemes there as well as with the  
19   monthly volume. And, again, just noting in 2019, the  
20   increase in participation in volumes has been  
21   significant compared to prior years.

22               So this is just a zooming-in of the

1 individual pillars that we list as far as environmental  
2 products. And, of note, the decreases in each of the  
3 open-interest lines is related directly to the physical  
4 delivery.

5           In 2018, 30 percent of all volume ended up in  
6 physical delivery. Now, for a futures market, this is  
7 quite high compared to historical other physical  
8 commodities. So there are benchmark delivery months in  
9 the carbon product, CCA and RGGI. We are looking at  
10 December. In the PJM markets, it is July based on the  
11 energy year how those transact. Most of the open  
12 interest hovers in one month. And then there is a big  
13 physical delivery. And that is where our clearing  
14 members in the clearinghouse really participate in  
15 these markets.

16           So, looking at the global environmental  
17 landscape, if you look at the North American markets,  
18 our average daily volume of around 8,600 lots. I  
19 mentioned 2019 has been a banner year so far versus  
20 2018. That is a 55 percent increase, open interest as  
21 well. This data was taken from the end of September.  
22 So September 30th, the open interest was 825,000 lots.

1 As of yesterday, ICE open interest is 912,000 lots. So  
2 in just over a month, that is almost an 11 percent gain  
3 in open interest.

4 And I had mentioned delivery volume  
5 approaching 300,000 lots as of the end of September.  
6 That is a 13 percent increase over 2018. And in 2018,  
7 30 percent of all volume went physical delivery.

8 Comparing this to the Europe ETS emissions  
9 scheme, average daily volume is 43,000 lots at ICE.  
10 And this is made up of approximately 30,000 futures and  
11 13,000 options.

12 Open interest is two times that of North  
13 America, at 1.5 million lots, with a notional value of  
14 38 billion. Now, in 2018, there has been a little bit  
15 of headwinds from Brexit relating to the European cap-  
16 and-trade program, but it is still a robust market.

17 So what are we seeing next? As I mentioned,  
18 things do change quickly, notably the program linkages  
19 on Tuesday. I should have Virginia in here as a  
20 possible linkage with RGGI. This is how fast things  
21 can change, obviously North Carolina, as Dan mentioned,  
22 New Jersey is going to be joining in January of 2020.

1 Pennsylvania is looking at a link with RGGI as well.

2 TCI, which could double the size of the RGGI  
3 market, is a tailpipe emissions market similar to the  
4 LCFS market with the exception that it is a cap-and-  
5 invest, more of a cap-and-trade, where the allowances  
6 will be auctioned, similar to California and RGGI.

7 So looking at CCAs, the possible states that  
8 would be linking to that program, Colorado, Nevada, New  
9 Mexico, Oregon, and Washington that were mentioned  
10 earlier, as well as Mexico, which is doing a  
11 preliminary market now with the possible expectation of  
12 expanding into WCI. CORSIA is a good example of  
13 currently it is a voluntary market with the  
14 international aviation industry. This is capping CO<sub>2</sub>  
15 related to international air travel. And, last, but  
16 not least, Article 6, which is the Paris Agreement,  
17 this is calling for a global price of carbon. Now, you  
18 can imagine it is hard enough to do it in one country  
19 or numerous countries, let alone having everyone on  
20 board. But certainly it is interesting. It is  
21 something to look forward to should there be a global  
22 price on carbon.

1                   Thank you.

2                   CHAIRPERSON WIGGINS: Thank you very much,  
3 Michael.

4                   Dr. Sandor?

5                   MR. SANDOR: Thank you very much for the  
6 invitation, Commissioner Berkovitz. And hello to all  
7 of the other Commissioners and staff here.

8                   It warms my heart always to be here. And the  
9 very role of this Commission in environmental  
10 derivatives may be overlooked. I want to share with  
11 you a little bit about the inventive process and how  
12 you come up with new ideas and the path of launching  
13 those new ideas. There would, in fact, be no  
14 environmental derivatives if there wasn't a CFTC,  
15 clearly.

16                  And, even in that process, in crafting the  
17 legislation -- I am 700 years old. So I am going to  
18 tell you some historical events. In '73, after the  
19 great grain markets and Arab oil embargo, the  
20 government established the CFTC in an act in '74. But  
21 where environmental derivatives come in is in that act,  
22 we had to carefully define what a commodity was, no



1 longer a storable physical commodity. So the  
2 definition had to be changed to include intangibles as  
3 well as things like financial futures. And the  
4 intangibility was a critical definition.

5           The second key factor is the agency. And I  
6 think it is relevant given the talk between the members  
7 of the Committee and the audience about who does what  
8 for CFTC, et cetera. So then we were careful and  
9 prodigiously worked to give the CFTC exclusive  
10 jurisdiction. And that facilitated the development of  
11 inventive activity. That involved working with the  
12 then CEA, working with the House and Senate committees,  
13 educating the legislators, and then educating the  
14 regulators. That will be a pervasive theme in the  
15 innovative process.

16           So if we take a look at five examples of  
17 financial innovation, the Dutch East India Company in  
18 1605; the birth of wheat trading in 1848; the birth of  
19 financial futures in 1975, interest rate futures; the  
20 birth of SO<sub>2</sub> trading in '90; and the birth of carbon  
21 trading in the Chicago Climate Exchange -- Dan did most  
22 of my heavy lifting. And so did Michael. So I

1 appreciate it.

2 All of those go through the same process.

3 You have a rapid, and you have to identify a structural  
4 change. In the case of the Dutch East India Company,  
5 it was the opening of trades with the Far East, which  
6 generated the need for capital, the invention of the  
7 limited liability corporation, the Amsterdam Stock  
8 Exchange, futures on the Dutch East India Company  
9 options, et cetera.

10 Wheat. The growing of the commodity was in  
11 the Midwest, the population in the East. You had to  
12 have forward contracting. You had, in fact,  
13 standardization that followed the structural change.  
14 Then you have to create evidences of ownership because  
15 you, better than everybody, know we don't trade actual  
16 corn or beans or bonds. We trade evidences of  
17 ownership. Then over-the-counter markets spring up.  
18 Exchanges come into being. Derivatives come. And then  
19 you have deconstruction with OTC markets, like swap,  
20 swaptions, et cetera.

21 You go and find the same thing with acid  
22 rain. How does it come about? How do you build the

1 market? And what is the clue? The clue is a massive  
2 change in the environment. There is production of  
3 electricity in the Midwest. When coal is burned, it  
4 releases sulfur. It combines with oxygen. It drifts  
5 over into the East Coast. Rivers get acidified. You  
6 get forests which are essentially neutered. And you  
7 get lung disease of incredible proportions.

8           You have to get an act passed. You are okay  
9 or one is okay because you know you can trade a  
10 derivative on it, but you have to enable the cash. So  
11 you have to work with different constituencies from  
12 utilities to line producers, who are part of the  
13 solution and will stand to benefit because of scrubbing  
14 devices that use the commodity.

15           You have to then very carefully once again  
16 work with the legislators. You finish that, and then  
17 the story really begins anew. And how does it begin  
18 anew? You have got multiple agencies here, and you  
19 have to go and visit Bill Reilly, the head of the EPA,  
20 and you have to point out that the legislation has got  
21 flaws and needs clarification. Why is that? Because  
22 there is no requirement for continuous emission

1 monitors. So there is asymmetric information. So  
2 people like Rob can't trade it if the utilities have  
3 all of the information about supply and the speculators  
4 have none.

5           You fix that legislation. You work with a  
6 devoted absolutely clear public person like Brian  
7 McClain, who headed the Acid Rain Division. And there  
8 is not a massive bureaucracy, but you work with them to  
9 get a registry. And, very importantly, you then have  
10 to go out and recognize the legislation passed, we are  
11 ready, but it doesn't take effect. There is no  
12 registry. And then you become a market participant.

13           And it is very important to recognize that  
14 the predecessor to EFP did the first trade. It wasn't  
15 a trade. It was a financing transaction. We went to a  
16 utility in Kentucky that was going to borrow \$50  
17 million to build a scrubber. We present-valued 30  
18 years of SO<sub>2</sub> allowance. We gave it to them so they  
19 didn't have to leverage the municipality. We took the  
20 30 years of reductions, sold it to a southeastern  
21 utility that didn't have the acreage to build a  
22 scrubber.

1           So, actually, you look at this agency. It  
2 looks like people are trading all over the thing. No.  
3 It is raising \$50 million to build the scrubber. And  
4 when people talk about derivatives, we need to  
5 emphasize more the financing, as opposed to the short-  
6 term risk transfer. There is a very, very big long-  
7 term transfer if it is used appropriately.

8           Let's go forward to carbon. You get to work  
9 on that, and you have got to get another bet, or as an  
10 inventor. And you get a lot of them right, and you get  
11 a lot wrong. And you go to Rio in 1992, and you  
12 present a paper at the Rio summit. And you talk about  
13 the need for CO<sub>2</sub> and cap-and-trade markets. And you  
14 get bounced around because the idea is too early, just  
15 like it was with every other innovation.

16           You work, and you try to get a global  
17 emissions-trading market started in 1995. You fail.  
18 Okay? You continue on, look at the effects and the  
19 battered body. You charge into the wall again, assess  
20 the damages, and go right back in the wall. You go to  
21 Kyoto in '97.

22           And then, finally, you go and take a fresh

1 look in 2000. And you say, "Okay. Nothing happened  
2 for the last eight years in Washington. What is going  
3 to happen in the next 20 years?"

4 And as you are an inventor, you say, "Nothing  
5 will happen in Washington for the next two decades."

6 So, therefore, you start a voluntary exchange. You  
7 build in 400 producers: Ford, DuPont, American  
8 Electric Power, Honeywell, Intel. You get common  
9 standards.

10 Then you invite cities, and you get lucky  
11 because you run into Jerry Brown in California, and the  
12 City of Oakland joins, and he buys the fact that there  
13 is a need for a regional program. And understand  
14 environmental laws start from the local level and then  
15 ultimately the national level.

16 So you don't lose heart, and you start a  
17 European market. And you go, and you have heard from  
18 these two guys. This is serious. The open interest in  
19 North American carbon is bigger than gold and silver  
20 and platinum combined. Let me say that again. The  
21 open interest in North American environmental markets  
22 is bigger than the open interest in all the precious

1 metals, not insignificant.

2           Let me, if I can, tell you that and just to  
3 conclude or the last five minutes that I have, in  
4 addition to the seven stages, you really need to do  
5 nine things simply. You have got to recognize that the  
6 market has price volatility. If there is no price  
7 volatility, there is no market. You have to have  
8 homogeneity. And you have to have some breadth of  
9 players. It doesn't have to be as wide as many people  
10 think. It can be 10. It could be 20. It could be 50  
11 as long as there is perfect competition and no ability  
12 to manipulate. Then you need to have hedging, which is  
13 flawed. Okay? So contracts, forward contracts, that  
14 are broken can't be reliably used to hedge, too  
15 expensive to hedge, like the borrowing of bonds and  
16 shorting the efficiency of derivatives markets for  
17 that. Once you have all of that, you need a viable  
18 cash market or something to settle to that is viable,  
19 like a stock index, but you need that viability.

20           And, most importantly, you need four steps  
21 which take you about a decade. Okay? They are the  
22 education of the legislature and the regulators. And

1 that is one-on-one hard time to make sure because they  
2 are your friends, not your enemies. You educate the  
3 legislators. You educate the commissions and all of  
4 the other regulators that are involved.

5           Once you do that, you then have to design the  
6 exchange. What degree of mutuality? Is it like  
7 members' exchange? Is it all for profit? Who owns it?  
8 What is the organic structure? Given the for-profit  
9 environment, how do you get advisory committees in the  
10 product development stage? How do you engage your  
11 constituency?

12           Then, of course, very important, the design  
13 of the contract itself, its size, and the  
14 environmental. Does it include negative emissions and  
15 positive emissions? So in 2002, the environmental  
16 community was not so keen on negative emissions  
17 offsets. And that is accumulation of carbon, methane  
18 credits, soil conservation from low-till, no-till.  
19 Many of those are not wasted because they are now in  
20 California's protocols. So that educational effort  
21 about having negative emissions and positive emissions  
22 be tradeable is very important.



1           The last one, which is onerous, is more  
2 education. So at the acid rain in 1993, we had at the  
3 Board of Trade SO<sub>2</sub> auction Ronald Coase, who Dan  
4 mentioned, who ultimately won the Nobel Prize. And at  
5 that point, he was an 89-year-old scholar. And he gave  
6 a pep talk about emissions trading and how it could be  
7 feasible.

8           You educate, and you go and you set up a  
9 course, which we did at Northwestern and one at  
10 Columbia. And you teach it. You get to students.  
11 Then you have to educate the attorneys. And after you  
12 finish with the attorneys, you need the accountants.  
13 And after you get the accountants, you need to go to  
14 the technologies, and you need to go to the ISVs, and  
15 you need to go to the back office. Then you need to  
16 get the salesmen, who sell the product.

17           In my humble experience, if you are starting  
18 in a brand-new commodity in a brand-new exchange,  
19 financial futures, acid rain, carbon, it is a 10- to  
20 20-year process. And it takes about \$30 to \$50 million  
21 of outside capital to get to that area. And I think  
22 Michael's notion of where European carbon trades is

1 right on that timeline. Fifteen years, you know, and  
2 it is finally kicking in.

3           So what did I learn on this process? You  
4 have to take a look at where one thinks the world is in  
5 2030 and 2040 if you are embarking now. We had to make  
6 a bet recently that LIBOR would go away, which we did  
7 in 2011 and prepared to spend two decades to implement.

8           What else have I learned? As long as you get  
9 a binding Federal agency, like the CFTC, you can start  
10 any new market. It does not depend on Federal  
11 legislation. As a matter of fact, the history of  
12 environmental markets is -- this is a clinical  
13 observation and not a criticism, it is mathematically  
14 related to the success to the distance from Washington,  
15 D.C. Okay? The further you go, the more people  
16 believe in cap-and-trade and execute it, number one as  
17 an observation.

18           Two, you have got to keep it simple. Maybe  
19 the products are complex, but you have got to find a  
20 way to homogenize them.

21           Number three, markets succeed when  
22 legislators and regulators are properly educated and

1 are not the enemy but the friend.

2           Four, there is an incredible amount of  
3 hostility to pricing -- okay? -- in environmental  
4 markets. One reads about the E.U. ETS, and you get a  
5 million articles. None of them talk about the  
6 environmental reductions that have occurred. They talk  
7 about the price being too low or the price being too  
8 high. When we have a bumper crop or scarcity, we know  
9 that price is a critical signal. It is not the  
10 objective of the program. The objective of the program  
11 is to reduce emissions. Low price doesn't mean  
12 failure, and high price doesn't mean success. It is  
13 the second- and third-order effects.

14           Policy can make or break a program. And we  
15 have got to be careful of that. Flawed market  
16 architecture cannot be assumed to be known and given.  
17 We work devilishly hard on the registry for SO<sub>2</sub>. And,  
18 yet, the government passed an act which had no RINs  
19 registry and, thus, manipulation and breaking it. So  
20 one has another reason to engage the regulators and the  
21 legislators.

22           I think we are just at the beginning, in

1 conclusion, there are water markets. There are  
2 endangered species. There are all kinds of genetic  
3 compositions that lie and whatnot. We are going to be  
4 in a very rich era. And I would not at all think that  
5 environmental markets in the future will be limited to  
6 airborne emissions. That is just the beginning.

7 Thank you.

8 CHAIRPERSON WIGGINS: Thank you all for your  
9 presentations.

10 We are now going to open the floor for  
11 questions and discussion regarding the environmental  
12 derivatives presentations. And, as we did before, we  
13 are going to begin with questions and comments from the  
14 Associate Members of the EEMAC to the Members of EEMAC.  
15 And, Michael, I think I saw your card up first.

16 MR. PROKOP: And thank you for that, Dena. I  
17 appreciate that. And thank you for a great  
18 presentation, everyone. Always great to hear your  
19 insight, too, Doctor.

20 MR. SANDOR: Thank you.

21 MR. PROKOP: We have known each other for a  
22 long time. And you would have thought that the good

1 doctor and I had talked about this for this segue, but  
2 your last comments are exactly what my first comment  
3 and question to the panel is going to be about.

4           In the 11 years that I have been part of and  
5 very fortunate to be a part of this committee in its  
6 various iterations -- and, Sean Cota, great to see you  
7 again from 2008, when Bart Chilton had the foresight to  
8 put something like this together. And we miss him  
9 dearly.

10           But, I always come back to the simple  
11 building blocks of some of these markets and what they  
12 mean. In that thought, we are here as an advisory  
13 committee, everybody in this room that is sitting at  
14 this table. And we are advising the CFTC, not only on  
15 new innovative markets like this but potentially on  
16 what markets may come or research.

17           One of the things I did way back in my  
18 brokerage days was look at weather markets. One thing  
19 Mother Nature always gave us was wind, sun, rain. And  
20 very much part of these renewable markets now, we are  
21 talking about growing wheat and sugar and different  
22 things that go into biofuels and what have you.

1                   So my question to the panel right now would  
2 be, are we actually going to be after all of these  
3 years maybe even seeing a resurgence in the weather  
4 markets? The weather markets back in the day were  
5 something that was conceived by many of the insurance  
6 companies for the hedging against natural disasters. A  
7 lot of the big amusement park companies, like the  
8 Disney Corporation, about hurricanes and loss of  
9 revenue that way. Are we now seeing a new reason for  
10 these markets to come as we look at the possible  
11 hedging and derivative aspects of these fundamental  
12 building blocks?

13                   Thank you.

14                   MR. SANDOR: Yes. I was really apprehensive  
15 about relaunching catastrophe derivatives. You may  
16 know we wrote a paper in the British Journal of Finance  
17 in 1970 calling for catastrophe derivatives. And I  
18 started it. And it was singly one of the biggest  
19 failures that I have had. We put a lot of energy into  
20 it, and I got it wrong.

21                   And I will tell you why we got it wrong,  
22 because it relates to what -- we thought it would come

1 to be a -- if you could trade. And we listed products  
2 like tornadoes, hurricanes, California quake, and a  
3 number of others. And it went down like a lead  
4 balloon.

5           And I will tell you why I think we failed at  
6 it. It didn't go down conceptually. It was a bad  
7 business decision because 15 to 20 percent of the  
8 insurance business is now in what is called alternative  
9 risk transfer, except there are CAT bonds. They are  
10 over-the-counter. And the lesson I learned from that  
11 failure, unless you have daily events that will move  
12 the price, it doesn't become a good futures contract  
13 because it lays there until there is an event. And  
14 maybe a Florida catastrophe comes and it forms a  
15 tropical depression and for seven or eight days, he or  
16 she, that hurricane bounces up and down, and there is  
17 really no risk transfer except for two, three days,  
18 when it is evident that it is going to hit. That is a  
19 better risk transfer in a bond than it is in a listed  
20 derivative.

21           And so what I learn is that you have to be  
22 cautious any environmental derivative you list. It has

1 to have something that will move enough to keep market  
2 makers involved, long-term hedgers, and short terms,  
3 and very successful product but not exchange-traded.

4 CHAIRPERSON WIGGINS: John?

5 MR. PARSONS: Thank you. Those were great  
6 presentations. I appreciate it.

7 I have a question, but I am going to state my  
8 question a little bit as a provocation. I am a little  
9 worried about the picture not being true to the  
10 reality. It sounds like there are lots and lots and  
11 lots and lots and lots and lots of environmental  
12 markets, but I don't think that is true.

13 The E.U. ETS is a real market. So that is  
14 fine. It is one product. It trades actively. All  
15 sorts of industries are involved. The price moves  
16 minute-by-minute, day-by-day. I can find lots and lots  
17 of academic studies analyzing the price movements. I  
18 can find academic studies analyzing the hedging and the  
19 operating decisions by various types of companies in  
20 Europe on that. I can't find a single one for any of  
21 these North American markets, but I may not be well-  
22 informed. So I am happy to hear about them.



1                   And I have a number of experiences where  
2   these markets have been presented as existing when,  
3   really, there is no trade. They are not really used or  
4   they are used for other purposes. So the other-purpose  
5   example isn't one for environmental markets, but China  
6   used to have a heating oil futures market that was very  
7   active until they changed their tax law and it  
8   disappeared. It was just a tax dodge. It didn't have  
9   any real hedging purpose. But people wrote about it as  
10  if it was a real risk management market.

11                  In the North American renewables market -- or  
12  let's talk about RGGI. In Massachusetts, we are a part  
13  of RGGI, but RGGI is a pretty loose cap on carbon. And  
14  we have a law that we passed that required us to reduce  
15  carbon much more than one RGGI requires. And we now  
16  have specified that the fossil fuel generators in  
17  Massachusetts have to go down, down, down. The RGGI  
18  price is very irrelevant to anything going on for a  
19  Massachusetts electric generator. So I don't know who  
20  is using RGGI hedges or for what purpose. I would find  
21  it a real puzzle.

22                  So, as I said, the E.U. ETS is real. I

1 understand the RIN market is real with all of its  
2 problems. Can you explain to me who is using these  
3 RECs? Is there any public data, public published  
4 information about the prices on these things that is  
5 academic that is peer-reviewed and transparent? I  
6 think that would be very informative.

7           The claim that the North American carbon  
8 market is larger than precious metals. Maybe you can  
9 come up with a statistic that says it is larger, but  
10 the precious metals are a real market. The North  
11 American carbon market, it is not clear to me it is.  
12 So I am curious to hear substantive information that it  
13 is.

14           MR. SCARBROUGH: Yes, sure. That is a really  
15 good question. And, I think this actually goes back to  
16 a lot of what Richard tends to talk about with the  
17 North American environmental markets' perception versus  
18 reality. And I think it is very safe to say that the  
19 perception is that there is not a lot going on in the  
20 U.S. environmental markets. They are not real markets.  
21 But I do think that, in large part, that is due to a  
22 lack of information, a lack of awareness on those

1 products.

2           And I can say, even for us, I mean, really,  
3 this is what we do on a daily basis and have been  
4 focused on this for nearly 15 years and trying to find  
5 good sources of data around these programs and trying  
6 to, certainly in an aggregated format, is a challenge.  
7 But that information is out there, and these are public  
8 programs.

9           I would note a nonprofit website DSIRE that  
10 tracks the state renewable portfolio standard markets.  
11 That tends to do a good job of summarizing the RPS  
12 standards and the evolving targets that they have in  
13 those markets. But to a certain extent, I would say  
14 that, if you look at, whether it would be the Federal  
15 renewable fuel standard, the state-based RPS markets,  
16 the Federal, the evolving I guess regional and state-  
17 based low-carbon fuel standards in California, Oregon.  
18 Some of the Canadian provinces are also looking to  
19 adopt mandatory low-carbon fuel standards as well.

20           And, really, it is, as Richard kind of I  
21 think alluded to, in the market development process all  
22 predicated on the underpinning of these environmental

1 markets. Are they legislated? Are they regulated?

2 who are the participants in these markets?

3 I think you can point to a lot of publicly  
4 available information because these are government-run

5 programs. If you look at the RGGI program, for

6 example, every quarter when they have a quarterly

7 allowance auction, you can see a list of eligible

8 bidders in that market. That is public information.

9 Also in the California cap-and-trade program, the same.

10 That is public information.

11 In the case of the REC markets, there are

12 numerous. Typically these are run by the registry

13 administrators. PJM has a registry. NEPOOL has a

14 registry. And there are a number of reports that show

15 the registry account holders in those programs,

16 generation statistics around the RECs, how they are

17 being created, where they are coming from.

18 So I would say that the data is out there.

19 It is not easy to find, certainly, but, I think if you

20 do take a look at those lists of companies, you are

21 going to see a lot of commercial end-users, some of

22 which are in this room right now, like BP, for example,

1 showing up on that RGGI participation list, the  
2 California cap-and-trade program. And typically if you  
3 look at that on top of the commitment in trader  
4 reports, you will start to see some of the disposition  
5 between commercial and noncommercial, you know, users  
6 in those markets and the fact that, you know, the  
7 futures markets now have come into play for the  
8 environmental markets fairly recently. You have more  
9 information. You have more visibility and obviously  
10 more transparency around daily volumes, open interest,  
11 number of trades, all the different products that are  
12 listed if you go to the ICE website, certainly, you are  
13 going to see a lot of that information. But, you know,  
14 again, you know, I think perception versus reality is a  
15 real thing in these markets.

16 MR. KIERSTEAD: Thank you, Dan. Very well  
17 said.

18 I would just like to add if comparing the  
19 E.U. ETS to RGGI or North American environmentals  
20 overall, that market, even based on average daily  
21 volume, is five times the size. If you pull out just  
22 RGGI, it would be 20 times, if not more. RGGI is only

1 the electricity industry, where the European ETS is  
2 industry-wide.

3           And as far as the data goes, I mean,  
4 Intercontinental Exchange has all of that data as far  
5 as volume, open interest, number of participants, and  
6 just the growth in the overall market.

7           MR. SANDOR: Dan, great observations. And we  
8 do talk a lot about perception and reality. There is a  
9 critical point here again. These innovations require  
10 10 to 20 years. I have been teaching at the college  
11 level for 56 years. And I have never seen an academic  
12 jump in and get a peer-reviewed article two years into  
13 something to be done.

14           So lesson number one, they don't come in  
15 until there is huge amounts of data because they are  
16 not going to say anything that can't be supported by  
17 the data. And the data are generally not accumulated  
18 is lesson one.

19           Lesson two, particularly in environmental  
20 markets, because of the constituency and because of the  
21 public, everybody who is involved in the market is  
22 expected to be perfect. Perfection is the enemy of the

1 good.

2               When the Wright brothers flew off Kitty Hawk,  
3 they didn't have seatbelts. Okay? They didn't have a  
4 runway. You just want to get the sucker off the  
5 ground, fly it for 63 feet for 40 seconds. The first  
6 airplane you build is not a dream liner, a 777, or a  
7 747. It doesn't have safety measures. It doesn't have  
8 anything. So why expect that markets should be  
9 perfect?

10              Look how long it took to get to the iPhone.  
11 You could have said, "The Mac." It is worthless. It  
12 is a toy. It is just for geeks and nerds. It will  
13 never serve any real purpose. So we have got to do  
14 that.

15              The second thing is because it is a public  
16 market, there is an exceeding demand for perfection.  
17 And I understand that. But the reality of industrial  
18 and financial inventive activity is they never start  
19 perfect. Inventions are then modified, proved, et  
20 cetera. So one has to be extremely temperate and  
21 cautious about describing whether a market performs a  
22 risk transfer, price discovery function until that

1 market is developed. It is a dangerous thing to draw  
2 conclusions based on it.

3 RGGI was flawed, so flawed they set the cap  
4 wrong. Okay? And the price was zero. Nobody killed  
5 the concept. They said, "Let's go back to work and get  
6 it right." We were against the single product,  
7 electricity. No other market runs like that. The EU  
8 is from many sources and allows industrials.

9 RGGI will grow. Don't criticize it. It will  
10 modify. It will develop. It's too early. And it is  
11 like me saying to my seven-year-old grandson who sticks  
12 his hand on a stove, "The kid will never learn." Okay?  
13 Yeah, he will learn if he gets burned once. So I think  
14 be cautious about leveling that heat-seeking missile  
15 because in new markets, heat-seeking missiles are easy  
16 to launch. And you don't want to kill the baby until  
17 it develops.

18 CHAIRPERSON WIGGINS: I am mindful of the  
19 time here, but I see quite a number of cards up. So if  
20 I can ask you to please be brief so we can stay close  
21 to being on schedule? Jim?

22 MR. ALLISON: I will try to be brief.



1                   In the history, you started with Coase, but  
2   Pigou's book from 1920 could be said to be the heart of  
3   this. Under what circumstances is a tax on the  
4   negative externality to be preferred? Under what  
5   circumstances do we prefer a cap-and-trade or when are  
6   we indifferent between the two solutions?

7                   MR. SANDOR: I would fall back on Ronald  
8   Coase's arguments about Pigou. And he said Pigou was  
9   never clear. Therefore, he could never clearly be  
10   wrong. And with a side pocket, I would take the  
11   argument he wasn't the first to talk about trading. He  
12   talked about flexible mechanisms, taxes, and subsidies.  
13   But, in fact, your question is right because most of  
14   the markets, including the E.U. ETS and California,  
15   have taxes, subsidies, and markets. And, in fact, they  
16   both contribute to attacking environmental  
17   externalities.

18                  MR. KIERSTEAD: Thank you.

19                  I would just add on that it is much better to  
20   allow the market to determine the price of CO<sub>2</sub>, for  
21   example, than a government. It is much easier to  
22   reduce a cap of a program than it is to increase a tax.

1                   CHAIRPERSON WIGGINS:   Dan?

2                   MR. DUNLEAVY:   Thank you.   It is about the  
3   LCFS.   So in 2018, I believe it surpassed the dollar  
4   value, the cash dollar value, of the RFS.   While I see  
5   the open interest and volume growing, it is still very  
6   small.   As a company that is kind of on the fringe of  
7   that space and when you see those kind of dollars,  
8   looking to invest, we called a couple of prominent  
9   investment banks and asked, "Can you make a market on  
10   LCFS for a hedge, right?"   It was basically crickets  
11   across the board.   So I don't know if they don't know  
12   about it, don't care, or they have their hands tied by  
13   regulators.

14                  So what do you see as the path to growing  
15   liquidity and open interest in that LCFS product?

16                  MR. KIERSTEAD:   It is a good question.   Thank  
17   you.

18                  And if you think RGGI is in its infancy, LCFS  
19   is much newer.   The futures contract we listed, which  
20   is cash-settled, not physically-delivered, was listed  
21   in May of 2018.   So there is not much data there at  
22   all.   The market is still physical, mostly bilateral.

1    So the data may be difficult to source, but it is  
2    certainly -- when my phone rings, it is one of the most  
3    frequently asked questions. So it will get there. It  
4    is just a matter of time.

5               MR. HEINLE: My question comes, Mike, from  
6    your presentation, but I would be happy to have any of  
7    the panelists answer it. You talked a lot about  
8    increasing volume in these markets. Can you talk a  
9    little bit about what effect the increase in volume had  
10   on price and volatility?

11              MR. KIERSTEAD: Absolutely. So I think when  
12   you look at the policy of the programs, so, for  
13   example, looking at the Virginia election on Tuesday,  
14   the underlying price of the RGGI futures contract,  
15   which on that day was \$5.61. It went up 14 cents in 1  
16   day after the result of that election, which is 2 and a  
17   half percent in 1 day, not a massive increase.

18              So when you look at California carbon, late  
19   in Q4 of 2017, they laid a pathway to 2030, which  
20   allowed the market to be extended a decade; runway for  
21   participants that come in. There is a floor mechanism  
22   that the price of carbon will increase every year.

1           So I just think that as that pathway was  
2   extended, more participation flowed into that market.

3           MR. SCARBROUGH: I think to a certain extent,  
4   too, one of the things you have seen is that if you  
5   followed the policy on a state-by-state basis in these  
6   RPS markets as they have increased, some of the  
7   renewable targets, you have seen price movement in the  
8   REC market. So for example, Maryland solar was trading  
9   a year ago for about \$10 a megawatt hour, trading I  
10   think last I saw \$70 to \$80 a megawatt hour. So there  
11   have been some markets where we have seen significant  
12   price movement in the market, but, generally speaking,  
13   even with California volumes have picked up, open  
14   interest has picked up in that market, and historical  
15   volatility has hovered recently in about 10 percent, 10  
16   to 11 percent, so not tremendously volatile market, but  
17   in large part this is going to be based on the  
18   regulatory and policy developments in those specific  
19   markets.

20           CHAIRPERSON WIGGINS: Do we have any comment  
21   from anyone on the phone?

22           [No audible response.]

1                   CHAIRPERSON WIGGINS: Comments and questions  
2 from the EEMAC Members? Yes, Ben?

3                   MR. JACKSON: Ben Jackson from  
4 Intercontinental Exchange. Thank you.

5                   I think the common thread that I have heard  
6 from our peers and colleagues here from some of the  
7 comments that have been made that I can't emphasize  
8 enough are comments such that as -- these contracts  
9 aren't created in a lab. They are not done in a  
10 vacuum. For any of us up here as exchange operators,  
11 they have to be done in close cooperation with our  
12 regulators, understanding the regulatory backdrop, but  
13 also very, very close partnership with the commercial  
14 traders, the people that are actually in that physical  
15 market making and taking delivery every single day.  
16 They are the ones that know where price formation  
17 happens because what is most important to them is the  
18 hedge that production or consumption risk at the point  
19 of where they have to make or take delivery. So having  
20 the commercials at heart, if you do that right, you  
21 partner with the regulators, you can incubate new  
22 innovation for the derivatives markets and answer a lot

1 of the questions that people had from that first panel.

2           So, absolutely, the futures markets should  
3 play a role here. Myself and our peers, that is our  
4 job, to partner with all of you to continue to provide  
5 that innovation.

6           And the last thing I would really highlight  
7 that, Dr. Sandor, you said -- I thought you absolutely  
8 nailed this, as you always do -- futures markets are  
9 organic living things. And they change. They modify  
10 because the underlying market that they are helping  
11 people to hedge at the end of the day is also changing  
12 and evolving. And I see it in every one of our  
13 markets.

14           You take a market like Brent Oil. That is an  
15 evolving, living marketplace that we have to stay very  
16 close to the commercial trader to continue to evolve  
17 that market to maintain its global position as a leader  
18 in helping people hedge their risk.

19           The same is true in natural gas. The same is  
20 true in the environmental markets that I thought the  
21 panel did a really good job of describing today.

22           Thank you.

1                   CHAIRPERSON WIGGINS: Commissioner?

2                   COMMISSIONER BERKOVITZ: One

3 question/observation, I guess more of a question.

4 Given the difficulty or the multiplicity of factors,

5 Dr. Sandor, that you have described, the magic nine, to

6 get a contract going. One thing, there is not an

7 explicit recognition there or maybe I didn't quite pick

8 it up, speculative interest. To what extent?

9 Obviously you have to have hedging interest. Generally

10 it is thought to be a fundamental prerequisite for a

11 successful contract, but, in addition to hedging, if it

12 is not adequately balanced, you need speculative

13 interest, too. But given this problem of climate

14 change and the implications for the global economy and

15 the difficulties, the long timeframe potentially and

16 money invested to get a contract like that going, on

17 the other hand, we see other cryptocurrencies, digital

18 commodities, huge amount of money and a huge amount of

19 trading into something that is more speculative in

20 nature as to what its relevance to the future of the

21 planet is at the moment. Now, it may be extremely

22 relevant to the future of the planet or whatever, but

1 to what extent are these markets driven by speculative  
2 interest? And how do you explain like what makes one  
3 market take off almost instantly in a year or two  
4 versus the 30-year timeframe that you have been talking  
5 about?

6 MR. SANDOR: I had a lot of bruises,  
7 Commissioner, from getting that wrong. So let me tell  
8 you what a thought is or three small thoughts. If it  
9 doesn't have what the industry calls naturals, real  
10 people who have an economic purpose, it dies like pork  
11 bellies. You know, it served a role for a certain  
12 time, and then it was better evolved into hogs and not  
13 bellies, number one. So if it doesn't have natural  
14 hedging interest, it ultimately will pass away.

15 Two, the amount of speculation needs to be  
16 categorized in two areas. Okay? Number one and if you  
17 look at some of the early work by Holbrook Working or  
18 Roger Gray, what you need is the net hedge long open  
19 interest, hedge short open interest. And that is going  
20 to be the net that has to be covered by speculators.  
21 So if 100 million bushels are demanded by exporters  
22 that need to be hedged and 80 million bushels are short



1 by farmers, you need 20 million to fade or underwrite  
2 the excess long or short hedger position. So that is  
3 one kind of -- and a subject of big debate. Certainly  
4 Keynes has speculated on a backwardation and contango.  
5 How much do you have to pay those people, what rate of  
6 return to take the unbalanced hedge?

7           The third thing is you need speculators, the  
8 high-frequency traders, the market makers, the  
9 liquidity because, in fact, somebody has to bridge the  
10 gap in the short term between the buy order and the  
11 sell order that comes in from the hedgers. Right?  
12 Somebody has to inventory the short mismatch as well as  
13 the long mismatch. And that is the job of a liquidity  
14 provider, right? The buy order comes from the hedger  
15 at 9:02. It comes, the sell order, from the hedger at  
16 9:04. They would not match but for the liquidity  
17 provider. So that is necessary. So you have the  
18 unbalanced hedging based upon naturals. You have the  
19 unbalanced hedging because the buy and sell orders. So  
20 you need the short term. And then you benefit only  
21 from the other speculators who were short-term trend  
22 traders and things like that who operate algorithms and

1 try to do weekly or non-thing.

2 But the perfect example -- and I will quit at  
3 that because it is a discussion hopefully we can have  
4 over a longer term -- always perplexing that the world  
5 price of wheat is made on a very small part of the U.S.  
6 crop. Right? We have hard red. We have soft red.  
7 And we have spring wheat. The soft red is 500 -- I  
8 don't know -- 25 percent of the production. I mean,  
9 wheat is a bread item. And the soft red is a cookie  
10 wheat. And how is it? It puzzled me as an academic.  
11 How does cookie wheat determine prices in Stuttgart and  
12 Beijing and Shanghai when it was so small relative to  
13 the Kansas City wheat contract, which was a bread  
14 market? And the difference was speculation, that the  
15 liquidity was provided. And there was a hard, huge  
16 hedging interest on both sides. But it wasn't liquid  
17 enough for the Cargills and the Bunges and the Louis  
18 Dreyfuses to use.

19 So I think if you take a look at wheat  
20 futures, a lot of spring, soft red, hard red, there are  
21 good insights there.

22 CHAIRPERSON WIGGINS: Thank you all very

1 much. Thank you for the comments from the Associate  
2 Members and the Members. And thank you very much to  
3 our panelists.

4 MS. KNAUFF: At this time, we are a few  
5 minutes behind. The EEMAC will take a lunch break now.  
6 We will resume the meeting at 1:45. All EEMAC Members  
7 and Associate Members that are participating in the  
8 EEMAC lunch can proceed to the security desk to be  
9 escorted upstairs to the boardroom on the ninth floor.  
10 If you are not attending the EEMAC lunch, a list of  
11 area restaurants is available within your meeting  
12 folder as well as on the agenda table in the front of  
13 the room.

14 Thank you.

15 (A luncheon recess was taken at 12:47 p.m.)

16



1 manage risk during this transition in the energy space.

2           Just as a quick reminder, the Commercial  
3 Energy Working Group is a diverse group of commercial  
4 firms in the energy industries whose primary activity  
5 in the physical delivery of energy commodities to  
6 others, including industrial, commercial, and  
7 residential customers and utilities.

8           Commercial energy firms across all sectors of  
9 the energy industry are impacted in a variety of ways  
10 by global efforts to decarbonize the energy sector.  
11 These efforts cut across the physical energy supply  
12 chain from power and natural gas sectors to the  
13 production, process, and consumption of transportation  
14 fuels. The promotion of renewable resources, and  
15 reduction of carbon emissions are accomplished through  
16 voluntary efforts by many of our members and customers  
17 that we helped accomplish these goals and in response  
18 to a diverse set of state and Federal mandated  
19 regulatory requirements as well as regional  
20 requirements, many of which we heard about this  
21 morning.

22           In this context, overall corporate strategies

1 for reducing carbon footprints have identified  
2 opportunities for commercial energy firms to make  
3 investments in the development of renewable resources  
4 and use carbon emission credit products to reduce costs  
5 and hedge our activities. To place some structure  
6 around the number of activities that could be covered  
7 by this topic, as we dove into it and talked about it,  
8 it was very immense and broad. We ultimately want to  
9 know about some of the activities in areas we  
10 participate in the energy and environmental derivative  
11 space.

12           We have taken the following approach. First,  
13 we have defined certain categories that represent areas  
14 of risk that commercial energy firms actively manage.  
15 Next, we then addressed some of the ways commercial  
16 energy firms use derivatives to manage these areas  
17 identified for risk exposure.

18           Interestingly enough, you probably heard  
19 about the pillars this morning from Mike Kierstead of  
20 ICE. Well, you will find that the areas of risk we  
21 identified match up nicely with his pillars, and we  
22 didn't coordinate at all.

1           First, let me have a quick discussion of the  
2 power and gas sector. Here we are talking mostly about  
3 mandated renewable energy or standard or programs that  
4 are administered at the state level. These RPS  
5 programs create exposures, not only for commercial  
6 energy transactions for retail customers but with other  
7 counterparties. And they also generate internally  
8 through commercial firms' own operations and energy  
9 consumption. Thus, at times, we are sellers of these  
10 products to third parties, but we also have our own  
11 operations, which require us to comply with a lot of  
12 these RPS requirements.

13           RPS risk exposure can be managed in two ways.  
14 First, it can be managed through physical channels,  
15 with procurement and delivery of renewable energy  
16 certificates, or RECs, which, again, we heard about and  
17 I think we are going to hear more about from Lopa after  
18 me. Second, they can be managed through commodity  
19 derivative markets using available exchange-traded  
20 futures that result in physical delivery of RECs.

21           Next I would like to talk a little bit,  
22 though, about kind of the dilemma we face in these

1 markets. A single standardized national market for  
2 RECs does not currently exist in the U.S. While there  
3 are crossover regional markets that accept certain  
4 RECs, RECs by their nature are the product of state-  
5 specific regulatory requirements. There is some  
6 regional acceptance of certain REC products, but much  
7 of the exposure to the need to participate in REC  
8 markets that commercial energy face must be managed on  
9 a state-by-state basis subject to a variety of  
10 sensitive REC standards.

11           Consequently, some of the REC markets are  
12 somewhat fragmented in that they are neither uniformly  
13 defined nor are they comprehensive in terms of various  
14 risk exposures to be managed. And prices for RECs can  
15 vary substantially in different jurisdictions.

16           Even in this environment, there are some  
17 derivative markets that provide the ability to hedge  
18 the exposures we face through these activities. And  
19 for that, they are helpful. So let me give you a quick  
20 example.

21           One commonly traded product that we will be  
22 seeing on Nodal Exchange or ICE futures, which we



1 talked about earlier today and was listed with the  
2 physical delivery RECs futures contracts, would be the  
3 PJM tri-qualified renewable energy class I futures  
4 contract listed by IFUS. Many firms servicing  
5 electricity customers in this market use these  
6 certificates to hedge their positions forward to meet  
7 the requirements.

8           Another area where we transact in RECs is in  
9 the development infrastructure projects. So, for  
10 example, firms might be developing a wind farm or a  
11 solar farm at utility level. When we do this and it is  
12 not subject to a long-term contract, a lot of times we  
13 are looking at a variety of sources of revenues to make  
14 this work. So we would be looking at energy market  
15 prices, capacity market prices, ancillary service  
16 market prices, but also RECs. And the value of RECs is  
17 an essential component to this. And so those revenue  
18 streams are something that we need to look at and then  
19 see if there are opportunities to hedge.

20           When developing renewable resources,  
21 commercial energy firms sometimes will also enter into  
22 what they call REC arbitrage, where sometimes you can

1 trade out high-value RECs for lower-value RECs and  
2 enhance the value of a particular project.

3           Next I would like to turn to the  
4 transportation fuel sector. In contrast to the power  
5 and natural gas sector, depending on their operations  
6 and segment of the physical supply chain, commercial  
7 energy firms in the transportation fuel sector can be  
8 subject to both Federal- and state-mandated design  
9 programs to reduce carbon emissions. The following  
10 provides a brief high-level overview of different  
11 programs that the commercial energy firms must comply  
12 with, the regulators that they must interact with, and  
13 the commodity derivative products used to manage those  
14 identified exposures.

15           So, obviously, we have spoken today earlier  
16 about low-carbon fuel standards, for example, from  
17 California. Commercial energy firms manage risk  
18 associated with the purchase and sale and consumption  
19 of transportation fuels. An example of one of the main  
20 drivers of this activity flows from LCFS products  
21 traded physically on platforms and on exchanges to help  
22 energy companies meet California low-carbon fuel

1 standards. The low carbon fuel standard is designed to  
2 encourage the use of cleaner low-carbon fuels. Similar  
3 to RPS in the power and gas sector, LCFS is a state-  
4 mandated program by the California Air Emissions Board.  
5 Providers of transportation fuels must demonstrate  
6 under this program that the mix of fuels they supply  
7 for use in California meet the LCFS carbon intensity  
8 standards or benchmarks for each annual compliance  
9 period. Exposure to meeting these requirements can be  
10 managed with products obtained on exchanges or through  
11 transactions with counterparties.

12 Commercial energy firms have the option of  
13 utilizing LCFS futures products to mitigate price risk  
14 exposure associated with LCFS credits and requirements.  
15 For example, CME's California low-carbon fuel standard  
16 futures contracts is a financially-settled futures  
17 contract that can be used to hedge price risk exposure  
18 associated with quotes from PRIMA, which is what it is  
19 designated as for the California LCFS index. Similar,  
20 IFUS California low-carbon fuel standard credit or OPUS  
21 futures is financially-settled contract that is used to  
22 hedge price risk exposure related to ethanol and gas

1 component spot market prices.

2           Also, under the EPA's renewable fuel standard  
3 program, which is a Federally-administered program by  
4 the U.S. Environmental Protection Agency in  
5 consultation with the U.S. Department of Agriculture  
6 and Department of Energy, commercial energy firms  
7 participate in the RINs market. The program is  
8 designated as the Renewable Fuel Standard Program. The  
9 RFS program is a national policy that requires certain  
10 volume of renewable fuel to replace or reduce the  
11 quantity of petroleum-based transportation fuel,  
12 heating oil, or jet fuel. At a high level, the RFS  
13 requires renewable fuel to be blended into  
14 transportation fuel in increasing amounts each year,  
15 escalating by 36 billion gallons by 2022.

16           Each renewable fuel category in the RFS must  
17 admit lower fuel levels of greenhouse gas emissions  
18 relative to the petroleum fuel it replaces. There are  
19 four renewable fuel categories under RFS: biomass-  
20 based diesel, cellulosic biofuel, advanced biofuel, and  
21 total renewable fuel.

22           The RFS program affects nearly every

1 participant in the market for ground transportation  
2 fuels. In general, there are six classes of actors in  
3 this market: refiners, who manufacture gasoline and  
4 diesel; renewable fuel producers, who produce fuels  
5 generated from renewable biomass; importers, who import  
6 gasoline, diesel, and renewable fuels; blenders, who  
7 combine renewable fuels with gasoline and diesel to  
8 create transportation fuel in the U.S.; retailers, who  
9 purchase the blended transportation fuel and sell it to  
10 consumers at gas stations; and, then, the consumers  
11 themselves.

12           Some of these participants are regulated  
13 directly under the RFS program while others are  
14 affected only indirectly by its requirements. For  
15 example, EPA regulations designate commercial energy  
16 firms, such as refiners and importers of gasoline and  
17 diesel, as parties required to demonstrate compliance  
18 with RFS program renewable volume requirements,  
19 commonly referred to as the obligated parties.

20           To implement the RFS program, EPA tracks  
21 production and use of qualifying renewable fuels using  
22 the RIN, renewable identification numbers, or RINs.

1 RINs are generated by renewable fuel producers or  
2 importers and are bought and sold or attached to  
3 renewable fuel until the fuel is purchased by an  
4 obligated party. At that point, the RIN is separated  
5 from the fuel and made after we independently bought  
6 and sold until it is retired to meet obligated party's  
7 renewable volume obligation. If obligated party has  
8 more RINs than it needs to meet its renewable volume  
9 obligations, it may sell or trade the extra RINs or,  
10 instead, use to bank them for the following year.

11 In order to manage exposures to price  
12 volatility in biofuel markets, commercial energy firms  
13 transact both biofuel and RINs futures contracts. Both  
14 CME and IFUS list for trading financially-settled RINs  
15 futures contracts that allow market participants to  
16 hedge volatility specifically linked to RINs prices.

17 The final area I would like to talk about,  
18 which was one of the pillars I mentioned earlier, was  
19 state and regional mandates around carbon. In addition  
20 to the foregoing commercial energy, firms located in  
21 certain jurisdictions must manage risks imposed by  
22 comprehensive carbon emission programs. As previously

1 mentioned, they involve the combination of state and  
2 regional regulatory compliance requirements, such as  
3 those imposed by the Western Climate Initiative and the  
4 Regional Greenhouse Gas Initiative, and are cap-and-  
5 trade programs intended to reduce carbon emissions in  
6 the power production sector. Generators in the  
7 participating jurisdictions must demonstrate they have  
8 enough credits to meet emission targets. While  
9 physical instruments for these products are credits and  
10 generators can engage in forward transaction for these  
11 instruments, they are also exchange-traded futures  
12 products.

13           Prices in these markets are impacted by  
14 shifts in supply and demand as well as applicable  
15 regulatory activity that surround these markets.  
16 Traders transacting in these markets monitor such  
17 changes and when deemed appropriate in their discretion  
18 and business judgment use commodity derivatives in some  
19 cases to manage risk around these things. So CME and  
20 IFUS list physically-delivered RGGI futures contracts  
21 for identified vintage years that allow market  
22 participants to meet applicable RGGI compliance

1 obligations.

2           The deliverable instruments under these  
3 contracts are RGGI CO<sub>2</sub> allowances equal to the contract  
4 size delivered through the programs.

5           As I previously mentioned, regulatory actions  
6 have impact on the markets. For example, efforts to  
7 place a value on carbon markets is also impacting the  
8 price of physical transaction in certain places and in  
9 related commodity derivative contracts. So that the  
10 spot price of energy serves as the underlying product  
11 for some of the futures contracts traded in  
12 electricity. As different jurisdictions consider  
13 carbon pricing, that impacts those forward markets.

14           Electricity futures, for example, in New York  
15 can be impacted by the proposal to add carbon pricing,  
16 which has been out there for a while. Trading past the  
17 proposed implementation date or liquidity past the  
18 proposed implementation date for the New York's carbon  
19 pricing proposal has diminished a little bit. So that  
20 is kind of an example of a situation where a public  
21 policy is having an impact on the energy market itself,  
22 as opposed to the environmental derivatives. And these



1 are the types of things that traders are monitoring.

2           So as we consider rules to incorporate the  
3 price of carbon in different markets, traders have to  
4 monitor those rules, both in the environmental space as  
5 well as trading energy products. Traders trying to  
6 manage long-term exposure to power markets monitor  
7 these ISO and RTO rule changes that were discussed  
8 earlier as well as state rule changes that might affect  
9 the markets.

10           Further, if the price of carbon is added to  
11 the market, then the carbon emissions ultimately could  
12 decrease and carbon market prices, such as RGGI prices,  
13 could decrease. My point being there is not only an  
14 interim effect on the price of energy itself, but it  
15 could affect the RGGI prices. As we heard earlier,  
16 there is a state-mandated program in Massachusetts for  
17 generators to reduce their carbon emissions. So as  
18 they go along that path and start reducing their  
19 emissions more and more over time, if supply and demand  
20 in the RGGI market stays the same, there will be more  
21 credits. In theory, there will be more credits that  
22 will be created as a result of these generators

1 reducing their emissions due to state-mandated  
2 programs.

3           The different examples presented today  
4 illustrate that physical environmental products are  
5 creatures of state, Federal, and at times regional  
6 programs. They become part of the trading landscape.  
7 However, the value of these products and the liquidity  
8 of the markets for them is very much impacted by, as I  
9 mentioned, regulatory activity at these levels. Thus,  
10 commercial energy firms that participate in these  
11 markets must have a vigilant eye on how these events  
12 impact products they use to manage exposure to the  
13 clients' requirements.

14           So what is the takeaway from this? It is not  
15 necessarily that the CFTC has a role to affect what  
16 those folks can do, but they can help commercial energy  
17 firms manage the risks around this by supporting the  
18 development of contracts in this space. We heard in  
19 the previous panel about the efforts to do that and  
20 based on our experience, we would be very supportive of  
21 efforts to develop contracts as over time and we go  
22 through their transition. New environmental products,

1 whether they are carbon emission products or REC-type  
2 products emerge, they are tools that we can use to  
3 manage the exposure. So we encourage the Commission to  
4 continue to foster an environment that allows those  
5 contracts to be created and allows our members to hedge  
6 our exposures.

7 Thank you.

8 CHAIRPERSON WIGGINS: Thank you, Matt.

9 Lopa?

10 MS. PARIKH: Thank you.

11 Good afternoon, Commissioners Berkovitz,  
12 Behnam, and Stump. Thank you so much for the  
13 opportunity to participate today in this important  
14 discussion.

15 I am here today on behalf of the Edison  
16 Electric Institute, or EEI. EEI is the association  
17 that represents all of the investor-owned utilities in  
18 the United States. Our members provide electricity to  
19 about 220 million Americans, which is about 72 percent  
20 of all end-use customers. We operate in all 50 states  
21 and the District of Columbia and are regulated at both  
22 the state and the Federal level. As a whole, the

1 electric power industry supports more than seven  
2 million jobs in communities across the United States.  
3 And our members are committed to providing affordable,  
4 reliable, and increasingly clean electricity to  
5 customers now and in the future.

6 I want to talk a little bit just to start my  
7 discussion about the transition because it really kind  
8 of sets the framework for the discussion that I would  
9 like to have with you about renewable energy  
10 certificates and what our members are doing with those  
11 today.

12 So this is an exciting time in the energy  
13 industry. As it is transitioning from one that was  
14 predominantly coal to one that is increasingly  
15 comprised of natural gas and renewable resources. The  
16 fuel mix is transitioning from one that was 48 percent  
17 coal in 2018 to one that is now comprised of one-third  
18 coal, one-third natural gas, and one-third carbon-free  
19 resources. And this evolution is going to continue  
20 going forward. Over the past five years, over half of  
21 the resources that were built in the United States were  
22 solar and renewables. And our members are increasingly

1 becoming involved in contracting for, building, and  
2 participating in renewable markets as well as using new  
3 technologies, such as storage, to facilitate the  
4 integration of these resources.

5           Due to these changes, the electric industry  
6 as a whole reduced the carbon dioxide emissions by 27  
7 percent below peak 2005 levels. Of that amount, the  
8 EEI member companies reduced their carbon emissions 37  
9 percent from 2005 levels. And we are continuing down  
10 this part going forward. Collectively, our members are  
11 on a path to reduce carbon emissions by 50 percent by  
12 2030 and 80 percent by 2050 compared to peak 2005  
13 levels. And our members are also working with their  
14 customers, both large and small, to help them meet  
15 their clean energy goals.

16           So I just want to talk a little bit about a  
17 conversation that was held on the first panel about  
18 certainty. While regulatory certainty from both our  
19 Federal and state regulators is very important for our  
20 member companies, one of the things that wasn't really  
21 discussed is all of the other components that have gone  
22 into this transition to renewables.

1           Declining costs for technology for wind and  
2   solar resources; increasing new technologies, such as  
3   storage or new technologies that allow renewable  
4   resources to be more controllable, the declining  
5   natural gas prices the help support the growth of  
6   renewables. And, most of all, our customer demands are  
7   constantly asking for more control over and greener  
8   resources. So all of these components are working  
9   together to kind of move our industry towards a  
10   cleaner, a greener use of resources to generate our  
11   electricity.

12           One of the ways that we can meet these  
13   renewable goals is through the use of renewable energy  
14   certificates, or RECs. RECs are tradeable, nontangible  
15   energy commodities. Generally, one REC is equal to one  
16   megawatt of electrical output from a qualifying  
17   renewable generation facility. What a REC does is it  
18   creates a distinction between the underlying  
19   electricity and the environmental attributes of  
20   renewable generation. This is important because once  
21   electrons are put onto the grid, the source of that  
22   generation is not distinguishable. And so a REC

1 certifies that one megawatt of clean energy was placed  
2 onto the energy grid.

3           And from an end-user perspective, which all  
4 of my members are, a REC is a physical commodity and  
5 that transactions in RECs, including those on  
6 exchanges, are all physically-settled for my members.

7           So, as has been talked about previously, the  
8 use of RECs was largely jumpstarted by state  
9 requirements. Twenty-nine states plus the District of  
10 Columbia have renewable portfolio standards, and eight  
11 states have renewable portfolio goals. These are  
12 standards and goals that my members are required to  
13 meet. Most of these standards specify the amount and  
14 type of specific renewable resources or technologies  
15 that must be procured within a specific timeframe.  
16 RECs are a way to meet these goals.

17           A lot of the states have specific goals that  
18 require generation to be generated in that state in  
19 order to qualify for the RPS. So it is very customized  
20 and particular, and we have to meet whatever the state  
21 requirements are.

22           RECs are also used to meet voluntary goals.

1 A large number of our large customers have announced  
2 publicly goals to be carbon-neutral by X amount of  
3 time. Our members are working with them to meet that  
4 goal. Thirty-five percent of our member companies have  
5 also announced their own goals to be carbon-free within  
6 an X period of time. A lot of these goals are  
7 voluntary. And in some cases, they exceed the state  
8 requirements. And so RECs are used to meet these  
9 voluntary goals as well.

10           So due to the diversity and specificity of  
11 the requirements of many of these goals, REC contracts  
12 tend to be customized products. The rise of the  
13 voluntary markets has also increased the specialization  
14 of REC contracts and as counterparties increasingly  
15 seek to match their over-the-counter product with the  
16 specific requirements of that customer.

17           The important thing about RECs is that they  
18 are certified and tracked to ensure that the energy  
19 being placed on the system is actually coming from a  
20 renewable resource. The Center for Resource Solutions  
21 under their Green-e Energy program administers a  
22 program to ensure that RECs are probably accounted for



1 and that no double counting takes place. The process  
2 requires third party verification to be performed by  
3 either an independent certified public accountant or a  
4 certified internal auditor which operates tracking  
5 systems.

6           There are now tracking systems that cover the  
7 entire United States. These include the Western  
8 Renewable Energy Generation Information System, which  
9 covers the western part of the United States, from  
10 Colorado to California. You have the North America  
11 Renewable Registry, which covers the middle of the  
12 United States, all the way from North Dakota to  
13 Florida. ERCOT covers Texas. The generation  
14 attributes tracking system, or GATS, is used in the PJM  
15 states. Individual states also run their own tracking  
16 systems. And these include Michigan, New York, and  
17 North Carolina. And then NEPOOL provides tracking for  
18 all of the states in the New England area. So there  
19 are tracking systems that are certified that can track  
20 these attributes from inception to final purchase.

21           So, just to kind of dig down a little deeper  
22 into how these REC markets actually work -- and I am

1 talking about RECs, rather than the carbon markets and  
2 RGGI because those have been talked about a lot. My  
3 members span the entire country, and RECs are used by  
4 members across the entire country, even those outside  
5 of RTO/ISO markets.

6           So since D.C. is located in PJM, I am going  
7 to use their generator attribute tracking system as an  
8 example of how this REC system works and how these  
9 attributes are tracked. So, per PJM, GATS is an  
10 independent centralized generation registry and  
11 tracking service for both the emissions data and  
12 renewable energy credits. GATS is a paid subscription  
13 service that creates and tracks a generator-specific  
14 electronic certificate for every megawatt hour of  
15 electricity produced by a generator. The system tracks  
16 the environmental and emission attributes of generation  
17 along with the ownership of credits as they are traded  
18 or used to meet governmental renewable energy  
19 standards.

20           As each megawatt hour of electricity is  
21 generated, the system collects data on the generation  
22 source and links it to data on that source's owner,

1 location, fuel source, air emissions rate, eligibility  
2 for state environmental programs, and any other  
3 relevant information. From this data, the system  
4 creates an electronic certificate with a unique serial  
5 number for each megawatt hour generated. The system  
6 maintains a database of all the certificates. Each  
7 certificate with the environmental attribute it  
8 represents can be bought, sold, or transferred by  
9 electricity market participants and other parties, such  
10 as environmental groups sometimes get involved.

11           The system tracks the transfer of each  
12 renewable credit from owner to owner until the credit  
13 is retired by final purchase or use of the megawatt of  
14 generation. The value of that individual REC is  
15 largely tied to the requirements of state law and the  
16 demand for that specific REC. So, for example, if  
17 state requires that X amount of renewable energy used  
18 to meet their RPS standard has to be generated in that  
19 state, that REC might have a higher value than one that  
20 can be used to meet an RPS standard anywhere in the  
21 United States.

22           So most state renewable portfolio standards

1   require sellers of electricity that purchase a certain  
2   amount of RECs equal to a percentage of their overall  
3   electricity sales. The value of RECs in a particular  
4   state is dependent on the amount of RECs a state  
5   requires electric sellers to purchase and the amount of  
6   qualifying RECs available for purchase. Some states  
7   require that the RPS obligation can only be met by RECs  
8   produced from renewable generation located within the  
9   state, which further increases demand for that  
10  particular REC.

11           In the past, most RECs came from large-scale  
12  resources, but with the growth of rooftop solar and  
13  other behind-the-meter resources and with the growth of  
14  smaller generators entering into the market, some  
15  parties aggregate the energy created by these smaller  
16  resources to sell a larger aggregated amount to  
17  customers or smaller parties will just sell their  
18  smaller amounts of RECs to individual customers.

19           With the changes in the market and increasing  
20  renewable requirements, the markets for RECs have  
21  expanded. While those able to meet credit requirements  
22  can transact on ICE or Nodal Exchange, most

1 transactions are still done as bilateral transactions  
2 in a brokered market. These brokered transactions  
3 allow counterparties to negotiate specific credit and  
4 contract terms and to negotiate specific criteria that  
5 will meet the needs of that state.

6           The REC markets have a variety of  
7 participants of all sizes, not all of which are large  
8 sophisticated market participants that the centralized  
9 markets are designed for. Exchanges typically have  
10 fees and collateral requirements that many  
11 counterparties may find cost-prohibitive.

12           In addition, exchanges have a selection of  
13 REC compliance products that they currently offer, but  
14 they do not list all of the compliance or voluntary  
15 products that stakeholders are seeking in the  
16 marketplace. And so, as with most transactions,  
17 bilateral transactions are the way to get these  
18 customized products.

19           So, going forward, RECs are still going to be  
20 used as more states and companies adopt renewable  
21 standards or carbon-free goals. This demand is likely  
22 to increase. The biggest challenge going forward is

1 meeting the increasingly complex regulatory  
2 requirements imposed by the states on EEI members as  
3 they are largely tasked with ensuring that the state  
4 goals are met.

5           Due to the specialized nature of the product  
6 and the number of small generators participating in the  
7 market, most of the transactions are continued and  
8 likely to be brokered.

9           So thank you for the opportunity to  
10 participate in this discussion today. And I am happy  
11 to answer any questions.

12           CHAIRPERSON WIGGINS: Thank you, Lopa.

13           Paul?

14           MR. HUGHES: First of all I want to thank  
15 Commissioner Berkovitz and the rest of the  
16 Commissioners for the opportunity to participate in  
17 this today.

18           My name is Paul Hughes, and I am the  
19 Generation Policy Manager for Southern Company. And I  
20 have had the pleasure of being an Associate Member here  
21 for several years now. And it has always been a very  
22 beneficial and educational process, and meetings have

1    been very educational in the past.  And hopefully we  
2    will continue to do that over the next few minutes.

3               As a bit of background, Southern Company  
4    serves approximately nine million customers through its  
5    subsidiaries.  Specifically, the company provides  
6    clean, safe, reliable, and affordable energy through  
7    electric utilities in three states; natural gas  
8    distribution companies in four states; natural gas  
9    peaking and storage operations in nine states; a  
10   competitive generation company serving wholesale  
11   customers these are large, could be large industrial,  
12   large technology customers, wholesale customers across  
13   the country; a distributed energy infrastructure  
14   company; as well as a fiber optics network and  
15   telecommunications services.  We take pride in  
16   providing excellent customer service, high reliability,  
17   and affordable prices that are below the national  
18   average.

19              And, just as a note, we have talked a lot  
20   about RTOs and non-RTOs.  We are a vertically  
21   integrated company, and we operate in a bilateral  
22   market.  And we generally -- typically for the most of

1 our transactions, whether they be energy or RECs in  
2 this case or over-the-counter.

3           As we will discuss here in a moment as I walk  
4 through a few slides, Southern Company has set a long-  
5 term goal of low- to no-carbon operations by 2050 on an  
6 enterprise-wide basis. On our path to 2050, we have  
7 set a goal of 50 percent reduction from 2007 levels and  
8 CO<sub>2</sub> emissions by 2030. Achieving these goals will be  
9 dependent on a multitude of factors, including natural  
10 gas prices and the pace and extent of improvements in  
11 energy technology.

12           Our three focus areas to reduce emissions  
13 include continuing to pursue a diverse portfolio of  
14 energy resources, including low-carbon and carbon-free  
15 resources; continued R&D efforts focused on  
16 technologies that lower greenhouse gas emissions; and  
17 constructive engagement with both state and Federal  
18 policymakers, regulators, and, of course, our  
19 investors, and, most importantly, our customers. So,  
20 to that end, our portfolio mix has changed  
21 substantially over the last decade with significant  
22 investment in low-carbon and carbon-free energy assets.



1           Along with our partners, we are building the  
2 first new nuclear units in the U.S. in more than 30  
3 years. These units will add 1,000 megawatts to our  
4 existing 3,700-megawatt portfolio of carbon-free  
5 nuclear generation. Our state-regulated electric  
6 operating companies' renewable resource portfolio  
7 includes more than 1,000 megawatts of solar, 3,000  
8 megawatts of hydroelectric, and nearly 200 megawatts of  
9 biomass.

10           Southern Power, our competitive generation  
11 subsidiary, owns approximately 1,800 megawatts of  
12 solar, 1,600 megawatts of wind, and 100 megawatts of  
13 biomass. We expect to own or otherwise control 16,000  
14 megawatts of carbon-free and carbon-neutral generating  
15 capacity by 2022. Southern Company is, without  
16 question, contributing to the growth of this renewable  
17 space that we have been talking about. That growth has  
18 directly led to the increase in our renewable energy  
19 credit program and our participation in voluntary  
20 markets.

21           And so I want to take just a couple of  
22 minutes to walk through a few slides and have a little

1 bit more of a discussion, instead of me reading an  
2 opening statement, and let you know kind of what we are  
3 doing. So if you all bear with me, I will walk through  
4 a couple of these slides.

5           Disclaimer: We are going to talk some  
6 forward-looking information. Please don't put too much  
7 emphasis on it. An attorney in the room could  
8 translate that into something that would sound a lot  
9 more lawyerly, but I think everybody knows what I am  
10 talking about.

11           A little bit about Southern Company. I am  
12 going to focus on the electric side of the business  
13 because that is where our renewable energy credits are  
14 generated. We do have a regulated, state-regulated,  
15 utilities: Alabama, Georgia, and Mississippi. And  
16 that is what you see primarily in this chart. At the  
17 bottom, though, you will see a lot of assets that  
18 stretch out kind of the southern portion of the U.S.  
19 all the way across over to California. And that is  
20 primarily through Southern Power, our competitive  
21 generation subsidiary. So think of them like an  
22 independent power producer.

1           So of that, you could say it is about 4.7  
2 million electric customers. It is around 44,000  
3 megawatts of generating capacity. And then when you  
4 throw in the natural gas side of the business, there is  
5 1,500 billion cubic feet of combined natural gas  
6 consumption in three-foot volume.

7           So we have changed dramatically in what our  
8 company looks like the time that I have been an  
9 Associate Member here. So it has definitely been an  
10 evolving market, and we have certainly been an evolving  
11 company through that.

12           So let me tell you what I did. So when I was  
13 asked, "Hey, would you come talk about renewable energy  
14 credits a little bit and what is going on in the  
15 renewable space?" I went out to the Green-e website.  
16 You heard Lopa mention that a little bit. They are one  
17 of the programs that administer the voluntary program.  
18 And they have Green-e-certified, and they have Green-e  
19 -- I was talking with somebody about this at the break  
20 -- Green-e-certifiable or Green-e-eligible facilities.  
21 And a lot of times, the terminology can get a little  
22 bit confusing. Green-e-certified means that they

1 actually went to the Green-e, and they actually paid  
2 for somebody to do an audit. Green-e-eligible or  
3 Green-e-certifiable will show up in some of these state  
4 platforms, and we check a box so they can be tracked  
5 accordingly. That is essentially a self-certification,  
6 if you will, saying that the generator that is creating  
7 these RECs meets a standard that is outlined by  
8 Green-e. And so that is what we talk about. A lot of  
9 times, we talk about the voluntary markets as the  
10 Green-e-eligible energy credits.

11           So I wanted to show a couple of slides that  
12 are really not mine. They came directly from CRS as  
13 the parent nonprofit of Green-e. So you can see -- and  
14 there is a general thing I just want you to pick up on.  
15 Green-e-certified, retail sales increased 24 percent  
16 from 2016 to 2017. This really should be no surprise  
17 to anybody in here. We have been talking about it all  
18 morning. Right? This market is growing. And we have  
19 seen here an average of 16 percent of the most recent 4  
20 years. REC sales makes up the majority of those. If  
21 you look at the chart, that is kind of the big chunk in  
22 the blue, is the RECs, the PPAs, and the VPPAs.

1           So RECs are often going to be sold directly.  
2   Sometimes they are bundled inside of a power purchase  
3   agreement. Sometimes, they are part of what is listed  
4   there as a VPPA, or a virtual PPA. And so there may be  
5   a financial product that takes the physical  
6   certificates, and that delivers to somebody else.

7           So the general overall impression I guess I  
8   want you to walk away from here is the demand for RECs  
9   is going up, but the supply for RECs is also  
10   increasing. And you are seeing that as we are building  
11   more and more renewable generation. It is going to be  
12   a theme we have heard all morning. But the demand is  
13   increasing as well.

14          Flip to the next chart. The majority of the  
15   growth that we are seeing and people purchasing is  
16   coming from the commercial sector, so a lot of growth  
17   in the commercial sector as well as growth in the  
18   wholesale sector. And the wholesale players in this  
19   market may be a large technology company. You know, it  
20   is a Google, an Apple, an Amazon, somebody like that.  
21   They want to have -- whether they are mandated to or  
22   not, they want to be able to stamp and certify their

1 products, "Hey, we are completely renewable energy."  
2 So there is a demand there for these types of products.  
3           One thing that we also have seen a lot of --  
4 and a lot of our sales, we are pretty basic. So you  
5 will see the numbers when I show our numbers. We are  
6 selling a lot through the broker market primarily, but  
7 we also know that there is a lot of aggregators. So it  
8 is because the market is so fragmented, it is not  
9 homogenous, it is so fragmented you will have an  
10 aggregator to kind of fill the space. I am just going  
11 to kind of make up an example here if you bear with me.  
12           So let's say Minnesota has some very strict,  
13 very different type of state policy in renewables and  
14 they have a very specific definition of what the  
15 vintage of a REC has to be. And let's say it has to be  
16 a wind REC that has a vintage of 18 months. And so  
17 that aggregator will go around the country on behalf of  
18 maybe an industrial or another large wholesale company.  
19 It will go around the country and try to put together a  
20 package of RECs that meet that profile that that  
21 company then can use in Minnesota or whatever state it  
22 may be. So there is an aggregator profile out there.

1 So I think that is important. You all should be aware  
2 of that.

3           One thing is when we talk about selling RECs,  
4 as a utility or as a group of utilities, a lot of  
5 times, we will use those RECs ourselves, even though  
6 we're in an area where everything is voluntary. We  
7 will use those RECs ourselves, but we also know that we  
8 have customers who are very much interested in those  
9 RECs. And then when we look at maybe the wholesale  
10 side of things a little bit farther out West, there is  
11 a big interest in bundling those RECs with traditional  
12 wholesale power projects. So not every REC  
13 transaction, not every REC that is generated is going  
14 to be taken up and placed on a market or an exchange or  
15 even the voluntary markets.

16           A little bit more background, and Lopa did a  
17 great job of kind of setting forth the industry. I  
18 think we fit the profile that she described. So, as I  
19 mentioned in my opening statement, Southern has a long-  
20 term goal of low- to no-carbon operations by 2050. And  
21 you can see that illustrated in the chart, and you can  
22 see how our electricity generation mix is changing

1 pretty dramatically.

2           It has changed dramatically already. You can  
3 see that 2007, we were 69 percent coal, 69 percent.  
4 Now we are below 30 percent. But the one to watch, as  
5 you see, in 2007, we were 1 percent renewables. Now we  
6 are at 10 percent renewables. That number is expected  
7 to grow substantially over the next several decades.

8           So now let's talk about where are we and what  
9 do we do. If you look at the REC sales we have here at  
10 Southern, you will see that we have grown pretty  
11 substantially, flattened off the last year. One thing  
12 I should mention before I forget this is the sales that  
13 we make, if they are not already used by utilities, the  
14 sales that we make by the utilities, they are going  
15 back to the customers. So they are going to be offset  
16 against a fuel clause or something like that. So all  
17 of this is really done on behalf of the customer.

18           Transactions for us, as I mentioned, are with  
19 brokers typically. That means they are bilateral.  
20 Less than a third of the RECs that are generated by  
21 Southern assets are actually sold on the open market.  
22 And so it goes back to they are already being embedded



1 in products that we have with our customers.

2 I mentioned the aggregators. I will see a  
3 couple of notes here, make sure I didn't forget to tell  
4 you guys. Physical contract. Oh, pricing. Pricing  
5 came up a couple of times this morning. And I want to  
6 just mention this. So I asked the person that is  
7 responsible at Southern for administering all of our  
8 REC transactions, "Hey, give me an idea on what pricing  
9 is like. What do you see?" And so I thought it was  
10 pretty fascinating because when we talked about the  
11 non-homogenous nature of RECs -- so they have different  
12 vintages. Some states like wind better than solar.  
13 Some like solar better than wind. We are always trying  
14 to package this very specific product. It is not just  
15 a generic REC is a REC is a REC. It just really  
16 depends on the attributes around that REC.

17 So then what I found is kind of interesting.  
18 In a voluntary market, I am looking at -- this happened  
19 to be somewhere out in Texas, I believe -- as low as 60  
20 cents on the bid side. Sixty-nine cents is a mid.  
21 Seventy-two cents is the -- we are taking less than a  
22 dollar. If I go look at RECs that is under a solar REC

1 specifically and another part of the country, we are in  
2 \$415. Right? So the variation, I can't emphasize  
3 enough how much variation we actually have in this  
4 market. All I think that tells you is this is a very  
5 nascent period in the markets.

6 I am not saying that we haven't had  
7 environmental markets for a long period of time, simply  
8 saying we are in the -- to me, it feels like somebody -  
9 - the incubator phrase stuck with me earlier this  
10 morning. There is a little bit of an incubator phrase  
11 it feels like we are going through. Where it is going  
12 to go, I am not sure, but as long as it is non-  
13 homogenous, that is always going to be a bit of a  
14 challenge.

15 So, as I kind of move on, what does that mean  
16 for us? And what do we expect in the future? We  
17 expect states to continue either to establish or set  
18 higher bars for their environmental goals. We expect  
19 the demand for renewable energy to continue to grow,  
20 but we also expect the prices are going to continue to  
21 drop. And we expect this continuing change that Lopa  
22 mentioned in our generation mix to change considerably.

1 And I think everybody feels the same way.

2 But if I was going to come back to you guys  
3 and say, "What should we do as regulators at this point  
4 in time?"; number one, I would say, "Hey, whatever we  
5 are doing, don't forget about the customer." Right? I  
6 think every time I have talked to this group, I have  
7 tried to mention that our customer makeup is 45 percent  
8 of our customer base has \$45,000 a year per household.  
9 We have to think about the customer. Any impact it  
10 creates more costs for our customer. We need to  
11 consider that very, very carefully.

12 Secondly, recognize and account for regional  
13 differences. When it comes to renewable energy, the  
14 regional differences matter. They are material. What  
15 things look like in Washington state looks a lot  
16 difference than it looks like in Georgia or Alabama.

17 And, then, finally, let's be flexible and  
18 careful with timetables and targets as we move forward.  
19 I think there are lots of opportunities to do this and  
20 to move forward with these markets. I do think they  
21 are going to continue to develop and mature. But we  
22 have to do it in a very methodical, careful way. And

1     that would kind of be my encouragement to the group.

2             That is all I have got, welcome questions.

3             CHAIRPERSON WIGGINS:   Thank you, Paul.

4             Bill?

5             MR. McCOY:   Good afternoon.   And thank you,  
6     Commissioner Berkovitz, Commissioner Behnam, and  
7     Commissioner Stump.   And thank you for this opportunity  
8     to let me speak from the perspective of a bank-  
9     affiliated swap dealer that also has with it an entity  
10    that has market-based rate authority with the Federal  
11    Energy Regulatory Commission, particularly in the  
12    context of how we, firms like us, provide risk  
13    management services that involve both the underlying  
14    physical commodities you will hear me speak about  
15    bringing together much of the products we talk about,  
16    RECs and cap-and-trade, as well as the derivatives  
17    markets that are tied to those.

18            Financial services firms, like Morgan  
19    Stanley, are in a unique position to address  
20    environmental and social challenges.   Environmental and  
21    social management is a priority for such firms.   And,  
22    if you will permit me, I would like to just quote from

1 Morgan Stanley's environmental and social policy  
2 statement, "Morgan Stanley recognizes that global  
3 sustainability challenges, including human rights,  
4 resource scarcity and climate change, can result in  
5 significant impacts if left unaddressed. In light of  
6 these challenges, sustainable global development is of  
7 critical importance. By considering environmental,  
8 social, and governance factors in our business  
9 activities, we help mobilize capital to deliver  
10 sustainable growth and long-term value for our clients  
11 and for society.

12           "Given our position as one of the world's  
13 leading financial services firms, we have a  
14 responsibility to manage and leverage our resources in  
15 a way that helps build a sustainable future. We  
16 mobilize capital to scale sustainability solutions,  
17 drive private capital into sustainable investments, and  
18 address environmental and social risks across the firm.

19           "To that end, we have dedicated substantial  
20 resources to this work. We have committed to marshal  
21 \$250 billion in low-carbon financing by 2030 and to  
22 become carbon-neutral by 2022, with an aim to source

1 100 percent of our global operational energy needs from  
2 renewable energy and to offset any remaining  
3 emissions." So that statement is part of much of the  
4 activities throughout firms like Morgan Stanley, and  
5 hopefully it continues engendering throughout.

6           As part of these commitments, Morgan Stanley  
7 regularly helps renewable energy project developers  
8 finance this construction and operation of their  
9 projects. So, for example, Morgan Stanley's  
10 commodities business through one of its swap dealers,  
11 Morgan Stanley Capital Group, Inc., or MSCGI, supports  
12 renewable energy deployment across the United States,  
13 providing offtake agreements and hedging products for  
14 new wind farms, solar installations, and the like.

15           Developers of renewable energy projects, such  
16 as wind farm installations, rely on the risk management  
17 services of swap dealers like MSCGI in order to assure  
18 investors and lenders that revenues will support  
19 project loan repayment. Given that the energy price  
20 hedge often concerns long-dated power deliverable in a  
21 remote region, the market may be very illiquid. By  
22 entering into derivatives with a swap dealer to protect

1 against falling power prices, the wind farm developer  
2 achieves stable cash flows, thus demonstrating its  
3 ability to service its debt load and complete the  
4 construction.

5           As an alternative to financially-settled  
6 derivatives, marketers with FERC's market-based rate  
7 authority may enter into a physical offtake agreement  
8 with a renewable energy project, thereby additionally  
9 providing the developer the assurance of a long-term  
10 buyer of the project's output. When we look, the  
11 combination of between derivatives and hedging products  
12 and offtake, et cetera, various agreements, in 2018,  
13 for example, MSCGI provided long-term hedging  
14 transactions to nearly 750 megawatts of renewable  
15 energy projects.

16           In addition to providing hedging transactions  
17 in the form of derivatives and power offtake agreements  
18 with renewable energy projects, dealers and marketers  
19 also purchase renewable energy certificates, RECs, as  
20 we have been discussing today. These RECs are  
21 available both for the firms' own needs as well as for  
22 resale to our clients. RECs are used by clients as a

1 credit against their own power usage to demonstrate  
2 that they are procuring green energy for, as we have  
3 heard, both voluntary and regulatory compliance  
4 programs. For example, many utilities, our clients,  
5 other load-servicing entities seek RECs to satisfy  
6 their requirements under the state renewable portfolio  
7 standards we have been discussing.

8           The requirements vary state by state, with  
9 the requirements of many states increasing over time.  
10 So RECs can be a flexible means for these organizations  
11 to achieve their clean energy goals, but in many  
12 instances, we know that RECs may be purchased  
13 separately from associated electricity and  
14 independently matched with electricity consumption. So  
15 in states where the current amount of renewable energy  
16 production is low, relative to the high percentage  
17 requirements of that state's renewable portfolio  
18 standards, the ability to purchase RECs and electricity  
19 separately offers an attractive alternative to  
20 organizations that may already be in long-term power  
21 purchase agreements. Dealers and market makers and  
22 RECs can identify opportunities to buy RECs from



1 renewable energy producers in one region and sell those  
2 RECs to utilities and other commercial end-users in  
3 other regions to satisfy their overall clean energy  
4 strategy.

5           Dealers and market makers are also active  
6 market participants in the cap-and-trade programs, such  
7 as the Regional Greenhouse Gas Initiative, the  
8 California greenhouse gas emissions cap-and-trade  
9 program, and European Union emissions trading system.

10 While these programs all differ in form and design,  
11 they generally provide for the establishment of  
12 mandatory caps on the total amount of certain  
13 greenhouse gases emitted by the certain parties in  
14 their installations that are subject to the programs.  
15 These caps are designed to decline over time, to foster  
16 greenhouse gas reductions. The programs typically  
17 allow for compliance with these caps through this  
18 render or retirement of emission allowances. And such  
19 emission allowances are allocated in auction to market  
20 participants; in addition emission allowances are  
21 tradeable, which contributes to the development of a  
22 market price intended to encourage the lowest-cost

1 means of reducing greenhouse gas emissions.

2           The ability of dealers and market makers to  
3 participate in these markets promotes liquidity and  
4 efficient transfer of such allowances from market  
5 participants that have more holdings than they need to  
6 those market participants that need them.

7           Through greater liquidity and efficiencies in  
8 the establishment of transparent market prices, the  
9 emissions market establishes price signals to encourage  
10 more development and renewable energy production and  
11 potentially improve technologies to produce greenhouse  
12 gas emissions.

13           Swap dealers and market makers like MSCGI use  
14 the environmental derivatives markets in varying ways.  
15 Because of timing and locational differences associated  
16 with the source and ultimate buyer of the RECs or the  
17 emission allowances, market makers in these products  
18 may use the futures contracts based on such  
19 environmental products to hedge their purchase and  
20 sales.

21           Market participants may also make or take  
22 delivery of the emissions allowances upon expiration of

1 the futures contract to satisfy the need for such  
2 allowances. And, additionally, swap dealers may design  
3 swaps, options, and other OTC derivatives that  
4 reference prices to environmental futures and  
5 environmental products.

6           At Morgan Stanley, we are seeing an increased  
7 demand for environmental derivatives. Now, this demand  
8 is coming not only coming from the traditional  
9 producers or commercial end-users that are consuming  
10 energy. Rather, we are seeing increased interest from  
11 a wider universe of corporations, municipalities,  
12 investors, and other parties that are given greater  
13 consideration to environmental, social, and governance  
14 risk and products. However, the derivatives markets  
15 and environmental products are still in their early  
16 stages of growth, at least in the United States, where  
17 such markets do not appear as deep and active as the  
18 European counterparts.

19           As the demand grows, the markets for both  
20 exchange-sponsored and OTC derivative products likely  
21 will grow. The Commission is well-positioned in its  
22 current framework for regulation oversight of the

1 derivatives markets.

2           In its 2012 joint rulemaking with the  
3 Securities and Exchange Commission providing for  
4 definitions of swap and securities-based swap and other  
5 terms, the Commission declined to provide a definition  
6 of "environmental commodity." However, the Commission  
7 provided an interpretation regarding the circumstances  
8 under which agreements, contracts, or transactions in  
9 environmental commodities will satisfy the forward  
10 exclusion from the swap definition.

11           The Commission stated that an agreement,  
12 contract, or transaction in an environmental commodity  
13 may qualify for the forward exclusion from the swap  
14 definition if the transaction is intended to be  
15 physically-settled. Meanwhile, as an intangible  
16 commodity, the Commission indicated that an  
17 environmental commodity that satisfies the terms of the  
18 interpretation would be viewed as a nonfinancial  
19 commodity. Consequently, there is an existing  
20 regulatory framework for both futures contracts and OTC  
21 derivatives transactions, referencing an environmental  
22 commodity, namely the framework of regulation of

1 futures contracts and OTC derivatives of nonfinancial  
2 commodities.

3           As demand for environmental products grows,  
4 it is important that regulatory agencies and other  
5 governmental bodies appreciate the public policy goals  
6 that would foster the ongoing success and growth of the  
7 markets in environmental products and their derivatives  
8 and, at a minimum, take actions not hindering the  
9 viability of markets designed to promote the  
10 development of renewable energy, curb greenhouse gas  
11 emissions, and otherwise mitigate the impact of climate  
12 change.

13           Thank you again for permitting me to speak  
14 about these important issues.

15           CHAIRPERSON WIGGINS: Thank you, Bill.  
16 Jackie?

17           MS. ROBERTS: Commissioners, Madam Chairman,  
18 Madam Secretary, thank you for inviting me to be on  
19 this panel. It is always an education to be here. And  
20 I always enjoy it.

21           As Commissioner Stump said, someone always  
22 has to go last. So I will try not to interfere with

1 your post-lunch lethargy, which we all have, before you  
2 get your cup of coffee.

3           First, let me just level-set a couple of  
4 things from a retail customer's point of view.  
5 Environmental markets are generally external to the  
6 wholesale markets. We like that. Transparent, liquid,  
7 central clearing markets for environmental attributes  
8 are essential for competitive markets. We like that.  
9 Derivative markets may be helpful if they contribute to  
10 transparent price formation and liquidity. We think  
11 that is positive. I believe that they should be  
12 separate, however, from one of partial markets, like  
13 the PJM GATS. Retail customers are always better with  
14 competitive outcomes. And I must say the PJM energy  
15 markets have served retail customers well in that they  
16 save retail customers every year billions of dollars  
17 from the old balkanized critically integrated system.  
18 That does not mean it is a perfect situation, but it  
19 has really helped financially the retail customers.

20           Ty said that it is a disruptive transition in  
21 energy markets, and it really is. And I would point to  
22 the primary cause of that, which is the shale play for

1 natural gas. That has completely changed the energy  
2 markets. And I am going to talk about PJM because that  
3 is the RTO that West Virginia is in. The cheap natural  
4 gas has caused our baseload nuke- and coal-generating  
5 stations to be displaced in the economic dispatch  
6 order, which means we have closed easily 100 gigawatts  
7 of coal plants in PJM.

8           When the Clean Power Plan came out and we  
9 looked at the goals we would have to meet when it was  
10 fully implemented, we had already met those goals  
11 through coal plant closures. Some states, like  
12 Illinois, that have five nuclear plants, many of which  
13 are uneconomic now, are very concerned about what they  
14 do about that. And we have had subsidies in the energy  
15 markets forever, starting, as early as I could find, in  
16 1916 through tax credits or outright subsidies or  
17 grants.

18           In 2016, I think the Congressional Budget  
19 Office estimated that tax preferences for that one year  
20 for the energy markets were \$18.4 billion. So we have  
21 always had these. We have operated either vertically  
22 integrated, like Southern Company, not in an RTO. And

1 I loved hearing your presentation because to me, it was  
2 a much simpler time. I loved your presentation,  
3 William, about how well the markets are working in  
4 Lopa's description, but we are seeing, I am seeing, a  
5 change that I think is going to have a pronounced and  
6 profound impact on the derivative markets and on  
7 environmental forward progress, at least in the PJM  
8 region.

9           Now, the state subsidies, which are at issue  
10 in the PJM region, are the capacity market subsidies.  
11 PJM has many energy markets. They have the energy  
12 market, which is the electrons. And they have the  
13 capacity market, which is a forward market, three-year  
14 forward market, based on the ability to produce the  
15 electrons. And PJM has decided that if you are a  
16 generating station that receives a subsidy from the  
17 state, you will be banned from the capacity market.

18           So if you look at states, like Illinois, that  
19 pass ZEC, zero emission credits, for some of their  
20 nuclear plants, or New York or Ohio for coal plants.  
21 And even West Virginia recently just subsidized the  
22 Pleasants Plant, which is located in West Virginia.



1 You will have to adjust your bid price into the  
2 capacity market, which will ensure that you don't clear  
3 the market.

4           So the state policy, which by law, the states  
5 have the right to establish -- as Sue said, they have  
6 the right to establish the generation mix, and they  
7 have the right to establish the renewable portfolio  
8 standards or any kind of mix they want. We now see  
9 running head on into the PJM capacity market, where it  
10 says, "No, you can't play. You can't play in our  
11 market if you get the subsidy."

12           So how this plays out is the units that are  
13 being subsidized in terms of coal and nuclear are  
14 borderline or marginally economic, if economic at all.  
15 They will be certainly wiped out of the capacity  
16 market. And they will fail even quicker than they  
17 would have otherwise.

18           And the other area that PJM and FERC has  
19 targeted is the renewable portfolio standards. They  
20 think those should be out of the capacity market, too.  
21 So for people, like William and the Morgan Stanley  
22 Capital Group, which invests in renewable projects, if

1 they are looking in the PJM region, they are factoring  
2 in that capacity payments will be received for these  
3 generating resources. And that is not -- if FERC and  
4 PJM has its way, that is not going to happen anymore.  
5 So what we are having is a Federal regional action that  
6 is in my opinion going to completely undermine the  
7 states' rights for generation mix and renewable  
8 portfolio standards.

9           So that is not final decision at FERC. They  
10 issued an initial order saying that zero emissions  
11 credits for nukes and renewable portfolio standards --  
12 also, parenthetically, new credits, subsidies would  
13 also include the coal subsidies -- are the ones that  
14 will be affected. That has been ordered to a paper  
15 hearing. And, of course, that will be appealed. I  
16 don't know when it could possibly be final because it  
17 will be hotly litigated.

18           So that is how the intersection of the  
19 environmental and the energy markets manifests.  
20 Because of the MOU between this organization and the  
21 CFTC, FERC has jurisdiction over the electric markets.  
22 And so they are moving forward with that agenda that I

1 described.

2           As a sidebar in following up on a comment  
3 that Ty made about the difficulty of participating in  
4 the RTO process, I can't underscore how difficult it  
5 is. And there are several people here that are  
6 integrally involved in that process representing the 62  
7 million retail customers in PJM. And the process is  
8 labor-intensive. It is complicated. And deference is  
9 given to the filings PJM makes by FERC because they say  
10 you have a stakeholder process. So whatever you end up  
11 filing obviously was vetted with all of the  
12 stakeholders.

13           Well, theoretically, that is a valid point,  
14 but you have got to remember that the RTO is a  
15 voluntary organization. The transmission owners  
16 voluntarily join it. The generators voluntarily join  
17 it. And so that influences the process.

18           For example, I was at the U.S. Senate Energy  
19 Committee a few weeks ago, and I was asked, not by the  
20 committee but by the staff, I was asked, "Why is it  
21 that the PJM capacity market clears at 30 percent  
22 reserve margin when the reserve margin is only 15.2

1 percent?"

2                   And I said, "Well, that is easy. They are  
3 trying to keep the prices up because if they can't,  
4 then the generators will leave."

5                   And I was also asked, "Why are there so many  
6 transmission projects that PJM will not review when  
7 they have the authority to do transmission planning?"

8                   And to give you the order of magnitude of  
9 this problem, if you look at AEP or First Energy, their  
10 earnings calls, they are always saying, "We are driving  
11 our earnings through transmission, through the high  
12 instant rates of return at FERC. And, parenthetically,  
13 because if it is not a reliability project, which is a  
14 project that PJM determines is required to keep the  
15 system reliable, no one is looking at it." And so  
16 these companies are investing billions, with a b, of  
17 dollars every year in these projects with their stated  
18 purpose to drive earnings.

19                   Now, clearly some of those projects are  
20 needed. The problem is we don't know, nobody knows  
21 what projects are needed and what aren't needed. So  
22 you have this dislocation in transmission and the

1 energy markets that is driven largely by the voluntary  
2 nature of the organization. And for those of you who  
3 think I might be a little paranoid about this, that has  
4 been stated to stakeholders by the organization. It is  
5 a voluntary organization. If we make them mad, they  
6 will leave.

7           So when you have agreed through an MOU to  
8 delegate your authority to FERC over these energy  
9 markets, that is fine, but when you come up against the  
10 states, legal goals and policies are going to be  
11 undermined solely because someone at PJM decided  
12 certain subsidies were bad, not all subsidies, not wind  
13 and solar and other things. Just certain subsidies  
14 were bad. It is going to have a devastating effect on  
15 the goals of the states.

16           So I hate to be a Debbie Downer to end this  
17 wonderful session, but I will say that these are  
18 barriers to the effective operation of the markets and  
19 of state goals. And, nota bene, if you think this is  
20 of a concern, wait until storage, utility-scale  
21 storage, becomes available and when the natural gas  
22 infrastructure is built out so that that cheap gas can

1 go anywhere. Right now, it can't go anywhere. We in  
2 West Virginia have a big part of the shale gas play.  
3 And, yet, the lower half of our state is supplied by  
4 gas to the Gulf. So when those two things happen, it  
5 is going to completely change the markets again.

6 And if you have any questions, I would be  
7 happy to answer them. Thank you.

8 CHAIRPERSON WIGGINS: Thank you all very  
9 much. We are going to open the floor for questions and  
10 discussion. So we are going to begin with questions  
11 and comments from the Associate Members of EEMAC to the  
12 members. And, Jim, I think I saw your card go up  
13 first.

14 MR. ALLISON: Thank you.

15 I wanted to come back to this question of the  
16 multiplicity of regulatory frameworks. Multiplicity is  
17 in one sense an opportunity because it gives us a large  
18 number of experiments going on simultaneously. So, in  
19 theory, we can figure out what works, what doesn't  
20 work. Whether that theory plays out is a different  
21 question.

22 But there is also a cost. And Paul's example

1 of the radical differences in the price of a REC, what  
2 was it, 60 cents versus \$400? So there are costs to  
3 the multiplicity.

4 And, by the way, that \$400 is one measure of  
5 the cost of violating Sue's mantra of what, not how.  
6 If you told them what to do but not how to do it, it  
7 would have been a 60-cent REC, not a \$400 REC.

8 The question is, what policy steps going  
9 forward would facilitate convergence to reasonable  
10 appropriate regulation without eliminating the  
11 incentive for innovation?

12 [Pause.]

13 CHAIRPERSON WIGGINS: Is anybody on the panel  
14 going to tackle that or should we move along here?

15 [Laughter.]

16 MR. PICARDI: No. I wasn't sure it was to  
17 the panel, but for the working group members, I think  
18 what I tried to present was there are these products  
19 that are created as a result of regulatory constructs.  
20 We were trying to use them to help our customers and to  
21 manage our own activities. And there is no question  
22 that what was demonstrated in the difference of price

1 in RECs -- I think solar RECs tend to be more expensive  
2 -- is out there. And so I guess the question is,  
3 again, which came up earlier, how can we manage all of  
4 this and get to a point where there was one product?  
5 And I just don't see that happening. I think we are in  
6 an environment where there is experimentation and our  
7 companies are trying to work their way through it and  
8 use the products the best way they can.

9 I think that for now it would be great to  
10 have a national product. We would love to have a cap-  
11 and-trade market that is national and a product and  
12 associated products, over-the-counter derivatives that  
13 we could use to manage our exposures, but that is not  
14 there right now. So the fact that we get opportunities  
15 in some places to do it, try and see it as a positive  
16 as we go through this process.

17 I don't know if that answers your question,  
18 Jim, or --

19 MR. HUGHES: I think I would just simply say  
20 I think that the markets are evolving or they are  
21 coming into being as a result of the demand. I mean,  
22 the fact that we have a voluntary market, that it is



1 active, I mean, there are lots of places around the  
2 country that there is somebody wanting that to occur,  
3 whether it is just at the policy level or to the  
4 customer level or wherever it may be, but there are  
5 different pockets around the country that are driving  
6 the demand for these type of markets.

7 I just think we are so early in the process  
8 we don't know where it is going to go yet. I mean, I  
9 get that the environmental markets have been around for  
10 a while, but the transition in the industry has just  
11 really gotten steam. It has gotten steam, and it is  
12 happening quickly. We heard lots of statistics about  
13 it. But as that continues to grow, then we will see  
14 some changes. It is hard to pinpoint where it is going  
15 to go, but I just think that shows that there is a  
16 desire for some type of market or markets for certain  
17 areas. It is the regional differences piece.

18 CHAIRPERSON WIGGINS: Erik?

19 MR. HEINLE: Thank you.

20 I want to go to an issue that, Lopa, you  
21 mentioned in your discussion briefly. And that is  
22 distributed energy. I represent a jurisdiction that

1 has that distributed energy. And especially rooftop  
2 solar is an important part of our RPS goal. And I  
3 would be interested in your thoughts.

4 And also, William, especially yours, how do  
5 you hedge or what role can the derivatives market play  
6 in distributed energy and taking that into account?

7 MS. PARIKH: So I just mentioned it in the  
8 context of smaller players are entering the market.  
9 Aggregators, as Paul mentioned and I mentioned, can  
10 take the environmental attributes from distributed  
11 resources and aggregate them into a REC that can be  
12 used to meet goals. And then it is tracked. How the  
13 hell it is tracked, I don't know, but it is tracked by  
14 PJM or other markets. And so it is a role for all  
15 renewable resources that can play as we try to meet  
16 these goals going forward.

17 MR. McCOY: I will just add as far as the  
18 derivatives markets, as we see more and more the  
19 liquidity coming greater open -- we have heard about  
20 the open interest in the exchange-traded derivatives  
21 markets, but it is still nascent. I agree with exactly  
22 what Paul was just saying. In all of these markets,

1 they are still new. So as it grows, we are finding  
2 greater demand. And I think that would go for the  
3 distributed as well. And as we are seeing different,  
4 not only just the traditional commercial users, but we  
5 are just seeing different interests coming in, that  
6 should just help with further efficiencies and  
7 transparency in pricing.

8 CHAIRPERSON WIGGINS: Are there any other  
9 comments from the Associate Members? If not, Tyson, as  
10 a Member, I will turn this over to you.

11 MR. SLOCUM: Thank you.

12 This is for Matt. And it is going to sound  
13 confrontational, but I am just trying to clarify the  
14 public record for the purposes of this meeting. Is it  
15 still your position that you won't disclose the names  
16 of the members of the Commercial Energy Working Group?

17 MR. PICARDI: Yes.

18 MR. SLOCUM: And, just to clarify for the  
19 public record, Public Citizen believes that trade  
20 associations should be required to disclose their  
21 members as if they are going to participate in a  
22 Federal advisory committee. Thank you very much.

1                   CHAIRPERSON WIGGINS: Commissioner?

2                   COMMISSIONER BERKOVITZ: Thank you. I will  
3 hopefully keep it short. I know that folks have got  
4 travel arrangements they have to get to.

5                   I was interested in following up on the  
6 discussion of this morning. And maybe, Bill, you would  
7 be in a place where you might be able to help us. The  
8 question of liquidity in these markets, many of the  
9 folks here are the commercial end-users and the  
10 generators and the consumers of these environmental  
11 products.

12                  But we mentioned also there have to be in  
13 many of these markets liquidity providers. I won't  
14 call them speculators. I will call them liquidity  
15 providers to make up some of the difference between  
16 buyers and sellers.

17                  A firm like yours, you mentioned about  
18 providing financing. And those financing solutions I  
19 think bank swap dealers will typically provide hedging  
20 instruments, in addition to the financing or maybe it  
21 is even as a condition of.

22                  From your perspective, what do you see as

1 challenges or willingness for entities to provide  
2 liquidity into these markets, as Dr. Sandor was talking  
3 about, to maybe balance these markets or is that a  
4 challenge in today's environment generating sufficient  
5 additional liquidity in terms of these early markets  
6 and given the general state of the economy and  
7 financial institutions.

8           MR. McCOY: Thank you. I think one has to  
9 distinguish between in providing the hedging products  
10 that are based on the energy products for the  
11 development versus the environmental products. And it  
12 is the latter where I think there are a great deal of  
13 challenges to the relative lack of depth in terms of  
14 pricing, but it is growing.

15           And then I struggled as I went into this  
16 thinking about the traditional in terms of hedges  
17 versus speculators because, as we talked about, a lot  
18 of the growing interests are due to the voluntary  
19 programs of many firms. Paul, you mentioned some of  
20 the corporates out there that are not producers of  
21 energy or very limited emissions that they may have,  
22 just our own firms, et cetera. Firms have their

1 voluntary contributions. And they come to the market.  
2 That is just going to provide for more buyers and  
3 sellers as renewables continue to rise as more wind  
4 farms being grown and developed and solar  
5 installations, including at the very small part of  
6 aggregation of various producers.

7           So I think the challenge is because we are in  
8 an early part of the development of these markets, so  
9 coming up with the comfort level in terms of the  
10 pricing and the models and such is going to continue to  
11 be a piece that liquidity providers have to work with,  
12 but I just think as more and more interests come into  
13 the markets and as we have policies to support that and  
14 not hinder that, it will be there. It will grow.

15           CHAIRPERSON WIGGINS: Thank you.

16           We have certainly heard a lot of information  
17 today on the current state of the energy markets and  
18 the environmental derivatives markets and issues  
19 affecting market participants trading in the exchange-  
20 traded and over-the-counter markets. I want to thank  
21 all of the Members, all of the Associate Members, all  
22 of the guest panelists for your participation here

1 today and for your thoughtful presentations and  
2 thoughtful participation. We look forward to the  
3 ongoing work of the EEMAC and our next meeting, on a  
4 date to be determined, sometime in the spring.

5 Abigail?

6 MS. KNAUFF: Thank you, Dena.

7 I now recognize Commissioner Behnam to give  
8 his closing remarks.

9 COMMISSIONER BEHNAM: Thanks, Abigail.

10 Thanks for all of your work. Dena, thank you for your  
11 chair[ing] and leading this discussion and,  
12 Commissioner Berkovitz, great discussion. To all of  
13 you, thank you for your service, your willingness to  
14 come to Washington and provide fantastic advice.  
15 Really great conversation across the board this morning  
16 and this afternoon.

17 To make one quick comment, very encouraged by  
18 a lot of the information that was shared by Lopa, by  
19 Paul, just generally speaking to how the private market  
20 is moving towards more sustainable methods of  
21 production. And it is a matter of consumer demand. It  
22 is a matter of technology. It is a matter of

1 sustainability.

2           But, that all said, I do believe there is a  
3 role for public policy to be integrated into this  
4 conversation. Regardless of what one might think about  
5 climate change, it is potentially existential. And we  
6 have to be thinking about this as a large coalition,  
7 the biggest coalition possible. Right? There is too  
8 much at stake. And, despite the targets that you all  
9 laid out, which are very impressive in terms of the way  
10 you are shifting your business and including, Vincent,  
11 what you mentioned about BP and how the sort of ratios  
12 of different energy sources are moving around,  
13 cognizant of that market, the natural forces in the  
14 market and competition pushing us in that right  
15 direction but also mindful that public policy and the  
16 regulators should play a role and should participate,  
17 creating standardization, creating uniformity, creating  
18 hard mandatory deadlines, and sort of requirements.

19           But, all that said, we have to recognize the  
20 transition risks and what needs to get done to meet  
21 those sustainability goals and those challenges from  
22 climate change and carbon concerns but also



1 understanding that we still need to serve end-user  
2 demands and needs that we have all become accustomed to  
3 as a convenience and as something that we view as  
4 something that we expect on a day-to-day basis.

5           So look forward to sort of seeing what  
6 happens from the market in these years to come but  
7 certainly speaking for myself, I would love to be a  
8 part of the conversation -- I hope I can be -- in terms  
9 of the way we can all work together to make the  
10 transition smooth but also productive.

11           So thank you.

12           MS. KNAUFF: Thank you, Commissioner Behnam.  
13 I now recognize Commissioner Stump to give her closing  
14 remarks.

15           COMMISSIONER STUMP: Thank you, Abigail. I  
16 will be very brief.

17           I always find these conversations to be  
18 interesting. I learn something each time we have an  
19 advisory committee meeting, but I often leave the  
20 meetings somewhat overwhelmed with what we are left to  
21 consider.

22           Today, I am actually quite encouraged that

1 the way the CFTC has approached innovation and new  
2 products and regulation is, in fact, the way to go. I  
3 actually might get buttons made up that say, "Tell us  
4 what, not how." So thank you, Sue. I do think that  
5 that is a principle that the CFTC has applied for  
6 years, but we haven't in quite some time had a new  
7 product. We have recently had new products, but it has  
8 been a number of years since we have been faced with  
9 the how do we ensure that the risk management, the  
10 derivatives are, in fact, providing the risk management  
11 options that market participants need in a new space.  
12 And I am encouraged that there is, in fact, market  
13 demand for these types of things. And because of that,  
14 we will have a demand for a derivatives market. And  
15 when that happens -- and it is happening -- we will  
16 need to determine, are the derivatives markets fit for  
17 that particular need? Are they helping inform price  
18 discovery? Are they helping mitigate risk?

19 And so I think that is all very interesting.  
20 I think that we will eventually get to a place where we  
21 are having more conversations about what the  
22 derivatives market structure should look like in this

1 space. I am also quite confident that the structure we  
2 have established for other asset classes will translate  
3 in this space once it is more developed.

4 So thank you all so much.

5 MS. KNAUFF: Thank you, Commissioner Stump.

6 I now recognize Commissioner Berkovitz to  
7 give his closing remarks.

8 COMMISSIONER BERKOVITZ: Thank you, Abigail.  
9 And thank you to all of the participants. Thank you,  
10 Dena. I thank my fellow Commissioners, who are here  
11 all day. And I think that is quite a testament. Their  
12 actions speak perhaps louder than their or just as loud  
13 as their words. They were here all day for this  
14 meeting. And I think that shows the level of interest  
15 and the quality of the discussion that we have had  
16 today.

17 It is actually quite humbling as I am  
18 thinking about some of the topics that we have  
19 discussed in the intersection, talking about global  
20 financial, risks.

21 This small agency, as Dr. Sandor was talking  
22 about, in 1974. What he mentioned, this agency was

1 given exclusive jurisdiction over futures and  
2 subsequently over swaps. The importance of the work  
3 that we do and the advisory committees, who assist us  
4 in that with respect to what are essentially global  
5 problems and when we are talking about global  
6 environment issues. We deal with global systemic risk,  
7 so the global advisory committee and the markets risk  
8 advisory committee. And trying to get this right,  
9 obviously the private and public sectors' advice to us  
10 and recommendations are absolutely critical for us to  
11 be able to do our function properly and help with the  
12 solutions and not get in the way of progress either. I  
13 mean, that is critically important. We have seen how  
14 regulation can both make the market stronger. And we  
15 have seen how if it is not done right, it makes the  
16 markets weaker. So we have to get it right, and I  
17 thank you all.

18 I know for many of you traveling here, it is  
19 on your dime, not on ours, for many of you. So I  
20 appreciate the time and effort that you put into this  
21 and the support that you give this committee. And,  
22 again, I want to thank everybody here at the CFTC who

1     helped put it together.

2                   And I didn't mention it specifically in my  
3     earlier thanks, but there was a lot of work to getting  
4     the six new members in on time and a very short notice.  
5     And that was helped through Lucy and Abigail, and the  
6     Office of General Counsel, and the Office of the  
7     Commission and the Commissioners who helped get that  
8     paperwork here very quickly. And if you have dealt  
9     with getting paperwork through the government, those of  
10    you who have had to go through it I hope can appreciate  
11    that it was very timely.

12                  Anyway, thank you all again. I look forward  
13    to future meetings of the committee. Thank you. And  
14    thank you, Dena, again.

15                  MS. KNAUFF: Thank you, Commissioner  
16    Berkovitz. And thank you to our guest panelists, the  
17    EEMAC Members, and the Associate Members of the EEMAC  
18    for participating in today's EEMAC meeting. The  
19    meeting is now adjourned.

20                  (Whereupon, at 3:15 p.m., the meeting was  
21    adjourned.)

22