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Formal Case No. 1050

In the Matter of the Investigation of the
Implementation of Interconnection Standards in the
District of Columbia

and

Case No. RM40-2022-01

In the Matter of the 15 DCMR Chapter 40 - District of
Columbia Small Generator Interconnection Rules

Moderated by Dilip Kommineni

Thursday, April 10, 2025

10:00 a.m.

Public Service Commission of the District of Columbia

1325 G Street N.W., Suite 800

Washington, DC 20005

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Reported by: Olivia Thompson

JOB NO: 7282592

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Dr. Laura Ward	38

1 A P P E A R A N C E S

2 List of Attendees:

3 Vasheena Butler, Regulatory Docu-Manager PSC

4 Harry Warren, Center for Renewables Integration

5 Linda Gray, GDS 7 Associates

6 Abraham Kebede, PSC

7 Nina Dodge, D.C. Climate Action

8 Dilip Kommineni, PSC

9 Knia Tanner, OPC

10 Taylor W. Beckham, Pepco

11 John Gorman

12 Maria Brown, PSC

13 Jason Cumberbatch, OPC

14 George Aleksandra, OPC

15 Albert LaFrance, Solar Solution

16 Nicole Rentz, New Columbia Solar

17 Kunle Adeyemo, Pepco

18 Roger Fujihara, PSC

19 Alex Woodward, PSC

20 Hunter Davis, PSC

21 Kevin Mara, GDS 7 Associates

22 Dollie Banks, PSC

1 A P P E A R A N C E S (Cont'd)

2 List of Attendees:

3 John Budd, Pepco

4 Thomas Bartholomew, DOEE

5 Hussain Karim, DOEE

6 Julianny Tate, Pepco

7 Laura Ward, DOEE

8 Brian Lydic, IREC

9 Adam Carlesco, OPC

10 Pamela Nelson, OPC

11 Lonko Tuma, Pepco

12 Tasha Kaewnukultorn, Pepco

13 Jack Bertuzzi, Ecogy Solar

14 Yohannes Mariam, OPC

15 Ashok Sundaram, Pepco contractor

16 Kimberly A. Curry, Pepco

17 Thomas Olmstead, PSC

18 Jason Turner, PSC contractor

19 Olivia Thompson, Veritext reporter

20 14344662188, Unverified

21 12022564327, Unverified

22

1 P R O C E E D I N G S

2 MR. KOMMINENI: Okay, group. I am
3 Dilip Kommineni, Chief of Climate Action at PSE. I
4 will be hosting today's call in the absence of Brian
5 Edmonds. Today's session will be recorded, and also,
6 we have a stenographer on the call who will provide
7 the transcript. So I would like to request folks who
8 are speaking up to state their name, and spell out
9 their last name, so that the name can be captured.

10 With that said, I'm also looking for a
11 volunteer to take the minutes. I know -- is there any
12 volunteer who wants to take the minutes for today's
13 call? All right. I'm going to call out someone here.
14 I know in the past, DOE and Pepco had taken the
15 minutes, so I'm just wondering if OPC or IREC could
16 help us take the minutes this time.

17 MS. TANNER: Good morning. This is
18 Knia Tanner from OPC. I'll take the minutes. I don't
19 mind.

20 MR. KOMMINENI: Thank you, Knia.

21 With that said, we will go through the
22 agenda. Let me bring it up. You guys can see my

1 screen. I think a couple of major topics for today's
2 meeting is Pepco is going to present about the
3 inverter default setting, and then followed by DOE
4 presenting their advanced inverter roadmap.

5 With that said, I'm going to ask folks
6 to stand by as they present. Once the presentation is
7 completed, we'll open up for questions so we can move
8 forward.

9 With that said, I am going to hand this
10 over to Pepco to present the default setting. I'm
11 going to stop sharing, and give the control to Pepco
12 so that they could present their information.

13 MS. BECKHAM: Hi, folks. This is
14 Taylor Beckham, assistant general counsel for Potomac
15 Electric Power Company. I'll go ahead and share my
16 screen with our presentation in just a moment. And
17 John Budd is going to give us a presentation.

18 So John, if you're ready to go, I will
19 turn it over to you.

20 MR. BUDD: All right. Thank you.

21 Good morning. My name is John Budd,
22 J-O-H-N B-U-D-D. I'm going to be presenting on

1 Pepco's default inverter settings today.

2 The default settings at Pepco Holdings
3 are uniform across all four of its jurisdictions, all
4 three of its opcos. So everything that you see here
5 today is also the same in Maryland, Jersey, and
6 Delaware. With that, we can get started. If we can
7 go to the next slide, please.

8 So the high-level goals of our default
9 inverter setting profile, which I'll go through in a
10 little bit more detail in the next ten slides, are to
11 minimize energy curtailment, increase hosting
12 capacity, and ultimately keep our grid safe, stable,
13 and reliable, with an emphasis on trying to
14 interconnect DERs to our system.

15 As, you know, we learn more about this,
16 as we evolve and get more field experience, we do
17 anticipate that, over time, these settings are not set
18 in stone. They could change. A lot of utilities
19 across the nation are learning from these types of
20 default settings, so it is an evolving process, is
21 what I'm getting at. Go to the next slide.

22 So the first part of default settings

1 are the performance categories, and IEEE 1547 divides
2 these into two performance categories. One is
3 abnormal operation.

4 So when we talk about "abnormal
5 operation," we're talking more about the inverter's
6 capability to support the bulk electric system
7 reliability needs. This is to avoid widespread
8 tripping of DERs, and that has happened in places like
9 Australia and California. And so standards were
10 adopted to try and head this off before it becomes a
11 problem in other areas, and that's to basically give
12 the inverters something called "ride through"
13 capability, and this allows the inverter to stay
14 connected during wide grid disturbances.

15 At PHI, our default setting that we
16 chose for this was Category 3, which is considered the
17 higher penetration of DER ride-through performance.
18 So you choose the higher category if you expect to
19 have higher penetrations of DER. Go to the next
20 slide.

21 The second category, or operating
22 performance requirement, is around normal operating

1 performance, and it's split into Categories A and B.
2 PHI's default setting is Category B, and effectively,
3 this just stipulates certain capabilities that the
4 inverter must have.

5 In general, Category B is a little bit
6 more rigorous. It requires the inverter to have more
7 of an extended set of voltage regulation capabilities
8 that Category A might not have, and this allows for
9 the DER and the utility to use the inverter in ways
10 that maybe you could not have in the past. Next
11 slide, please.

12 So the second set of settings are the
13 protective trip settings, and we'll go over this in
14 table form. I won't go into detail here, but
15 effectively, these are the settings at which DERs must
16 protect themselves and disconnect from the grid.

17 Guidance was taken from PGM, so we made
18 sure that our under-voltage set points for this align
19 with PGM's recommendations and guidance. Ultimately,
20 these are aligned with the IEEE 2018 and 2020-A
21 Amendment recommendations, and ranges of settings for
22 DERs to trip off. And the PHI default requirements

1 are circled, or squared off in red. Next slide.

2 The frequency trip settings, as well,
3 follow the IEEE guidance. And we use the IEEE
4 defaults here, and the PHI defaults follow those
5 defaults shown below in red. Next slide.

6 We require anti-islanding protection to
7 be turned on. This is a pretty simple one. This just
8 ensures that the inverter will disconnect from our
9 electric grid in two seconds or less. And we do
10 require, for larger DERs, the customer, at our
11 request, to disclose that method of islanding.
12 Different OEMs for inverters have different islanding
13 detection methods. An island is really just the
14 ability of an inverter to back-feed into our system.
15 Go to the next slide.

16 The next default setting is called the
17 "enter service setting." The enter service setting is
18 how a DER turns on, or enters service into the PHI
19 electric grid. So there are certain criteria that
20 need to be met for a DER to turn on. In other words,
21 it will not connect unless these minimum ranges are
22 met.

1 So for example, the PHI default
2 settings follow the IEEE defaults. So for example, it
3 will not connect if frequency is out of bounds. So if
4 frequency is below some certain amount, if you see
5 there 59.5 hertz, or above some maximum amount, it
6 will not enter service, or connect to the PHI
7 distribution grid. And there's similar requirements
8 for voltage, as well. If voltage is above 105 PU per
9 unit, it will not connect, right? So we follow these
10 ranges from 1547.

11 All right. The default voltage
12 regulation settings for PHI, these are probably the
13 meat. So PHI's default voltage regulation requirement
14 is to use Volt-Var. There are five main ones that you
15 can select from. So the simplest one is constant
16 power factor, and that's what we had used in the past.
17 That's just basically all real power, or let's say
18 power that is sold back to utility.

19 There are other functionalities,
20 though, that provide ways for the DER to mitigate some
21 of the problems that it might cause. So the default
22 setting that we selected at PHI was Volt-Var, and in

1 Volt-Var mode, the DER basically has the ability to
2 regulate its local voltage by injecting or absorbing
3 reactive power. Go to the next slide.

4 For that particular setting that we
5 chose as our default, there are more technical
6 settings. And I won't go into detail here, but
7 effectively, there is a default curve that PHI has,
8 and that's shown on the right there in that little
9 graphical plot. But that sort of depicts how the
10 inverter is set to regulate voltage at its local
11 terminal, where it's connected to the electric
12 distribution system grid. PHI's defaults are shown in
13 red.

14 Frequency regulation. So this is more
15 of a bulk system support functionality, as well. But
16 in some cases, the DER, if there is not enough
17 generation in the, say, local bulk electric system
18 grid, the frequency might start to dip, or it might
19 start to rise if there's too much. And so the smart
20 inverters have this particular setting built in, and
21 PHI has selected the Category 3 IEEE 1547 defaults.
22 Basically, this setting is here because it will try

1 and either increase or decrease DER output if the
2 frequency starts to get too low or too high in a given
3 region. Go to the next slide.

4 And of course, if you want to see these
5 default settings and default, you can look at our
6 website. If you go to the next slide, I have the
7 links here. There's two links. So the base link is
8 the acceptable inverters link, and we showed that at
9 the last, maybe few meetings ago, for this working
10 group. And then within that link, if you dig down
11 into it, there's going to be another link, which I
12 have shown below it, but there'll be some writing, as
13 well, that actually has the default setting addendum,
14 which sort of outlines it in a more English-friendly
15 format. It's not like a computer program format. It
16 describes some of these different default settings, if
17 you wish to dive further into it and see a little bit
18 more detailed view of what these default settings are.
19 But you can look at those two links on our website to
20 get more information on the PHI default inverter
21 settings.

22 And that's it. Are there any questions

1 about default settings at PHI? All right. Well,
2 thank you for your time.

3 MR. KOMMINENI: Thank you, John. I
4 think I see a question. Kevin has a question.

5 MR. MARA: Yes. This is Kevin Mara,
6 last name's M-A-R-A, representing OPC. Are you using
7 the same default settings on your spot network?

8 MR. BUDD: Yes. So the default
9 settings apply across all voltage levels, so to speak.

10 MR. MARA: So it doesn't matter if it's
11 on spot network or radial line; it's the same? Or on
12 a network, not a spot network.

13 MR. BUDD: Yes. Of course, depending
14 on the application, if a site-specific setting is
15 recommended, that will obviously change it. But if
16 we're talking about defaults, it is the same.

17 MR. MARA: Okay. And I had a follow-up
18 question. So on your overvoltage setting on slide 7,
19 at 110 percent, you had a two-second clearing time; is
20 that right?

21 MR. BUDD: Yes. Clearing time is two
22 seconds. Yes.

1 MR. MARA: Okay. And where is that
2 over-voltage measured? Is that measured at the point
3 of common coupling, or at the inverter itself?

4 MR. BUDD: It is measured at the -- so
5 for your smaller sites, in all practicality, the point
6 of common coupling is going to be effectively at the
7 inverter, because the impedance is super small, and
8 there's no transformer. For larger sites, where the
9 point of interconnection is at the point of common
10 coupling, these trip settings will be applicable at
11 that point of common coupling for the customer
12 interconnecting.

13 MR. MARA: Okay. Thank you.

14 MR. KOMMINENI: Kevin, if you're all
15 set, I'm going on to Mr. Warren.

16 MR. WARREN: Yeah. Hi. Say, thanks
17 very much, Dilip.

18 Hey, John. Just a follow-up on the
19 question that was just asked, for clarity. So you use
20 the same inverter settings across all the different
21 voltage configurations on your system. However, if
22 you're on a networked service, you're also going to

1 have some additional controls that don't allow export,
2 or require minimum export from a building; right?

3 MR. BUDD: Yeah. So in those cases,
4 where the active power curtailment function would be
5 activated, that would be more of a, what you might
6 call a "site-specific;" right? Because that level of
7 curtailment is going to be different, potentially, in
8 every single case.

9 MR. WARREN: Right. But it's related
10 to -- just so I'm clear, it's related to building
11 output. I mean, it's not really so much worried
12 about -- like, on a radial circuit, I think of an
13 inverter; when it gets to the point where it's
14 exporting power into the distribution line, that's
15 where it's looking to use its Volt-Var, or volt watt
16 settings to control voltage; whereas, if you're on a
17 network service -- are you allowing a custom volt watt
18 setting to be the mechanism that that reads line
19 voltage and controls the inverter that way? Or do you
20 ask for some additional controls that affirmatively
21 makes sure there's no export or minimum import?

22 MR. BUDD: So on a network service,

1 volt watt would not be the correct setting. It would
2 actually be the real -- let's say the the active power
3 curtailment setting would have to be enabled. And
4 generally, what would happen is our engineers would do
5 some kind of analysis to figure out what that minimum
6 import is, and --

7 MR. WARREN: Yep. Okay.

8 MR. BUDD: Okay.

9 MR. WARREN: And the inverters, then
10 you allow the inverter itself to be configured to
11 achieve that objective? You don't require necessarily
12 additional controls?

13 MR. BUDD: Well, okay. So additional
14 controls are required, but you can't do that sort of
15 thing without programming the inverter; right?
16 Because --

17 MR. WARREN: Yeah. Okay. I hear you.

18 MR. BUDD: -- the reality is you can
19 put a relay, and we do require that in many cases.
20 But if you just put a relay, you don't want the
21 customer tripping, so the inverter also has to be
22 configured to curtail that output.

1 MR. WARREN: Okay. Got it. Okay.
2 Thanks. And I do have a couple other questions for
3 you, John. So I think I saw on your cover slide that
4 the presentation package was dated, like, was it dated
5 as January 24? Which I think is when all these went
6 into place; right?

7 MR. BUDD: Yeah. So that's all I was
8 trying to communicate there, was that this all sort of
9 has been in effect since, you know, January 1 of last
10 year.

11 MR. WARREN: Right. Question, then. I
12 think in the Maryland Interconnection work group,
13 there were some comments made. I seem to recall, and
14 maybe there's someone from IREC on the phone, that
15 IREC made some recommendations about kind of tweaking
16 some of the inverter settings that you had; I think
17 some of the Volt-Var curves. Have you guys -- do I
18 recall that correctly? And if so, has PHI been
19 considering, or is it in the process of considering
20 any adjustments to the fine details of these settings
21 in response to the comments over the last year or so?

22 MR. BUDD: So on slide 2, I put in

1 there, right, like, this is a learning experience.
2 And I think, yes. Part of what we're doing is, you
3 know, as we get more field experience, and things
4 evolve and change, these settings could evolve and
5 change over the years; right?

6 I don't recall an IREC-specific
7 recommendation from the Maryland working group. It
8 was a while back. But we do take feedback from all
9 different types of stakeholders, and try and balance
10 that against some of those objectives there that we
11 show what we're trying to do when we set a default
12 profile. And it's hard, because everyone has their
13 own needs and wants, so we're trying to balance those
14 among the different objectives and needs.

15 MR. WARREN: Okay. But at this point,
16 there's no sort of active -- there's not a -- we
17 wouldn't anticipate some change in the near future.
18 At this moment, we're still gathering data, and see
19 where that goes.

20 MR. BUDD: Yes. Yes. Definitely.

21 MR. WARREN: Okay. And then one third
22 question -- I'm "Question Man" here -- at the inverter

1 workshop that my group co-sponsored back in December,
2 you had raised a question for the group about whether
3 some consideration of, you know, volt watt settings as
4 an additional way to control things, to allow, you
5 know, to possibly improve hosting capacity further;
6 whether that was something people might want to talk
7 about. Where is PHI at this point, in trying to
8 invite, or, you know, consider how to approach that?

9 MR. BUDD: Yeah. So in Maryland, we
10 have a pilot that we're trying to push out there. And
11 really the concern, right, that we've heard about that
12 setting is this first point; right -- minimize energy
13 curtailment.

14 MR. WARREN: Yeah. Yep.

15 MR. BUDD: And you know, we're
16 considering it; right? And the question is how much
17 are we going to push against that curtailment of
18 energy? Because -- and that's sort of what we're
19 trying to evaluate with that pilot. Is it going to be
20 so much to where it's not going to be worth it? Or is
21 it something, on average, that it will be so small
22 that, hey, we can push our system?

1 We can put this -- we can maybe explore
2 considering this setting that you mentioned to try and
3 push more on the second objective there.

4 MR. WARREN: Right. Right. Okay. And
5 that pilot, you say you're trying to push that out.
6 So am I right, I mean, the results of that pilot, you
7 know, if that gets moving quickly, would be a couple
8 of years out of kind of running that pilot? Is that
9 the timeframe?

10 MR. BUDD: Yeah. I believe it is a few
11 years, we presented recently, in one of our Maryland
12 working groups around that pilot.

13 I'm not on the project management side
14 of it, so I'd have to defer to them. But I know
15 they're in the process of trying to get approval, I
16 think, for that. Final approval to go forward.

17 MR. WARREN: Right. But going back to
18 the earlier question, volt watt is still something
19 that's on the menu of possible custom settings for any
20 particular installation if it might appear that that's
21 a beneficial approach, right, in D.C.?

22 MR. BUDD: You're talking about site-

1 specific settings.

2 MR. WARREN: Yeah, site-specific. That
3 was the term I was looking for, yeah.

4 MR. BUDD: Yeah. So when we go
5 through -- yeah. So if you look at the IEEE standard,
6 they list out all the different capabilities that are
7 available if an inverter meets that certification. So
8 within that standard and what's certified by it, all
9 those different capabilities are potential tools that
10 you could use for a site-specific setting, so to
11 speak.

12 MR. WARREN: Right. Okay.

13 MS. BECKHAM: And I'll just add, Harry,
14 I think in our technical interconnection requirements,
15 site-specific settings are -- we use our default
16 settings for those systems that are below 250 KVA; we
17 utilize site-specific settings for those systems that
18 are above 250 KVA. And that's in that technical
19 interconnection.

20 MR. WARREN: Yeah. Which actually,
21 that raises an interesting issue that, you know, maybe
22 should be discussed at some time, as to whether, you

1 know, if that 250 KVA cutoff, you know -- are there
2 ever opportunities to use those site-specific settings
3 on smaller systems that would be beneficial, you know,
4 to them.

5 I also, actually, have always wondered,
6 I think you brought this up in a prior meeting, this
7 250 KVA cutoff, maybe, when we were looking at TIRs.
8 And when I flip that around, I also wonder if some
9 of -- if the goal of these advanced inverter settings
10 in part, right, is to increase hosting capacity. What
11 is it about the Pepco system in D.C., where you would
12 not want to employ site-specific settings, like, for
13 smaller systems; you know what I mean?

14 Are there any chances where we're --
15 are we leaving anything on the table because we're not
16 applying the most sophisticated, you know, set of
17 settings to something smaller than 250? Because I
18 don't know what the distribution of systems is in
19 D.C., but I'd imagine there might be a reasonable
20 number of, like, commercial, or some of the smaller C-
21 segs that might be in that sub-250 range. So you
22 know, just a question as to where that cutoff came

1 from. Is that anything that we should visit at some
2 point, to see if we're getting the most bang for the
3 buck, if you will, out of the inverter settings?

4 MS. BECKHAM: I will let, if John
5 knows, speak to, like, where the 250 cutoff came from.
6 But I think, you know, from a -- I don't want to say
7 we wouldn't consider it, just as kind of the whole
8 initial goals of the inverter default settings. We
9 said, you know, it's a learning experience,
10 definitely, thinking through how, as technology
11 evolves, times evolve, how those settings can be
12 updated.

13 I think one of the, just kind of
14 general policies -- and again, from a non-technical
15 aspect, site-specific settings require you to do a
16 specific study. And just generally, with the
17 proliferation of applications that come in, and the
18 regulatory timeframe that the team has to evaluate an
19 application, I think we created, or there is a
20 creation of default settings so that we can, you know,
21 more efficiently, and more -- I'm just trying to think
22 of the right words here -- but, you know, process

1 applications. So I think that's one of the
2 considerations, you know. If you add in this step of
3 doing site-specific settings for smaller systems,
4 that's something that Pepco has to consider. And so
5 I'm not saying that there wouldn't be, obviously,
6 chances for us to rethink that 250 cutoff --

7 MR. WARREN: Right. No, I hear you.
8 Yeah.

9 MS. BECKHAM: -- but I think we have to
10 be mindful of that. Just one thought I had.

11 MR. WARREN: Oh. I apologize.
12 Actually, now I remember back a couple of meetings;
13 there's another little fine point I want to put on my
14 question there. I think he said that below 250 KVA,
15 you use the default settings. But I think I recall a
16 comment where, above 250 KVA, unless you see a need
17 for some kind of site-specific setting, you don't use
18 any default settings at all; you use, not Volt-Var,
19 but power factor 1.

20 And that was the thing I was confused
21 about, because that's where I thought it sounded like,
22 from a hosting capacity standpoint, like we might be

1 leaving something on the table, because I didn't quite
2 get, why would a larger system not have any Volt-Var
3 correction unless you needed a site-specific setting;
4 right, like, to minimize some interconnection costs?

5 So I know -- could you clarify that one
6 for me? Because maybe, now that I think of it, that's
7 where I thought we might be leaving, if you will,
8 "hosting capacity" on the table by not applying that
9 voltage correction to larger systems, also.

10 MR. BUDD: So for larger systems, the
11 site-specific setting that we usually go with is unity
12 power factor. And we do that for a few reasons. The
13 main one is that the larger sites can negatively
14 interact with things like capacitors, regulation
15 equipment on our system.

16 And if there's no real need to employ
17 that to try and reduce a voltage, right -- say there's
18 no high voltage, because that's typically why we would
19 deploy Volt-Var, or volt watt, right -- then there's
20 really no need to try and cause the customer to lose
21 energy, right? Because there might be a small amount
22 of energy that they lose by deploying that. And so

1 it's done for two reasons. So it's almost like we're
2 focusing more on the third objective and the first
3 objective; right? If there's not really a need to
4 deploy that, then we just use unity power factor.

5 And once we get to the point where
6 we're starting to see voltage problems, then we will
7 deploy that, you know, our site-specific. We'll go
8 from unity -- maybe we'll go to off-unity power
9 factor. Or maybe it'll be something else entirely.
10 Maybe it will be a limited export. Who knows; right?
11 There's different ways we could go about a site-
12 specific setting.

13 MR. WARREN: Yeah. Okay. So you're
14 not really worried that -- so I guess -- I appreciate
15 the particular thing you brought up about, you know,
16 negative interactions with some of your electrical
17 equipment. I could see that that would be a problem.
18 But I guess you're not concerned, like -- I don't
19 know. Maybe I'm just thinking about this too
20 simplistically. But I'm just imagining, you know, the
21 first big system that goes on the distribution line,
22 you look at it and you say, "I'm not worried about a

1 voltage problem there. We just leave it at unity
2 power factor." And then the second and third systems
3 that hook up to that line, you say, "Oh. Well, now
4 that we've got this additional power coming onto this
5 line, we are going to need some settings on those."

6 And I look at that, and I say, "Okay.
7 Well, now everybody downstream of that first decision,
8 they're the ones that have to take the burden of power
9 factor correction." You've sort of lost that
10 opportunity on the first person that hooked up,
11 because, you know, you decided to set that at 1 at the
12 outset.

13 I guess I was thinking that it's when
14 all -- maybe I'm wrong about this. When all systems
15 are operating in a consistent power factor correction
16 mode, like Volt-Var, then, like, everybody benefits in
17 terms of increased hosting capacity. And like, all
18 the systems that are out there that don't do that
19 today, I mean, in a way of speaking, that's like, a
20 foregone opportunity over the years, to -- that now
21 all future systems have to worry about handling the
22 power factor correction, because all those older

1 systems just don't participate.

2 Or am I, like, is the mechanical
3 engineer in me, like, not appreciating the electrical
4 engineering subtleties here?

5 MR. BUDD: I understand what you're
6 saying; right? So you're sort of alluding to the
7 cause or pay model --

8 MR. WARREN: Yeah. In a different way.

9 MR. BUDD: -- and how that applies to
10 settings, right, in a different way.

11 MR. WARREN: Yeah. Sort of.

12 MR. BUDD: But like I said, there is a
13 technical concern where it can interact negatively
14 with our equipment, and we don't want that to happen.

15 And then furthermore, we actually do
16 have the ability to go back and change settings;
17 right? If the system changes, and as the system
18 changes -- and if we start seeing problems on our
19 system, we could require that customer to adjust that
20 setting; right?

21 Back when we had only power factor
22 adjustments, constant power factor adjustments, we

1 didn't have things like Volt-Var curves. In fact, we
2 would do that; right? We might have, "Well, you need
3 to change your power factor in the winter to, I don't
4 know, 99 percent, and then in the summer, it's one,
5 and maybe in the spring and fall, it's 92 percent."
6 So we can have schedules of settings where we have to
7 adjust it in time.

8 MR. WARREN: Okay. All right. Okay.
9 Thanks for letting me digress on that. I appreciate
10 that. Always good to have you on these calls, John.
11 I really appreciate you.

12 MR. KOMMINENI: Thanks, Harry, for
13 those questions. And moving on to the next person, it
14 looks like Brian Lydic has a question.

15 MR. LYDIC: Yeah. Brian, B-R-I-A-N,
16 Lydic, L-Y-D-I-C, with Interstate Renewable Energy
17 Council. Yeah, I did have a slightly different
18 question, but just wanted to respond to John and Harry
19 there about that last point, you know.

20 So Harry, you are right that, you know,
21 in order to have the voltage regulating effect on the
22 grid, you would need, you know, all the systems, or as

1 many as possible, participating in Volt-Var. Just
2 wanted to make that clear, that that is correct. And
3 so, yeah, if you wanted to get the full effect, you'd
4 have to revisit those older systems and change their
5 settings in the future, which I advise against,
6 because that's, you know, not necessarily easy to do,
7 you know. That might require a truck roll to the site
8 every time you change settings, unless we've got
9 communications out to every site, which I don't think
10 is the case, necessarily, today.

11 So you know, they had this issue in
12 Hawaii where they had tons of old inverters that
13 weren't smart inverters, installed, and got to high
14 penetration before smart inverters started getting
15 installed. And you know, just adding smart inverters
16 with Volt-Var activated doesn't correct the voltage
17 that was, you know, already high because of the
18 existing high penetration of inverters that aren't
19 doing voltage regulation. So definitely a word of
20 caution there in terms of not activating those
21 settings for all systems.

22 But yeah, my question was just -- and I

1 apologize if we've discussed this before, either in
2 Maryland or here. But kind of alluding to some of
3 Harry's other questions was just, how -- could you
4 give a kind of rundown of how the Volt-Var settings
5 were selected? You know, there's a slightly wider
6 dead-band than the default settings in 1547, and just,
7 like, a little less severe in general. Was that based
8 on, you know, modeling studies or anything like that?
9 And what kind of different considerations went into
10 that selection, if you could reflect on that.
11 Appreciate it.

12 MR. BUDD: We worked with EPRI to
13 provide them some models of different feeders on our
14 systems that we felt were characteristic, and I don't
15 remember how many it was. It was a handful. And we
16 had EPRI do some statistical modeling, and power flow,
17 or say electrical modeling, and they sort of gave us
18 some idea of what they called the "best fit" setting
19 could possibly be.

20 So we took that into consideration, as
21 well as our own concerns with how our regulation
22 equipment is set -- like, regulators and capacitors --

1 to try and minimize the impact on that, as well.

2 To elaborate more on that, when EPRI
3 looked at that setting, a "best fit," you know, they
4 were looking at things like hosting capacity, energy
5 loss, you know, the primary and secondary objective in
6 the regs, as well as impacts to the grid, like I
7 mentioned before. Impacts on regulation equipment.

8 MR. LYDIC: Can you opine a little bit
9 more on what the potential impacts on the regulation
10 equipment would be? And is that something that isn't,
11 or can't be studied when you're connecting a larger
12 system? Or yeah. Like, just in relation to, you
13 know, selecting Volt-Var settings, is it challenging
14 to study that? And again, what are the parameters
15 that you're working around there?

16 MR. BUDD: Yeah. So in some cases, we
17 have --

18 MS. DODGE: Excuse me for interrupting,
19 but Brian is fading in and out, and at least I am
20 losing chunks of substance in his questions. John,
21 could you repeat his question just now, and in
22 general? Because it's hard to follow. Thanks.

1 MR. BUDD: Sure. I think Brian asked
2 me about opining about what some of the impacts are
3 that we see from Var absorption on our system, and
4 maybe generation, as well.

5 So the main impacts we see are that
6 capacitors, particularly in D.C., are generally
7 triggered by voltage or Var. So if we're consuming a
8 lot of VARs on our systems, we could end up mis-
9 operating those capacitors, and turning them on during
10 light load seasons when they shouldn't, and that could
11 actually defeat the entire purpose of that Volt-Var
12 setting on that inverter. So in that case, it doesn't
13 really work well with our current way of dispatching
14 capacitors, and we don't have a way of easily changing
15 that system right now.

16 MR. LYDIC: Okay. Thanks for that.

17 MR. KOMMINENI: Brian is all set there.
18 Then I just have a general question, John.

19 It looks like those default settings
20 are in place since 2024 January. Is there a
21 particular setting or settings where a large group of
22 customers keep requesting you guys to change? And how

1 do you handle that?

2 MR. BUDD: I'm sorry; are you saying
3 are there a large group of customers requesting us to
4 change our default settings?

5 MR. KOMMINENI: Yeah. Is there a
6 particular setting in the, you know, various settings
7 which you've shared with us -- is there a particular
8 setting which, you know, you see customers coming back
9 and asking to change it, or, you know, modify it?

10 MR. BUDD: For the default?

11 MR. KOMMINENI: Yeah. For the default.

12 MR. BUDD: Yeah. I think the one --
13 and I think Harry touched on this a little. But the
14 most feedback we've heard from developers, or
15 customers -- not really customers, more developers --
16 is the volt watt setting. That's kind of been the one
17 that I've heard the most feedback to enabling by
18 default.

19 MR. KOMMINENI: Okay. Thanks for that.
20 I do see another question from Harry.

21 Harry, please go ahead.

22 MR. WARREN: Yeah. Sorry. Just

1 following up on Dilip a little bit there. Again, tell
2 me if this is maybe a question for another day. But
3 when -- if you look at enabling volt watt, is that
4 something that you would enable volt watt along with
5 Volt-Var so that the VAR variation tries to handle the
6 voltage rise, you know, as much as possible, but if it
7 falls outside of that tolerance, then you engage volt
8 watt outside of that? Or when you're using it in D.C.
9 and other places, is it, like, a one-or-the-other sort
10 of approach?

11 MR. BUDD: I don't think we've really
12 figured that out at this time. That's something we'd
13 probably explore in our pilot, potentially enabling
14 both, maybe one at a time, as well, to see what the
15 effects are, and how it affects hosting capacity; how
16 it affects energy curtailment. I know that's been
17 done in research, in some of our research scripts that
18 we work with, so I know it's possible. It's
19 definitely something we're considering.

20 MR. WARREN: Okay. Dilip, just to
21 follow up one more thought there. I think that --
22 tell me if I'm right, John. The only reason that

1 people would ask for volt watt is if, in a site-
2 specific kind of situation, the default Volt-Var curve
3 is engaged; however, there's still a large
4 interconnection cost that's going to be needed for
5 upgrades. And so people will say, well, if we install
6 -- if we use the volt watt setting to more -- I don't
7 know; want of a better term, more aggressively, or
8 more fully manage our export onto the system, can we
9 avoid those upgrade costs if we implement that?

10 And then I think to John's earlier
11 point, I think one of the things that, as I understand
12 from him, they're trying to get out of the Maryland
13 pilot, is to sort of say, "Okay. The one concern that
14 people have with volt watt is how much curtailment am
15 I going to get?" And that's something, I think, John,
16 you've said earlier, that's not something that's easy
17 for you guys to even, like, estimate on a site-
18 specific basis with your power flow modeling. That's
19 like, so this is where your pilot is going to try to
20 get underneath that, and figure out, you know, what
21 should people expect in terms of curtailment to better
22 inform that kind of decision; right?

1 MR. BUDD: Yes. Yes.

2 MR. WARREN: Okay. Thank you.

3 MR. KOMMINENI: Yeah, that's good to
4 know. Thank you, Harry. Thanks, John.

5 I don't see any other questions, so
6 probably, we'll move to the next item on the agenda.

7 Next we have DOEE present on the
8 advanced inverter roadmap. So I would like them to
9 share the screen and the stage here. Let me check if
10 Peter is on the call, or someone from the DOEE.

11 DR. WARD: Yes.

12 MR. KOMMINENI: Hi, Laura. Are you
13 going to be presenting today?

14 DR. WARD: Yeah. That's right.

15 MR. KOMMINENI: Perfect. Thank you.
16 Laura, I did not get your material. I presume you're
17 going to be sharing your screen. If you're talking, I
18 think it looks like you're muted, too.

19 DR. WARD: Yeah. So let me share with
20 you my -- can you see my visual?

21 MR. KOMMINENI: Yes.

22 DR. WARD: Okay. Perfect.

1 So good morning, everyone. I'm Laura
2 Ward, the Energy Innovator Fellow at Department of
3 Energy and Environment, and yeah. So I'm here today
4 to discuss advancing grid modernization, and achieving
5 15 percent solar generation by 2041 with advanced
6 inverters, and multilayer research roadmap for the
7 District of Columbia.

8 My mentor is Thomas Bartholomew; and
9 also, we have been working with Peter. Today, he is
10 not in the meeting, and yeah. So I have a
11 presentation online.

12 Basically, the District of Columbia has
13 set ambitious goals for grid modernization and renewal
14 energy integration, and the main goal is achieving 15
15 percent. This is a key target that we have. And I'm
16 going to start with the motivation; purpose of the
17 roadmap for advanced inverters; the research roadmap
18 in advanced inverters; and technical and regulatory
19 aspects.

20 Also, I'm going to explain an example
21 of short-term actions that we are actually doing right
22 now, and an example of medium-term actions, as well.

1 We are focused on the FERC 2222
2 implementation, and I'm going to present aggregating
3 ideas and the roadmap study. And we have some
4 references, as well, of this study. Current study.

5 Current study of the grid that we have
6 can be represented by these two figures. Actually,
7 our existing grid infrastructure faces several
8 limitations: traditional technologies, a struggle to
9 keep up with the growing demand for renewable energy,
10 grid resilience, and customer-centric services.

11 Actually, as we can see here in these
12 two figures, we have the current situation of the grid
13 with the current inverters that we have. Basically,
14 we call them "grid following" inverters, because the
15 control of them is actually following the signal of
16 the conventional system.

17 However, in the right side, we can see
18 the main idea of the future of the grid modernization
19 that we call with advanced inverters, that can
20 actually be, you know, incorporated into the grid.
21 And the key objective is to leverage advanced inverter
22 technologies to enhance system reliability and

1 facilitate higher penetration of solar energy in D.C.
2 We have a scope that actually is, you know, taking
3 more steps to advance grid modernization goals.

4 Also, I would like to present the
5 advanced inverters as our power electronic devices
6 that can transform the way we manage the grid. So
7 they offer engaged capabilities such as improved
8 efficiency, advanced control and communication, and
9 the ability to support greater renewal energy
10 penetration. We have a comparison of inverter
11 capabilities.

12 And based on the three following
13 inverter controls that currently we have in our
14 system, we can mention that they act as current
15 sources, control current and phase angle. They cannot
16 function without an externally-regulated voltage, and
17 cannot operate standalone, cannot achieve 100 percent
18 penetration, and the control of acting and reactive
19 power, as well as fault currents.

20 Other functionality for advanced
21 inverters focus on all other technology that
22 incorporate other functionalities. We can have,

1 like, the grid forming inverters, for example, that
2 are other type of advanced inverters. These inverters
3 act as voltage source controls for frequency and
4 fundamental voltage magnitude, and inverter controls
5 that don't require a PLL can operate standalone; can
6 achieve 100 percent or greater penetration. This is
7 our main goal. And also, they can provide,
8 instantaneously, balances lots without coordination
9 controls. So we have these different principles for
10 these advanced inverters, and we are working on that
11 roadmap in order to achieve this main goal in the
12 future.

13 We want to present, as well, this
14 research roadmap, and we have been able to specify a
15 multi-year research roadmap based on short, medium,
16 and long-term. The main idea is to analyze the
17 capabilities and compliances for interconnection of
18 distributed energy resources that use advanced
19 inverters. We are focused on capabilities, such as
20 voltage and frequency regulations, and also the black
21 star capability of these advanced inverters. We are
22 focused on the IEEE 1547-2018, and also on the FC 1050

1 in the main idea, and actually, we are working on
2 these short-term tasks during the first and second
3 year.

4 We started in 2024. So we have been
5 advancing in the revision of the current deployment of
6 advanced inverters in D.C.; and update regulatory and
7 technical standards, we are working on it; review and
8 deploy pilot projects to evaluate advanced
9 capabilities; and also, we have established some tasks
10 for medium-term.

11 That is going to be between the third
12 and the fifth year, such as the expansion of advanced
13 inverter deployment; ongoing research and refinement
14 of the default settings, and, you know, the adjustment
15 that we can do in order to reach the main goal, if we
16 can be focused on the penetration levels, as John was
17 mentioning in the previous presentation, so we can
18 have these inverters default settings. However, other
19 aspects are important when we are increasing the
20 deployment of these advanced inverters, and that can
21 be readjusted by the penetration levels on the
22 distribution system.

1 Also, we have the refined regulatory
2 frameworks and technical standards in the developed
3 advanced planning and modeling techniques, workforce
4 develop development and training, and as a long-term,
5 that is going to be after the fifth year.

6 We have full integration into the grid
7 system optimization of clear stability efficiency, and
8 establishment of long-term regulatory and technical
9 standards.

10 I would like to present this example as
11 short-term actions that we have. So focus on three
12 specific items. As you can see here, we have the
13 advanced inverter settings. So first of all, we need
14 to refine, test, and implement default and optional
15 inverter settings. We are working on it with Pepco;
16 voltage ride-through, frequency response, and all that
17 through coefficients, and all the parameters for these
18 coefficients in order to present default settings, but
19 also taking, you know, more settings in the future,
20 because the penetration levels can define, as well,
21 these settings.

22 Define technical settings and develop

1 guidance for the distribution of energy resources.
2 The developers begin pilot projects with advanced
3 inverters, analyze pilot outcomes, and refine the
4 settings, and roll out mandatory compliance for all
5 new distributor energy resources. And finally, our
6 goal is to evaluate grid impacts and improve system-
7 wide settings.

8 Related to the hosting capacity
9 analysis, we have been actually conducting a study
10 focused on the current law that we have in D.C. So
11 the main idea is to evaluate this study in order to
12 realize results and propose grid upgrades or
13 solutions, implement capacity upgrades based on
14 studies, continue monitoring capacity, and optimize
15 results allocation, finalize hosting capacity analysis
16 framework for D.C.

17 Related to interconnection standards,
18 we have been taking some actions, and we are working
19 on it. Basically, we've been updating and aligning
20 interconnection process with IEEE 1547-2018, including
21 new requirements for the distributed energy resources.
22 And we actually initiate standards update and

1 stakeholder audit.

2 As a part of the examples for medium-
3 term actions, we are focused on the FERC 2222. They
4 basically present two -- two different, no, but
5 several, you know, several aspects. We can
6 incorporate advanced inverters for improved stability
7 and faster interconnection to assist with the FERC
8 Order 2222 implementation.

9 Basically, this order is focused on the
10 deployment of this new technology into a conventional
11 power system; develop a reliable grid to provide
12 resilience technologies; and embrace stakeholder
13 driving pathways for equitable energy solutions, and
14 our planned system upgrades and funding mechanisms for
15 the adoption of this technology.

16 So as a summary of the roadmap
17 procedure, we actually have been starting with some
18 tasks on this roadmap. First of all, we conduct
19 workshops and interviews with utility regulators in
20 those three spurs and research community, gather
21 feedback or capabilities, challenges, and research
22 means.

1 And also I want to mention that we
2 start, you know, basically from the last year, and we
3 have some goals. We are working also in this
4 technology and the interconnection process. The
5 roadmap drafting is basically emphasizing stakeholder
6 input into a comprehensive draft roadmap outline
7 short-term. We are doing that through this working
8 group, and we have a roadmap review and revision. So
9 the main idea is to present a draft of this roadmap by
10 the end of May, in order to have responses, and also
11 questions. First of all, questions, and then the
12 answer for these questions. And I think after this
13 meeting, I can provide the draft in order to get this
14 feedback for the stakeholders.

15 And finally, we are going to present
16 the roadmap document at the end of July, and yeah. So
17 publish and disseminate a roadmap to key stakeholders,
18 and establish ongoing tracking and reporting
19 mechanisms. This is our program procedure related to
20 the roadmap, and yeah. Thank you for your attention.

21 MR. KOMMINENI: Thank you, Laura, for
22 that presentation. It was very informative. Thank

1 you for that.

2 Before I open up for the team to -- for
3 the questions, if you can share this deck with me of
4 the whole thing, that would be helpful. I don't think
5 so I have a copy of it, but that would be helpful.

6 DR. WARD: Yeah, for sure.

7 MR. KOMMINENI: Thank you.

8 DR. WARD: Yeah, for sure. Thank you.

9 MR. KOMMINENI: I will open up for
10 questions from the team members here. I do see one
11 question from Harry. Go ahead, Harry.

12 MR. WARREN: You can always rely on me
13 to ask questions.

14 MR. KOMMINENI: Yes.

15 MR. WARREN: Hey, Laura. I don't know
16 if this is -- if you're able to sort of handicap this
17 for us, but could you help me understand a little bit
18 your DOEE's roadmapping exercise that you're working
19 on, and how that integrates with, like, this working
20 group process; right?

21 So we have a working group. And I
22 think, Dilip, correct me if I'm wrong, but we're

1 looking forward to, by July, coming up with some
2 recommendations to bring forward to the commission on
3 this issue as a working group.

4 So Laura, is the idea that the roadmap
5 that you are looking to develop kind of in that same
6 timeframe -- is the input that you're getting the same
7 input that we are sharing in this meeting, or is there
8 a separate process, and you're imagining bringing your
9 roadmap forward as a part of this working group's
10 recommendations, or is it on a separate track?

11 I'm a little -- I was just a little
12 confused as to how you were talking about this, as to
13 whether we had some parallel tracks here, or whether
14 this is all merged together into one unified kind of
15 product that's, you know, that we're working on.

16 DR. WARD: Thank you, Harry. This is a
17 good question. So I can say this is a parallel track
18 that we are trying to do based on the feedback, you
19 know, provided by this working group.

20 As a team, you know, we have been
21 compiling the main ideas to be able to get all the
22 feedback from the utility and for the different actors

1 and stakeholders, and also provide a product that can
2 be, like, a guide for this main goal; that is, the
3 grid modernization, always keeping in mind the main
4 goal: that is the 15 percent of solar generation by
5 2041.

6 This is a goal that was actually
7 established by 2018 in our Clean Energy D.C. And
8 based on it as a fellow, as an energy innovator
9 fellow, I have been working in IDP, and in IDP with my
10 mentor, Thomas, in order to provide this guide, with
11 this, you know, handbook, yeah, related to the grid
12 modernization.

13 So everything that is related to the
14 advanced inverters; the interconnection process;
15 actually, in the future, the tariff and the structure
16 of tariffs for this technology -- that is going to be
17 included into the conventional power, is very
18 important as a guide for us to, you know, have
19 something in which we can have a base. We can have
20 some goals in a short term, in a medium term, in a
21 long term. So this is the main idea of this project
22 in D.C.

1 MR. WARREN: Okay. Well, Dilip, I
2 think that's something that maybe, you know, you and
3 Brian sort of want to make sure you've got your heads
4 around, is how these parallel -- how these different
5 processes are working together so that we kind of have
6 a one, I don't know, one playbook, if you will.

7 MR. KOMMINENI: Yeah.

8 MR. WARREN: Sounds like some of the
9 things that DOEE is working on are things that
10 probably lend themselves to, like, in the long term,
11 how is this working group, or the commission, going to
12 deal with sort of the future, you know, the long-term
13 issues of making better and better use of advanced
14 inverters over time? And just being able to
15 articulate how the processes flow together would
16 probably be helpful to get some direction from, you
17 know, you all, or your participation.

18 So I'll put my hand down now, but I
19 would like to come back to another question later, if
20 I could.

21 MR. KOMMINENI: Yeah. Sounds good.
22 Thanks, Harry.

1 And I do agree. I think it's going to
2 be evolving, and we need to collaborate with DOEE as
3 they develop their recommendations and stuff like
4 that. We want to either modify or consider their
5 recommendation as it comes. They'll be trying to wrap
6 this up soon.

7 And Laura, if I remember looking at
8 your deck, I think for the near term, you had Q4 of
9 2025. So probably, that's when you'll have at least
10 the near-term thing wrapped up. So we'll keep a close
11 eye on that. Thank you.

12 DR. WARD: All right. Thank you so
13 much.

14 MR. KOMMINENI: Moving on. Ms. Nina
15 Dodge.

16 MS. DODGE: Yes. Thank you, Dilip, and
17 thank you, Laura. It's N-I-N-A D-O-D-G-E, Dodge.

18 I think it's very useful to be looking
19 at the overarching goal of meeting our local
20 generation solar carve-out for D.C. goal -- statutory
21 goal, I should add -- and to see where we are now in
22 terms of reaching that goal.

1 I'm just thinking of a sort of
2 timeline, a different perspective on timeline, and
3 fitting in the actions that Laura described, and where
4 the working group is now. And I really see a sort of
5 past/present/future in all of this. I think it's very
6 good for this group to embrace the past, the near
7 past, the present, and the future. We don't have time
8 to just move at the slowest pace.

9 And on the one hand, we see -- and in
10 that respect, I think what's missing here is the
11 example of where other jurisdictions are for the
12 current term, the medium term, and the long term,
13 whether it's for DOEE's timeline, or for what we're
14 doing here in the working group.

15 For instance, I see the volt watt
16 discussion as sort of in the past. There have been a
17 lot of -- there's been deployment of volt watt in
18 other jurisdictions that's been studied. There have
19 been pilots run. I'm not saying that a pilot is a
20 waste of time, but I think the idea of spending two to
21 three years on piloting one functionality that's
22 already been studied elsewhere before it's used for

1 site-specific work in any one jurisdiction of PHI, to
2 me, that's sticking in the past, holding us hostage to
3 something that really, arguably, should be really
4 subjective to evaluation in terms of how we're moving
5 and where others have moved, you know.

6 So -- and I say that respectfully, of
7 what the engineers really need to understand of their
8 own networks; but I really do think that there's
9 something troubling about that timeline, given what's
10 been done elsewhere.

11 And then there's the present where
12 we're moving forward -- advanced inverters being used
13 in a different way by DOEE than is being used in our
14 regulations. So I really request DOEE to be very
15 clear about what they mean.

16 THE REPORTER: Excuse me for a second.
17 Could you repeat, about the last ten seconds of what
18 you said, if you can recall? I'm sorry.

19 MS. DODGE: Let's see if I -- you're
20 asking a lot.

21 MR. KOMMINENI: So Nina, I think, yeah.
22 Just to let you know, Nina, when you said you were

1 going to talk about the present, that's when I think
2 the screen froze.

3 MS. DODGE: That it went off? Okay.
4 Thank you. Sorry about that.

5 In the present, I'd like to see -- I
6 think it's very important that DOEE describe where we
7 are now in their current part of the timeline; what's
8 the reality encapsulating what we've been discussing
9 in this group, which has been very productive. And I
10 really thank John Budd for his ongoing presentations
11 and Q and A responses. Okay.

12 And then in terms of the future, I
13 think there's enough brainpower in this group to start
14 really encompassing the future -- some of what's been
15 discussed by Laura for DOEE. And again, there are
16 examples of some of these more futuristic applications
17 of these functionalities of inverters. There are
18 examples, living examples of deployment and of pilots.
19 So I think to make DOEE's less sort of pie in the sky
20 futuristic-sounding with a lot of three to four-
21 syllable words that most lay people really aren't used
22 to, please illustrate what's been going on elsewhere.

1 I think that also will provide some
2 sort of an easier way for our group to imagine what's
3 being talked about. Again, some of it's not totally
4 in the future. The pilot projects I would put in
5 future, testing for the future, but there's also
6 deployment.

7 So sorry to be sort of impressionistic
8 here, but I'm also trying to anchor all of these
9 initiatives more in the realities that we're dealing
10 with, and I think we need to tweak all of our
11 timelines. I don't think they all really correspond
12 to what we need and to what's possible. So I'll stop
13 there for now. Thank you.

14 MR. KOMMINENI: Thank you, Nina. I
15 think that's a, you know, a lot of information you
16 just presented and you mentioned. But at least, you
17 know, I think if I look at simple lines here, if I
18 were to look at the past, I think your concern is if
19 this study is looking at other jurisdictions so that
20 we don't re-create the wheel, right, for certain
21 settings, and stuff like that.

22 And then for the present, at least we

1 would like to plot, in this roadmap, where we are
2 today so that it's easy to move forward. And it looks
3 like for the future, we could still consider pilots,
4 and look at other items which are left out. So that's
5 my understanding. And I would like to -- yeah. Go
6 ahead.

7 MS. DODGE: Sorry, Dilip. Just to add
8 one thing. For the future, is looking at existing
9 pilots, as well as deployment for some of these ideas
10 in the future, part of the timeline? And I don't
11 know; does anybody in this group attend DISTRIBUTECH
12 conferences? Maybe you don't know what I'm even
13 talking about. Well, I guess --

14 MR. KOMMINENI: I did. In my past
15 organization, I used to, but not here.

16 MS. DODGE: Yeah. Yeah. I mean, I
17 think for those of us who have attended them, it's a
18 very, very good way to know what's going on, and
19 future-oriented among very conservative utilities,
20 mind you. We're not talking about, you know, the
21 fringe here -- because they present what's going on
22 before those findings are published. So you can get

1 an idea of some of what Laura's talking about actually
2 implemented.

3 And I think, you know, we don't want to
4 be held back from lack of exposure in, you know,
5 sharing of knowledge. And I'm not saying that we
6 should wildly go and adopt what others have been doing
7 and testing for a decade, but we need to know better
8 where we are in the grander scheme of things.

9 Thank you. And thanks, Dilip, for your
10 summary.

11 MR. KOMMINENI: Thank you, Nina.
12 Before I get to Harry, I just wanted to see if DOEE or
13 Pepco has any reactions? If not, I'll move on to
14 Harry. At least I would like them to think through
15 this as, you know, as presented here.

16 Harry, back at you.

17 MR. WARREN: Yeah. Thanks. Sorry I'm
18 holding you all up here. Hey, so, you know, I've had
19 the benefit of seeing this presentation from Laura,
20 and a couple other ones that she did, you know, back
21 at our seminar we did in our workshop in December. So
22 one question I would have that may kind of put

1 something concrete, like Nina's talking about as far
2 as the future.

3 A question that we may want to make
4 sure gets addressed at some point is, you know,
5 Laura's talked about, if we think forward to the
6 district's 15 percent penetration goal right now,
7 where are we right now? I think -- are we in the low
8 single digits right now at this point? Are there, you
9 know, Laura talked a lot about these grid-forming, you
10 know, capabilities of the inverters; the fact that
11 they actually have a very important role in
12 maintaining grid stability; right? They're not just
13 there to make sure that they're not messing up the
14 voltage on the distribution line, but they actually
15 have the capability, in some scenarios, to really help
16 manage grid stability.

17 And a question might be for Pepco to
18 opine on, at some point, at what level of penetration
19 and in what parts of their system do those kinds of
20 advanced inverters, like, start becoming those
21 important tools in managing their grid, as opposed to
22 tools that are there almost to make sure that

1 distributed generation isn't messing up their system,
2 if you know what I mean; right? I mean, right now,
3 they have a way of operating their system. We're
4 making sure, through the use of these advanced
5 inverters, that we minimize the amount of
6 interconnection cost we have, and we're good citizens
7 on the grid.

8 But Laura, you know, maybe you could
9 correct me. But as I understand you, there's a level
10 of penetration, and it might be very localized on the
11 Pepco system at first, where, at a high level of
12 penetration, well, by golly, you need these inverters
13 to do more.

14 If I'm understanding that right, I
15 think that might be something to make sure is on our
16 list that makes the future state sort of concrete as
17 to where we want to get to. Did I misunderstand
18 you at all, Laura? Or was that kind of -- am I
19 thinking -- am I getting something out of your
20 presentation that I should be getting?

21 MR. KOMMINENI: Laura, if you're
22 talking, maybe you are muted.

1 DR. WARD: Yeah. So yeah, actually, we
2 have three different levels of penetration. So we can
3 talk about if we have a low penetration, it can be
4 between zero and 20 percent, that actually requires,
5 like, minimum curtailment needed, the grid can usually
6 accommodate variations. And when we are talking about
7 medium penetration, we can talk about 20 percent, and
8 40 percent of, you know, penetration with DERs. And
9 in that case, we normally use curtailment, begins
10 increasing, and also, we estimate that network
11 constraints become visible.

12 And in terms of high penetration, then
13 we can talk about 40 percent penetration, you know, in
14 the conventional system. So this is like, the
15 estimations that we normally use when we are talking
16 about penetration; that the highest penetration is
17 actually exponential increase and curtailment needs.
18 And also, we can consider system flexibility becomes
19 crucial, and yeah. So many other factors, like
20 limiting factors, pre-capacity, minimal load
21 requirements, and yeah, things like that.

22 So basically, we expect to have, like,

1 15 percent solar generation in D.C. We don't
2 necessarily talk about, "This is the high penetration
3 that we can have," but it's higher than what we have
4 today. Based on it, we consider other functionalities
5 of advanced inverters crucial to reach this goal.

6 And that's why our presentation
7 incorporates, for example, the grid-forming inverters,
8 because they have the capability to form networks and
9 also work by themselves, even when we don't have
10 necessarily the conventional power system working,
11 let's say because an outage occurs, and, you know, we
12 don't have power. So in this case, these inverters
13 with these functionalities can continue working to
14 supply critical electricity for critical loads, such as
15 hospitals, and yeah. So we have other different pilot
16 projects that actually have been using this topology
17 of inverters to provide this benefit to the grid.
18 Yeah.

19 MR. WARREN: Well, my reaction to that
20 is that's, like, yet another issue, like, for the
21 future; right? So like, one thing, when I heard you
22 talking about those, it was useful to hear there's

1 different regimes of penetration, and how the
2 functioning of the system changes in those different
3 regimes.

4 You know, again, I haven't run any
5 numbers, but just thinking out loud, you know, if we
6 get to a 15 percent penetration in D.C., again, it's
7 going to be localized; right? There'll be localized
8 areas of much higher penetration, I'm sure, because
9 there's some areas where we may not see that level of
10 high penetration, you know. Or where the business
11 district, a lot of the big buildings that are on spot
12 networks, or the network services, you know, we might
13 see higher penetration more out on the radial
14 circuits, you know, just for other reasons. So you
15 may start to get into some other regimes in the
16 future, and you want to know, like, where you're going
17 there.

18 And then I think your point about
19 during outages, you know, the ability to island, and
20 do those sorts of things, that's a whole other
21 capability of these inverters that's out in the future
22 that can be explored, as well.

1 And I guess the only third thing I
2 would add to that list we haven't talked much about, I
3 think Brian Lydic brought this up in our seminar back
4 in December. The inverters acting together with other
5 controls are going to be necessary if we start talking
6 about when batteries get involved; EVs; V-to-grid. I
7 mean, there's other levels of controls and other
8 standards that come into play in those situations, but
9 the way all of that is going to interact with the
10 inverters, you know, on generation is going to be
11 important, too. So I think that's another one that
12 may be, you know.

13 If, to Nina's point, we're trying to
14 get a feel now for what are some of the concrete
15 things we're going to need to evaluate down the road,
16 those are a few that come to mind, you know. How can
17 we -- in those three areas?

18 DR. WARD: Yeah, for sure. In our next
19 presentation, we are going to be able to present, yes,
20 that interconnection with these advanced inverters and
21 other technologies like EV batteries, microgrids. We
22 are currently working on some regulation for

1 microgrids, as well. We have some pilot projects
2 already deployed in D.C., and yeah, we are working on
3 this presentation for next time.

4 I mean, because, remember, this
5 presentation was postponed. Yeah, that was the
6 initial presentation that we have. But yeah, of
7 course we are working on something more on-site with
8 the current status of the grid in D.C.

9 We were waiting, as well, for the
10 hosting capacity study that was just presented last
11 week. So we still are, you know, reviewing the
12 information that Electrify DC present to us in order
13 to incorporate all the needs, or, you know, the
14 analysis of possible upgrades that we need in the
15 system.

16 MR. KOMMINENI: Thank you, Laura.

17 I think, Harry, if you're all set, then
18 I have Albert LaFrance.

19 MR. LAFRANCE: Yes. Thank you. I'm
20 Albert LaFrance, that's L-A-F-R-A-N-C-E, with Solar
21 Solution.

22 I wanted to just kind of maybe reframe

1 something that we've discussed in this session, and
2 previous sessions, and put this out both to DOEE and
3 the Pepco team, and whatever; just a way of framing a
4 question.

5 At various times, we've talked about
6 two potential means of utilizing advanced inverter
7 features -- high voltage conditions, which, if I
8 understand correctly, are the primary bottleneck that
9 we see for technical issues on interconnection; and of
10 course, we've talked about volt watt controls, where
11 the inverter throttles back power, as needed, to
12 maintain the voltage within limits.

13 And then we also discussed briefly in
14 the last session about what Pepco has, in fact,
15 implemented under their regulations, which is power
16 export limitation. And as I see it, both of those
17 methodologies, power export limitation and volt watt,
18 are different means to achieving the same end. And so
19 I think it would be valuable for us to maybe have some
20 side-by-side comparison discussion of the benefits and
21 drawbacks of those two methodologies to meet the
22 overall goal.

1 And again, this would would be for, you
2 know, both for Pepco, DOEE, and anyone else who has --
3 probably IREC, who has experience and knowledge with
4 that. So I just wanted to kind of put those two
5 things on the table side-by-side for discussion.
6 Thank you.

7 MR. KOMMINENI: So it looks like one is
8 the Volt-Var control, other one was the power export
9 limitation. So --

10 MR. LAFRANCE: Limitation control.

11 MR. KOMMINENI: Limitation control.

12 MS. DODGE: Albert, wasn't that a
13 volt -- weren't you speaking of volt watt?

14 MR. LAFRANCE: Yes. So basically,
15 yeah, we've been talking about volt watt control, but
16 then also, there is another modality which is what's
17 implemented in Maryland. The inverter simply
18 maintains a utility-specified maximum power export.

19 So both of them ultimately end up
20 controlling the power export. The volt watt does it
21 based on what the voltage is; the export limitation
22 simply maintains a maximum export determined by the

1 utility and agreed by the customer. So I think one of
2 the issues in comparing those two is that, you know,
3 who takes the risk, basically, of the curtailment, or
4 how the risk of curtailment is assessed when you're
5 using volt watt control? To some extent, the
6 curtailment is at the mercy of conditions beyond the
7 customer -- control affect voltage on that segment of
8 the grid, whereas with an export limitation
9 arrangement, the customer would know ahead of time
10 that this is going to be your maximum export, based on
11 an agreement with the utility, as part of the
12 interconnection. So I think there are benefits and
13 drawbacks to both, but I just thought it would be
14 useful to look at them side-by-side.

15 MR. KOMMINENI: So I'm just thinking.
16 John, sorry to put you on the spot.
17 Any thoughts on that? Or based on your presentation,
18 is there something that you can share, or --

19 MR. BUDD: Yeah. Sure. I can give
20 some opinions on that.

21 So from my perspective, it depends on
22 what type of problem you're addressing. So if you're

1 addressing a thermal overload problem, or a reverse
2 power flow problem, the limited export option is
3 probably the better way to go.

4 If you're directly trying to address a
5 power quality issue, then I feel like using one of
6 those Volt-Var, or volt watt, whatever we're talking
7 about, one of those types of functionalities, is going
8 to be the better way to go.

9 But in theory, I mean, Albert's
10 correct. You could, in theory, use either one to fix
11 a voltage problem; it's just, you know, what's the
12 better way to go? That's just my opinion -- if a
13 better way to go is to match volt watt with voltage
14 problems, and limited export with thermal and reverse
15 power flow problems.

16 MR. KOMMINENI: Thanks, John.

17 Albert, does that help?

18 MR. LAFRANCE: Yeah. That is exactly
19 the kind of opinion that I was looking for, yeah.
20 Because, you know, there are two different ways that
21 ultimately lead to the same thing. To some extent,
22 there's sort of a risk allocation that, with the

1 limited export agreement, a little more of the risk
2 maybe is on the utility, because the utility's telling
3 the customer, "As long as you limit your export to X
4 kilowatts, you're good." Whereas with volt watt, a
5 little more of the risk is on the customer, because
6 the customer agrees to throttle back their output to
7 maintain the system voltage. So that's just another
8 aspect, or way of looking at it.

9 But yeah, John's comment was exactly
10 what I was interested in. Thank you.

11 MR. KOMMINENI: Perfect.

12 I don't see any other questions.

13 Again, thank you, Laura, for the
14 presentation. If you can share that material, that'd
15 be helpful.

16 Moving on to the next item, I think
17 we're going to be looking at the next steps. But one
18 thing I want to touch upon is I know there were a few
19 questions to Pepco. And maybe, Taylor, if you can
20 share those questions and responses, and if you need
21 to expand on any of those, that would be helpful.

22 MS. BECKHAM: Sure. I can share my

1 screen with them. I don't think we have anything to
2 expand on. I'm not -- I hope we have the right people
3 on the call. But I can show we circulated them, let
4 me just see here, last week. And I think you have our
5 positions. Our response is pretty straightforward
6 here. There we go.

7 So I mean, I think we'd be happy to
8 take questions on the responses that we sent in. And
9 if there's something that we can't answer on the phone
10 here -- just looking at who we have.

11 THE REPORTER: I think either the audio
12 went out, or did someone freeze? Did you freeze,
13 Ms. Taylor?

14 MS. BECKHAM: I may have. Can you
15 folks hear me now?

16 MS. DODGE: Yes.

17 MS. BECKHAM: Okay. I said I think we
18 sent these around last Wednesday, and they should be
19 in the box.

20 MR. KOMMINENI: Yes. Thank you,
21 Taylor.

22 So if folks have any follow-up

1 questions, send it to us. We will work with Pepco to
2 respond. That said, I think those are the only items
3 I had for today's session.

4 For the upcoming session, if you have
5 any topics you would like us to discuss, or if you
6 want to present anything, just share with us, and we
7 will take that in.

8 And I have one more. I see Albert,
9 your hand is up.

10 MR. LAFRANCE: Yes. Thank you.

11 Yeah, just in regards to the upcoming
12 agenda, I was interested in possibly presenting some
13 specific proposed rule changes related to advanced
14 inverters, and was wondering if that would be
15 appropriate for the next session.

16 MR. KOMMINENI: So Albert, if you can
17 send that to us, we'll look, and I will touch base
18 with Brian, and I'll try to add it for the next
19 session.

20 MR. LAFRANCE: Okay. Thank you. I
21 will get that to you. Thank you.

22 MR. KOMMINENI: Yeah. Too, and if you

1 can copy --

2 THE REPORTER: Can you repeat the last
3 name, Mr. Dilip?

4 MR. KOMMINENI: And I believe we do
5 have an another educational session by IREC, which is
6 going to be scheduled for April 15th. I'm not sure if
7 the invite has been sent out, but if not, we will send
8 it out shortly. That's going to be just a virtual,
9 and it'll be recorded if folks miss the session.

10 With that, I think, pretty much, I have
11 everything covered. I think Kunle has his hand
12 raised.

13 MR. ADEYEMO: I just wanted to confirm
14 that DOEE was going to add their presentation to the
15 box, or email it around.

16 MR. KOMMINENI: Yes. So Laura, if you
17 can send it to the whole team, or if you can send it
18 to me, I'll add it to the box so that it's available.

19 DR. WARD: All right. Thank you.
20 Yeah.

21 MR. KOMMINENI: Thank you.

22 MS. BECKHAM: Also, Laura, I put in the

1 chat, are we able to get, I think you mentioned a
2 draft report about what's been done until Q4 2024. If
3 you have that, do you think you can drop that, or
4 circulate that to the group, as well, please?

5 DR. WARD: Yeah, yeah. For sure. Yes.

6 MS. BECKHAM: Thank you.

7 DR. WARD: So we actually sent the
8 presentation and the draft one month ago to Brian.
9 But for any reason maybe he didn't circulate that, but
10 yeah, I'm going to do that right now.

11 MR. KOMMINENI: Yeah, that'd be
12 helpful. I know Brian is on leave right now, so
13 that's why I couldn't find the material. So if you
14 can send that around, that would be helpful.

15 DR. WARD: All right.

16 MR. KOMMINENI: And I do see Harry. Go
17 ahead.

18 MR. WARREN: Yeah. Dilip, do we have a
19 date for the next -- beyond the 15th, do we have a
20 date for our next meeting here?

21 MR. KOMMINENI: Yes. For this one, I
22 was going to look up -- I think the next one would be

1 May 15th --

2 MR. WARREN: May 15th?

3 MR. KOMMINENI: -- which is a Thursday
4 from ten to twelve.

5 MR. WARREN: Okay. Thanks.

6 MR. KOMMINENI: And I will send out the
7 notes so that you can have it in the calendar.

8 MR. WARREN: Thank you.

9 MR. KOMMINENI: Anything else before we
10 wrap up? Okay, then. Thank you all. Thanks for
11 participating, and thanks for presenting. I'll catch
12 up in the next session. Have a great day.

13 MS. BECKHAM: Thanks, everyone.

14 MR. WARREN: Thanks, everyone.

15 MR. KOMMINENI: Bye-bye.

16 MR. LAFRANCE: Thank you.

17 (Whereupon, the meeting concluded at
18 11:41 a.m.)

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