

Chat Log Zero Emissions by 2040 Technical Conference

from George Diamantopoulos to everyone: 10:08 AM

Is the study referenced by Ms. Anderson available for review and if so where?

from Josh Berman to everyone: 10:09 AM

In incorporating historical weather patterns, did you attempt to incorporate impacts of forecasted climate change?

from Lindsay Anderson to everyone: 10:10 AM

@Josh Berman - yes we did the baseline with the historical patterns, then we did have a follow on study that includes potential climate change scenarios.

from Anshul Gupta, NYCP to everyone: 10:12 AM

Ms. Anderson mentioned that the study was based on scoping plan recommendations. Did it include the energy efficiency measures mandated by NYC Local Law 97?

from Lindsay Anderson to everyone: 10:13 AM

@George Diamantopoulos: the advance version is available here: <https://arxiv.org/abs/2307.15079>

from Chuck McCall to everyone: 10:15 AM

In the study, did Professor Anderson remove all fossil from the supply stack by 2040 as contemplated? Was there an alternative study (sensitivity) performed where a certain amount of repurposed (decarbonized) conventional infrastructure remained? If so, what were the observations/conclusions?

from Lindsay Anderson to everyone: 10:17 AM

@Anshul Gupta - we use the NREL data for electrification of buildings. using the whole-home electrification high-efficiency representation for residential buildings and a High performance electrification for commercial buildings.

from Josh Berman to everyone: 10:18 AM

Thank you, @Lindsay Anderson! Time permitting, I would be interested in how the modified assumptions impacted the timing and magnitude of the "gap."

from Roger Caiazza to all panelists: 10:18 AM

How should the PSC define the magnitude and duration of the renewable energy resource lull worst case

from John Koroglu PSEG LI to everyone: 10:22 AM

is this presentation available for public?

from Zach Smith NYISO to everyone: 10:26 AM

See all of our studies at <https://www.nyiso.com/library>

from Zach Smith NYISO to everyone: 10:27 AM

The Outlook: <https://www.nyiso.com/documents/20142/33384099/2021-2040-Outlook-Report.pdf>

from Zach Smith NYISO to everyone: 10:28 AM

Our recent Comprehensive Reliability Plan, which discusses the concept of DEFRs:

<https://www.nyiso.com/documents/20142/2248481/2023-2032-Comprehensive-Reliability-Plan.pdf>

from Lindsay Anderson to everyone: 10:30 AM

@Chuck McCall - yes, we removed all fossil generation in our analysis. we have a sense of what is needed in terms of capacity to manage the power shortfalls, but location is critically important.

from Zach Smith NYISO to everyone: 10:34 AM

For anyone interested, we will coordinate with DPS to share the slides

from Roger Caiazza to everyone: 10:35 AM

The new problem with the weather dependent resources is that they correlate. All the offshore wind could drop off a lot in a short time. How does that affect n-1-1 planning?

from Lindsay Anderson to everyone: 10:51 AM

@John Koroglu - yes. we see a general shift to winter peak, but summer weather patterns (esp under potential climate futures) could increase load significantly and impact on hydro availability, which is our best current emission free resource that provides all the important characteristics that Zach articulated in his slides.

from Tim McClive to everyone: 10:56 AM

Do the panelists' separate studies presume that 70 y 30 will occur? As reported in Politico today, about one third of awarded onshore projects have been cancelled since October, comprising 3 GW of new renewable capacity and 159 MW of storage. It appears that investors and equity sources are not flocking to NY, so the risk of not meeting 70 by 30 may be growing.

from Anshul Gupta, NYCP to everyone: 11:39 AM

NYCP documented National Fuel Gas' disinformation campaign that Clarke mentioned in comments on NFG's long-term gas plan:

<https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={30F76A8A-0000-C53A-9691-A15F98873017}>

from Richard Corash to everyone: 11:47 AM

GM –We've discussed NYC load requirements and environmental consciousness towards disadvantaged communities, Regarding upstate impacts: Generically, Solar presently utilizes 6+ acres of land per MW and land based wind farms utilize approximately 60 acres of land per megawatt, will the increase in planned solar real-estate needed during the transition advertently offset NY's agricultural production or is technology expected to advance in the near term and possibly mitigate that potential effect?

from Eric Walker to everyone: 11:56 AM

I'll suggest that the attendee review the CAC's Local Government and Land Use Advisory Panel's recommendations. This tension between renewables and ag was approached there as well.

from Lew Daly to everyone: 12:04 PM

Hi Richard I agree that impacts on agriculture must be carefully considered as well as local decisionmaking? I think the Clean Path transmission planning process was generally considered to be a good process in those aspects.

from Abbey DeRocker to everyone: 12:04 PM

See also New York State's Agricultural Technical Working Group <https://www.nyatwg.com/>

from Richard Corash to everyone: 12:07 PM

Thanks to Eric, Lew and Abbey for your insights and references. Very helpful!

from Abbey DeRocker to everyone: 12:09 PM

one more - the Farmland Protection Working Group <https://agriculture.ny.gov/land-and-water/farmland-protection-working-group>

from Chris Casey NRDC to everyone: 12:15 PM

How many pipefitters are there in NY? What is the avg age of their union members AND their avg age of retirement?

from John J Murphy to everyone: 12:17 PM

approximately 18K active members

from Eric Walker to everyone: 12:18 PM

I also want to surface that "community" shouldn't be exclusively the domain of nonprofits and that local government as well as CBOs can benefit from direct pay and that some reconsideration of "public-private-partnership" may be in order.

from Chris Casey NRDC to everyone: 12:30 PM

I realize this last panel is finish but noting my curiosity about what subset of those 18K pipefitters work on the gas system? From John's answer, it sounds to me like even if NY pursued electrification to fullest extent possible, there would be more than enough work over the next few decades for every current pipefitter to retire as pipefitter. Not enough jobs for the current generation of pipefitters does not seem like an actual problem we are facing. It would be helpful to know if labor is hearing something different from their employers. Or if the real problem is something else like needing new generations of pipefitters to support the pensions of the prior generations.

from Roger Caiazza to everyone: 1:25 PM

Do these resources fulfill the DEFR characteristics described by Zach Smith. Not sure they would be available during the worst case winter wind lull situations

from Tim McClive to everyone: 1:36 PM

I agree with Roger's question and direction. Please comment on this.

from David Nemetzow to everyone: 2:11 PM

And also there are at least three quickly growing areas with potential here: EV charging (incl buses not just cars), "smartness" (that can be optimized for energy performance, not just convenience and security), and stationary batteries (used often for reliability/resilience but available for DER/VPPing)

from David Nemetzow to everyone: 2:14 PM

i have to jump right now, thx. I'm at david.nemetzow@hq.doe.gov

from Greg Geller - Stack Energy Consulting to everyone: 2:16 PM

To the last question, check out the DER case studiesL <https://aem-alliance.org/policy/white-papers/>

Day 2

from Raymond Albrecht to everyone: 9:39 AM

Are liquid renewable fuels such as biodiesel and renewable diesel also under consideration by the PSC? Such fuels have been used for power generation elsewhere in the US.

from Irene Weiser to everyone: 9:51 AM

CLCPA prohibits CCS for power generators. Is consideration being given to changing that?

from Anshul Gupta, NYCP to everyone: 9:56 AM

Also, the refining can never be 100%. Just like the pipeline-grade RNG will still have a few % CO2, the CO2 stream released after separation will have a few % methane.

from Valdi Weiderpass to everyone: 10:00 AM

If our grid is being considered to have ramping power plants run from methane, with CCS, who would be responsible for making sure there is NOT so much fugitive methane emissions, and CO2 emissions, that the claimed (typically self-monitored and reported by industry as way too low compared to independent measurements), that it would not overwhelm claimed performance. If too much leakage, the result is not Zero emissions, but actually still a driver of greenhouse effect.

from Valdi Weiderpass to everyone: 10:02 AM

Also, how will we be assured that the carbon dioxide sequestration (storage) is actually permanent, for more than at least a thousand years, or whatever climatologists think is adequate?

from Irene Weiser to everyone: 10:07 AM

What are lifecycle impacts of injecting CO2 for storage?

from Valdi Weiderpass to everyone: 10:07 AM

RNG from biodigesters should be used on-site to feed an electricity generator, rather than piped or trucked elsewhere, in order to minimize safety risk and minimize fugitive methane emissions.

from Dietmar Detering to everyone: 10:13 AM

how realistic is the option of turning bio methane into a liquid synfuel?

from Pervez Khaled to everyone: 10:13 AM

would someone touch on the cost aspect of maintaining small percentage of natural gas/RNG generation?

from Raymond Albrecht to everyone: 10:17 AM

There is a huge global potential for renewable fuel feedstock production. Just need to ban deforestation of rain forests and focus instead on reforestation of arid tropical regions using drought-tolerant, salt-tolerant plants/vegetation. The United Nations Development Programme has started serious work in sub-Saharan regions of Africa. Great opportunity for 3rd world farmers to start earning living wage using sustainable agri-fuel production.

from Valdi Weiderpass to everyone: 10:24 AM

Why would you not build other forms of energy storage that are much more proven and have no or very low risk of fugitive emissions, instead of considering this risky idea of methane with CCS? Battery costs and performance keep getting more attractive as time goes on.

from Raymond Albrecht to everyone: 10:26 AM

With the right framework of regulation and economic incentives it should be possible to steer renewable gas production toward ethane/butane/propane production then put together a synthetic blend of non-methane gases.

from Chuck McCall to everyone: 10:26 AM

Per the expert panels yesterday, it became apparent that no amount of wind, solar, storage (e.g., batteries, VPP), and transmission can keep the lights on, in particular in the winter & summer time (when needed the most) and in urban areas (a social justice concern). How do the panelists see the role/viability of decarbonized conventional infrastructure (hydrogen, biofuels, CCUS) in helping solve that gap and aide with the CLCPA environmental justice objectives (while keeping lights on)?

from Valdi Weiderpass to everyone: 10:27 AM

And yes, my reading of CLCPA is that page 13, of the text prohibits alternative means (such as CCS) of meeting greenhouse gas reduction mandated targets. Here's excerpt "f. Sources in the electric generation sector shall not be eligible to participate in such mechanism."

from Valdi Weiderpass to everyone: 10:30 AM

'No Miracles Needed' by Mark Jacobsen says we can transition to renewables without exotic means.

from Rachel Thomas to everyone: 10:34 AM

Its hard to hear Davic Cohn

from Valdi Weiderpass to everyone: 10:35 AM

It is by Mark Z Jacobson. <https://web.stanford.edu/group/efmh/jacobson/WWSNoMN/NoMiracles.html>

from John to everyone: 10:39 AM

The NYPA test had significant issues from what was reported. This seems to be misleading based on what was reported.

from Amanda Trinsey to everyone: 10:41 AM

Does retrofitting with hydrogen impact/degrade other parts of the generator?

from Amanda Trinsey to everyone: 10:41 AM

degrade*

from Roger Caiazza to everyone: 10:44 AM

The scoping plan uses green hydrogen as the place holder for DEFR. Please speak to the feasibility and affordability of that presumption.

from Valdi Weiderpass to everyone: 10:50 AM

Why would you not put the hydrogen electrolyser close to where you would use the hydrogen?

from Dror Ladin to everyone: 10:51 AM

What is the leakage profile of pure hydrogen pipelines extending over significant distances?

from Christopher Wentlent to everyone: 10:51 AM

Being we are starting from a limited supply; what in your opinion are the best near term uses and sectors for hydrogen utilization ?

from Valdi Weiderpass to everyone: 10:52 AM

If you use hydrogen in combustion derived power you end up with nitrogen oxides which is a greenhouse gas.

from John to everyone: 10:55 AM

Again, I must be missing something. If I read correctly NYPA stopped the test because they were exceeding their NOx limit.

from Valdi Weiderpass to everyone: 10:57 AM

From EPA website: ' Nitrous Oxide (N2O) has a GWP 273 times that of CO2 for a 100-year timescale. N2O emitted today remains in the atmosphere for more than 100 years, on average. '

from Valdi Weiderpass to everyone: 10:58 AM

GWP is global warming potential. Even small amounts of NOX emissions will be a huge problem for climate!

from Valdi Weiderpass to everyone: 10:59 AM

OK. Sorry.

from Irene Weiser to everyone: 11:00 AM

NOx emissions are no laughing matter

from Madison Hertzog "MOCEJ" to everyone: 11:09 AM

I suggest reading 'Atmospheric implications of increased Hydrogen use' by Nicola Warwick, Paul Griffiths, James Keeble, Alexander Archibald, John Pyle, University of Cambridge and NCAS and Keith Shine, University of Reading. The paper discusses leakage and highlights CH4 response to changes in atmospheric H2.

from Madison Hertzog "MOCEJ" to everyone: 11:09 AM

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1067144/atmospheric-implications-of-increased-hydrogen-use.pdf#:~:text=Leakage%20of%20hydrogen%20into%20the%20atmosphere%20will%20decrease,lifetime%20of%20methane%20and%20its%20impact%20on%20climate.

from Valdi Weiderpass to everyone: 11:12 AM

Is PSC going to consider Virtual Power Plants (VPP, using batteries in EVs, home energy storage systems, business based energy storage systems, and timed demand response from electricity users) to help fill in gaps from intermittency of renewable energy?

from Christopher Wentlent to everyone: 11:13 AM

If we utilize hydrogen for transportation do we also reduce our electric T&

from Pervez Khaled to everyone: 11:13 AM

can anyone touch on the cost aspect of the transition phase? maybe there is an end cost optimized stage, but the transition will require maintaining multiple commodities; hence the affordability could be in question as we know most infrastructure investments are normally made for long term

from Christopher Wentlent to everyone: 11:13 AM

D buildout needs going forward?

from Deric Tilson to everyone: 11:18 AM

How do you determine the opportunity cost of investing money into research and building infrastructure of the various fossil fuel alternatives, especially when considering permitting and administrative barriers? "If we just invest \$X amount of money" has been brought up several times, but there is no amount of money that will solve institutional constraints that may prevent solutions from being built. Yesterday, it was suggested a new department could be created to expedite projects by mediating between developers and local/state agencies. This seems like a good start, but what other advances could be made to lower such costs?

from Hector P. Raymond to everyone: 11:25 AM

How long was the test duration on NYPAs GT?

from Anshul Gupta, NYCP to everyone: 11:26 AM

Here is the link to the epri report:

<https://restservice.epri.com/publicdownload/000000003002025166/0/Product>

from Christopher Wentlent to everyone: 11:26 AM

The DOE is considering hourly matching of renewable energy with new hydrogen production - will this requirement have any impact on the buildout of the hydrogen infrastructure in your opinion?

from Anshul Gupta, NYCP to everyone: 11:29 AM

According to the EPRI report, NOx emissions increased by 24%. Maybe still under limits, but a significant increase even at 44% volumetric (15% by energy content) blending.

from Jeffrey Goldmeier to everyone: 11:30 AM

This is a link for the EPRI executive summary for the Hydrogen Co-firing Demonstration at the New York Power Authority's Brentwood Power site.

<https://www.epri.com/research/products/000000003002025166>

from Mark Younger to everyone: 11:31 AM

How easy would it be to ramp the hydrogen generation up and down so that it could produce most or all of the hydrogen when there was excess renewable generation?

from Stephen Wemple to everyone: 11:33 AM

The reported increase in NOx emissions was at the GT exhaust but that was mitigated by the plant's existing post-combustion emission controls.

from Josh Berman to everyone: 11:52 AM

Are there safety concerns with relicensing nuclear reactors beyond 60 or 80 years? If so, can those be mitigated?

from Allan Page to everyone: 11:58 AM

Would a combined nuclear and hydrogen generation plant effectively make the nuclear dispatchable?

from George Diamantopoulos to everyone: 12:04 PM

What is the expected average cost increase to ratepayers in implementing nuclear?

from Valdi Weiderpass to everyone: 12:06 PM

Nuclear industry has a long history of over-promising and under-delivering, with huge cost over runs and delays in construction. There are risks in getting the fuel and processing it as well. We don't have 10 years to build nuclear. We need huge buildout of clean energy by 2030 or so.

from Valdi Weiderpass to everyone: 12:07 PM

We have public resistance (NIMBY) regarding relatively benign wind and solar. Imagine the public pushback to nuclear.

from Allan Page to everyone: 12:08 PM

Utilities in NY tried the SNR standard nuclear reactor probably 40 years ago and got no where with it. Economics did not carry the day.

from Pervez Khaled to everyone: 12:11 PM

could you please touch on the aspect of inelastic aspect of nuclear in a more dynamic future electric system from maintenance (only few months given dual peake systems) as well as the resulting output drops from renewables? additionally how would you manage the risk and resiliecne of so much generation cetralized in one location?

from Anshul Gupta, NYCP to everyone: 12:15 PM

How about district heating?

from Valdi Weiderpass to everyone: 12:17 PM

<https://web.stanford.edu/group/efmh/jacobson/WWSNoMN/NoMiracles.html>

from Mark Saltsman to everyone: 12:18 PM

How does the micro reactor differ from the reactors used by the Navy in its ships?

from Valdi Weiderpass to everyone: 12:30 PM

Thanks for your comment on No Miracles Needed.

from Ramesh Koripella to everyone: 12:30 PM

very informative session on nuclear energy. Thank you all the panelists.

from Mark Saltsman to everyone: 12:31 PM

Well done indeed

F

rom Anshul Gupta, NYCP to everyone: 12:31 PM

Not only did we replaced most of Indian Point egeneration with gas, closing Indian Point is why we are having problems with closing the NYC peaker plants. So there are environmental justice implications of not valuing nuclear.

from Julie Kozeracki to everyone: 12:32 PM

julie.kozeracki@hq.doe.gov

Closing remarks