CITY COUNCIL
CITY OF NEW YORK

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TRANSCRIPT OF THE MINUTES

of the

COMMITTEE ON ENVIRONMENTAL PROTECTION

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February 17, 2011
Start: 1:15 pm
Recess: 4:00 pm

HELD AT: Committee Room
250 Broadway, 16th Fl.

B E F O R E:
JAMES F. GENNARO
Chairperson

COUNCIL MEMBERS:
G. Oliver Koppell
Peter F. Vallone, Jr.
Elizabeth Crowley
Stephen Levin
James Vacca
James Sanders, Jr.
Letitia James

A P P E A R A N C E S (CONTINUED)

Sergej Mahnovski
Senior Advisor to Commissioner Holloway
NYC DEP

Anthony Fiore
Chief of Staff to Deputy Commissioner for Operations
NYC DEP

Frank Zammataro
President and Founder
Rentricity, Inc.

Ron Smith
Chief Executive Officer
Verdant Power

Josh Kanagy
Director of Business Development
Lucid Energy Technologies, LLP

CHAIRPERSON GENNARO: Thank you, thank you. We're not actually starting yet, I'm just--hey, Bill--just saying hi and sorry that we're a little late getting started, sorry that it was a little bit of a mix-up with the rooms. Going through the list of sorrys here, I'll say sorry the last time we were supposed to have this meeting, it snowed or had a tornado, whatever it was. We'll put things in order in just about two minutes, we'll get going then. Thanks.

[Off mic]

FEMALE VOICE: How you doing?

CHAIRPERSON GENNARO: Hi.

[Off mic]

FEMALE VOICE: Long time no see.

CHAIRPERSON GENNARO: Yeah, I know, I know.

[Off mic]

CHAIRPERSON GENNARO: Yeah, I just…. Thank you.

[Off mic]

FEMALE VOICE: After the administration [off mic] this guy here, he's [background noise] go first 'cause he has another-

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[background noise]

SERGEANT-AT-ARMS: Anytime you're ready.

CHAIRPERSON GENNARO: [Off mic] statement?

[Off mic]

FEMALE VOICE: You're opening statement? Of course.

CHAIRPERSON GENNARO: I mean, I know--

[Off mic]

CHAIRPERSON GENNARO: Lucky stiff.

[Off mic]

CHAIRPERSON GENNARO: I wish I was where he is, he is.

MALE VOICE: No, you don't, no, you don't.

CHAIRPERSON GENNARO: I think I do.

[Off mic]

CHAIRPERSON GENNARO: Okay. Sergeant, we're ready to go?

SERGEANT-AT-ARMS: Yes.

CHAIRPERSON GENNARO: Okay.

SERGEANT-AT-ARMS: You're ready to go. Quiet, please.

CHAIRPERSON GENNARO: Okay. Thank you, thank you and good afternoon, my name is Jim Gennaro, Chair of the Committee on Environmental Protection. Today, the committee will hear testimony on New York City's hydropower capacity, present and future opportunities.

New York State ranks third in hydropower-producing states according to the Energy Information Administration and our hydroelectric power generation is the highest of any state east of the Rockies--I didn't know that. But by far the vast majority of hydropower generate comes from just the Niagara Power Project, which is of course located on the Niagara River just downstream from the falls. New York City, we think, has yet to fully utilize the hydroelectric generation potential that exists as a result of city-owned dams on a substate reservoirs, although they've done some many wonderful things with that, we'll be hearing about that from DEP today--where was I--that exists as a result of city owned dams on a substate

reservoirs, rivers, and streams that it controls and its 14 city-owned sewage treatment plants, we'll be talking about that somewhat today.

Yet, New York City manages a water supply that provides a billion gallons of water a day to residents in New York City and other nearby areas. The water is delivered from a watershed located 125 miles away and is delivered almost entirely by gravity.

The New York City water supply system includes 19 reservoirs and three controlled lakes, along with 7,000 miles of water mains, tunnels, aqueducts which deliver water to city residents and businesses. The water utility infrastructure also includes 7,400 miles of sewer lines which take wastewater to the city's 14 sewage treatment plants.

While no specific assessment of the city water supply system's hydropower potential has been undertaken by the Idaho National Laboratory--these are folks who were in for the last hearing that we were going to have on the 27th and we couldn't have the hearing, but I did talk to them at length over the phone. So while

they have not undertaken a study of New York City--which they're the entity, I am told, that is charged with analyzing America's hydropower resources by the U.S. Department of Energy. According to a 1998 assessment of undeveloped hydropower in New York State, 25% of undeveloped hydropower is located in the Hudson River Valley.

The New York City DEP has already issued an RFEI, a Request for Expressions of Interest, from entities interested in designing, building, financing, and/or operating hydro plants on four of the city-owned dams and reservoirs in upstate New York: The Cannonsville, Pepacton, Never sink, and Schoharie reservoirs. According to the DEP, hydro generated from these four city-owned dams upstate could generate as much as 45 megawatts of energy in the city and upstate--enough to power approximately 4,000 homes.

Renewable energy solutions such as hydropower are part of New York City's future and we must continue to envision and expand upon these kinds of ideas. U.S. Energy Secretary Steven Chu noted last year that, "There is no one solution to the energy crisis, but hydropower is clearly part

of the solution and represents a major opportunity to create clean energy jobs. Investing in our existing hydropower infrastructure will strengthen our economy, reduce pollution, and help us towards independence."

By continuing to examine New York City's renewable energy resources such as hydropower, the city will continue to demonstrate its great leadership in sustainability and long-term planning.

We're going to be hearing from the Administration.

Now let me just kind of add a little coda to this statement, and I know my staff has talked to some folks about more traditional forms of hydropower, there are also more high-tech kinds of mechanisms that could be placed inside aqueducts and [off mic] plants and that kind of thing. And I know DEP has given some thought to this, I'm very proud of their efforts to date, but we want to hear some people who are in hydropower business that I think could shed some light on where the city might be able to go.

So this proves to be--hope will

prove to be quite a good hearing.

Sorry, it got delayed on the 27th, sorry we're off to a late start today. Let me introduce my patient--no, the list, the list of the people who have been here--my patient colleagues.

Now before we had Council Member Koppell was here, Council Member Vallone is in the midst of chairing another hearing, they were here, I'm happy that they have an interest in this topic, and we're joined by Council Members Crowley and Levin, two members of this committee, grateful to have them here today.

And without further ado, we'll call the witnesses from DEP: Anthony Fiore, Anthony Fiore, I would ask Anthony to write bigger in the future, Anthony, I'm getting older, so as I get older, you have to write bigger, okay?

ANTHONY FIORE: Good.

CHAIRPERSON GENNARO: And also from DEP, looks like Sergej, I can't really read the last name but--

[Crosstalk]

CHAIRPERSON GENNARO: Okay, okay.

Had it been written clearly, I would have been able to pronounce it, but it was not written clearly, so that's two DEP people so far with challenged handwriting, okay. Oh, that's it for DEP, okay.

And we have Rick Muller in the audience, great guy from DEP that--so I'm very grateful to have the folks from DEP. I normally try to give people that haven't testified before the committee before from DEP a little bit of a hard time, so, you know, you took your baptism with great grace and I appreciate that. And what I would ask--okay, this is probably a good time to ask the counsel to the committee Samara Swanston to swear in the panel, after which you can state your names for the record and proceed with your good testimony.

SAMARA SWANSTON: Gentleman, would you please raise your right hands. Do you swear or affirm to tell the truth, the whole truth, and nothing but the truth today?

SERGEJ MAHNOVSKI: I do.

ANTHONY FIORE: Yes, yes.

CHAIRPERSON GENNARO: Okay. Thanks

very much, grateful to have you here. I was just with DEP last night, we had a town hall regarding the new water meters, there have been--people think there's some kind of issues with those meters and I wanted to kind of lay that to rest and we had a good town hall last night. So I was with Joe Singleton and Mark Lanigan, so this is just--I was with DEP last night, with them today, and that's a good thing. So, please, continue.

SERGEJ MAHNOVSKI: Good afternoon, Chairman Gennaro and members. I'm Sergej Mahnovski, Senior Advisor to Commissioner Holloway and Director of our new Energy Team at the New York City Department of Environmental Protection. With me this afternoon is Anthony Fiore, Chief of Staff to our Deputy Commissioner for Operations, Katherine Garcia. Anthony has worked extensively on our energy projects and on the issues connected with--

SERGEANT-AT-ARMS: [Interposing] Speak into the microphone, please.

SERGEJ MAHNOVSKI: Sorry. Anthony has worked extensively on energy projects and the issues connected with our proposal for new

hydroelectric facilities, which I will talk about in a minute.

On behalf of Commissioner Holloway, thank you for the opportunity to speak about DEP's hydropower strategy. On November 22nd of last year, DEP released a Request for Expression of Interest for the development and financing of four hydroelectric facilities on the city's upstate reservoirs.

Before going into more detail on the current and proposed hydropower facilities, I would like to put this RFEI in context by describing the energy initiatives and responsibilities Mayor Bloomberg has tasked DEP with exploring and developing. As you know, on November 22nd, Deputy Mayor Goldsmith announced that the city's energy policy and planning functions, which were formerly housed at the City's Economic Development Corporation now reside at DEP.

As one of the largest energy consumers in the city, DEP has a strong interest in keeping energy clean, reliable, and affordable, and we are well-situated to take a leadership role

in the Mayor's efforts to reduce greenhouse gas emissions from city agencies by 30% by 2017.

DEP is going to be working with key energy regulators, including the Public Service Commission, Federal Energy Regulatory Commission, and other key energy-related entities such as New York Independent System Operator and NYSERDA on energy issues affecting city residents and taxpayers. DEP will also work with the Mayor's Office of Long-Term Planning and Sustainability, as well as the Department of Citywide Administrative Services to develop and implement the city's long-term energy strategy. This strategy includes demand reduction, clean energy generation, and other initiatives. By combining the policy-making functions with DEP's existing capital investment planning expertise, its large asset base, and its technical expertise in water, wastewater, and energy systems, the city will be in a better position to meet these energy needs and goals of the future.

From the wastewater treatment plants throughout the five boroughs to the reservoirs upstate, DEP has a unique asset mix

that, in partnership with local utilities and the private sector, can be harnessed to generate clean power--clean energy, that is. DEP expects to invest more than $200 million over the next four years in projects that include clean energy and energy-efficiency technologies for its facilities in support of its core utility function. This includes such potential projects as harnessing solar energy at our Port Richmond facility, a wind turbine at Oakwood Beach, harnessing energy at our landfills, and utilizing digester gas from our wastewater treatment facilities. DEP has also requested in a separate RFEI that proposers [phonetic] look at the prospects for generating power and steam at Wards Island Wastewater Treatment Plant by using gases produced in the sewage treatment process. These public-private initiatives could generate up to 45 megawatts of clean energy in the city and upstate, improving the reliability of the city's energy grid, and also reducing greenhouse gas emissions.

Last week, Mayor Bloomberg and Commissioner Holloway launched Strategy 2011 to 2014, which includes 100 specific commitments to

fulfill DEP's mission to provide clean waters, fresh air, and also an aggressive energy policy, and a bright future for New Yorkers. You can read about our energy strategy and all 100 initiatives on our website, www.nyc.gov/dep.

A core energy strategy for DEP is to use our unique asset base, like our upstate reservoirs, to generate clean, renewable energy. Currently, our upstate water supply system hosts five operating hydropower facilities, including two that DEP itself owns, where the energy inherent in the flow of water from high to low elevation is used to move turbines that generate electricity without burning any fuel. There are four additional locations in our water supply system that are the subject of the Request for Expression of Interest that brings us here today.

The city currently holds a preliminary permit issued by FERC, that's the Federal Energy and Regulatory Commission, to evaluate the development of hydro facilities at three dams in the Delaware watershed--those are Cannonsville, Pepacton, and Neversink--and one at the Catskill watershed--Schoharie. Water from the

reservoirs is released for conservation purposes and to comply with downstream flow targets in the main stem of the Delaware River, as prescribed under 1954 U.S. Supreme Court Decree. This water, along with water that would otherwise spill, is available for energy production.

Preliminary estimates indicate these four facilities could produce something on the order of 15 megawatts of renewable energy, which is equivalent to offsetting 16,800 metric tons of greenhouse gases, which is roughly equivalent to removing approximately 3,200 cars from the road.

This project is an important part of DEP's commitment to PlaNYC's goal of reducing greenhouse gas emissions by 30% from municipal sources by 2017, as well as a reduction overall in the city by 2030.

Electricity generation from this project may offset purchased energy directly and reduce demand from the electricity grid. We are currently investigating the economics of these projects, which could generate revenues from the sale of electricity, and potentially qualify for

other sources of value within the state's Renewable Portfolio Standard. By having the city develop these facilities, DEP can continue to perform its job of protecting and providing the highest quality drinking water and utilize its expertise and experience of operating existing hydroelectric facilities.

The Bloomberg Administration has recognized that addressing the energy challenges facing New York City involve both conservation and increased sources of renewable energy, among other tools. Increasing the power provided from renewable hydroelectric sources is a very appealing proposition, if it can be done without jeopardizing the operations of our water supply system. DEP looks forward to reviewing the responses to the RFEIs on hydroelectric power.

Thank you for the opportunity to present testimony. Anthony and I will gladly answer any questions you have.

CHAIRPERSON GENNARO: Thank you, thank you very much for being here and for your testimony and certainly all of the good work you've been doing to be creative about harnessing

potential hydropower sources. And also I wish you luck, that is DEP, luck in taking over the city's energy operations. I never quite understood why it was in EDC, although Gil was a terrific guy and somebody took it over from Gil or something, but Gil was great and that's where the energy braintrust was, and so be it, but now I think it's where it needs to be. And so good for the Mayor and Deputy Mayor in recognizing that and putting it where it belongs, with you folks.

And with regard to--and just strolling through your testimony, I made some notes here. It seems, again, part of this is to educate myself in what's going on so I can be better versed, but would it be fair to say that the projects that are being contemplated now, are those that would be, I guess, more or less, I don't know if this is really like a term of art, but traditional hydro projects? So you got those and then at the sewage treatment plant you're going to be looking at using the sewer gases that'd be produced to generate energy and presumably those gases are going to be burned, that's going to run a turbine, and that's how

you're going to produce energy, right? And so what I'm not really hearing, and maybe there's a good reason for that and you can let me know, I hear about these other concepts where people are putting some sort of device like within an aqueduct or within a pipe that leads from the sewage treatment plant with the water that comes out of the sewage treatment plant and it doesn't seem like those kinds of projects are in the offing.

And so if you could, I'm actually going to get to a question, it's going to happen if we all live long enough. Why don't you talk a little bit about the projects that are contemplated, which seems to me to be, unless I'm mistaken, traditional hydro, you know, the sewer gas thing and talk about perhaps some of the other types of things that maybe you've heard of, there's other kinds of technologies that DEP at the moment is sort of choosing not to pursue, and there's probably reasons for that, they're not economic, they're not mature, they're not proven, so there's sort of like a landscape out there of like different kinds of hydro--so there's like a

hydro menu so to speak and DEP has selected the more traditional and also the sewer gas things and has left like a couple of things kind of on the menu, but isn't choosing them and I'm sure has good reason for doing so. So if that's a coherent question, maybe you can give it a shot.

SERGEJ MAHNOVSKI: Yeah, I think Anthony--

CHAIRPERSON GENNARO: Yeah.

SERGEJ MAHNOVSKI: --can speak to some of the more exotic--

CHAIRPERSON GENNARO: Sure.

SERGEJ MAHNOVSKI: --hydro projects--

[background noise]

SERGEJ MAHNOVSKI: --but just to give you the broader energy context--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --I think that's true, some of the investments we're looking at, I would classify as more traditional things you can actually maybe put in the capital budget cycle and so forth, but I think we're looking at the whole gamut across the entire utility, at literally

everything. And in some cases we're looking at pilot projects to prove a technology, in other cases, we're really moving forward and actually trying to execute projects.

CHAIRPERSON GENNARO: Yeah, we'll certainly talk about that.

SERGEJ MAHNOVSKI: Yeah.

CHAIRPERSON GENNARO: 'Cause if you're not going to talk about it here, when are you going to talk about--

[Crosstalk]

SERGEJ MAHNOVSKI: [Interposing] Yeah, so I think Anthony can tell you a little bit more about some of the more--

CHAIRPERSON GENNARO: Sure.

SERGEJ MAHNOVSKI: --cutting edge ideas that we looked at.

ANTHONY FIORE: Chairman, thank you--

CHAIRPERSON GENNARO: Sure.

ANTHONY FIORE: --Council Members, thank you, Anthony Fiore. The current hydro facilities that we have are all in conduit facilities, so just so you understand they are--

CHAIRPERSON GENNARO: Oh, I see.

ANTHONY FIORE: --they are in water conveyance tunnels. The ones subject to the RFEI are more traditional hydro, they would be on the dam side of our reservoirs where we release water downstream for conservation purposes in directed releases.

We've also looked at the potential for hydroelectric generation at our wastewater treatment plants and we've worked with some of your other testifiers, witnesses here today to study that potential and I think we're still pursuing that.

CHAIRPERSON GENNARO: Right.

ANTHONY FIORE: It's smaller--

CHAIRPERSON GENNARO: [Interposing] Is there a formal process by which this is being undertaken or how is that structured, this kind of exploration of these other technologies? Is it part of some big initiative or is it just something DEP is doing? How does that work?

ANTHONY FIORE: Well I think, like Sergej mentioned, that we're looking at the whole gamut of potential opportunities and we've been

speaking with a number of different developers, we had one developer that actually used our data to try to size turbines to fit in wastewater treatment plants where it would have potential economic benefits. And we've been approached by other developers that have actually done some feasibility or pre-feasibility analysis looking at the head and flow that's available at these wastewater treatment plants--

CHAIRPERSON GENNARO: Right.

ANTHONY FIORE: --to see if they're good fits.

CHAIRPERSON GENNARO: And I guess different people in the business have [off mic] different concepts about what their technology would do and where it would go in the plant, and like that kind of thing, right, would that be fair to say?

ANTHONY FIORE: Yeah, I think the commonality is wherever you have a elevation drop--

CHAIRPERSON GENNARO: Right.

ANTHONY FIORE: --and flow and so there are different places within the wastewater

treatment plant where that does occur.

CHAIRPERSON GENNARO: Right, now if this were to happen, would it be a--because one is the technology and does it work, doesn't work, and then the other question would be, okay, given that the technology works or has a good chance of working, how would it be implemented, would it be that DEP would just say, okay, Company X, you put it in, you own it, you manage it, you generate some power or whatever and it's kind of like your thing and, you know, stay out of our way and what we're trying to do with like the mission of the wastewater treatment plant; and it's your thing, you put it in, if it breaks, you fix it, and we just kind of get a check at the end of this thing and you sell the power to whomever? Or is the concept that DEP is going to own it, going to buy it, going to put it in, going to manage it, going to futz with the various entities about putting energy back into the grid or maybe it's envisioned that it would just provide power to kind of help run the plant 'cause--

SERGEJ MAHNOVSKI: Right.

CHAIRPERSON GENNARO: --plants like

use a lot of power. So just jumping like one step ahead of the technology, what would like the operational model be as to who would own this thing and how would all of that work?

SERGEJ MAHNOVSKI: I mean, I think that's actually the core subject of the RFEI, we're trying--

[Crosstalk]

CHAIRPERSON GENNARO: Oh, I see.

SERGEJ MAHNOVSKI: --best, we're trying to get the best ideas.

[Crosstalk]

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: Traditionally we would have our own capital project out of our capital budget and we would soup to nuts we would hire somebody to construct it for us and design it, but we would be essentially--it would be out of our capital budget and it's something that we would own and operate. We're trying to see where on that spectrum we should be.

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: And, I mean, if you look at it at a core, we're a water utility,

so we look at energy as aiding our--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --power system and so we're trying to look at the most cost effective ways to do it. So on one hand we want to know where the generation resources are potentially--

[Crosstalk]

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --facilities, but what we--

[Crosstalk]

SERGEJ MAHNOVSKI: --about is integrating it so there are some--you know, we're trying to look in the most cost effective places to integrate different types of energy resources.

CHAIRPERSON GENNARO: Right, because when I just kind of look at things and I'm thinking DEP should certainly be an innovator, but does it need another thing to buy and spec and put in and test and maintain and repair and you guys got a lot to do.

[Crosstalk]

CHAIRPERSON GENNARO: You know what

I mean? And like the capital budget's being stretched and--

[Crosstalk]

CHAIRPERSON GENNARO: --maybe there's some kind of arrangement where we, you know, we stick to the core mission of processing the wastewater and let the power people do their thing and write us a check, you know, so they break it, they fix it, it's like their headache, we don't own it.

[Crosstalk]

CHAIRPERSON GENNARO: And so what do you think about that?

SERGEJ MAHNOVSKI: Yeah, I think, and for example, let me give you an example with the Ward's Island RFEI just to give you an analogy--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --it's structured in a roughly similar way to the hydro one, but really the idea is we had a choice of either spending $80 million to build our own dedicated boiler system there from our capital budget, or should we build a cogeneration facility

and have a private developer take our--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] If you could speak a little closer to the mic.

SERGEJ MAHNOVSKI: Sorry about that. Or should we spend 60 to $80 million of our own capital budget to build a dedicated boiler plant or should we open it up to some of the ideas out there to build maybe a cogeneration facility to serve us, we could be an anchor client for--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --the steam in exchange for our waste gases, and then you could structure it so that an entity invests the capital and we have some kind of relationship as an offtaker. There are all different kinds of--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --prospects out there and so that's what we're trying to investigate.

CHAIRPERSON GENNARO: Sure.

SERGEJ MAHNOVSKI: And I don't think we want to be in the business of operating a major power facility as a course of action,

that's--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Right, yeah, I mean, I personally just didn't think so, not that it's up to me and if DEP thinks it can really do it, then God bless you, you know. But has there been any focus on what some other cities are doing, maybe someone's already peeled this onion and figured out how to do it and…?

SERGEJ MAHNOVSKI: Yeah, I mean, I think we're trying very informally to get that--

CHAIRPERSON GENNARO: [Interposing] There's got to be other cities that are--

SERGEJ MAHNOVSKI: Yeah.

CHAIRPERSON GENNARO: --that have done all kinds of cool stuff. I mean, not that we're not at the cutting edge of cool, I didn't mean to suggest that for a minute, we are like the East Coast distributor of cool, but--

SERGEJ MAHNOVSKI: Yeah.

CHAIRPERSON GENNARO: --but every now and then, some other lesser city gets a good idea, you know, and so it has happened.

SERGEJ MAHNOVSKI: Yeah, I think,

you know, we've been talking to developers trying to get the best ideas, whether they're overseas or within North America, obviously we have some unique constraints on land and so forth--

[Crosstalk]

CHAIRPERSON GENNARO: Sure.

SERGEJ MAHNOVSKI: --in New York City that make us unique, and also I think we're pretty cutting edge on some things, we can talk about that more, but, yeah, we are trying to get the best ideas to essentially move our capital stock and make it sensible for dealing with rising energy costs. Again, inevitably energy costs are going to be going up, so we need to realize that, and so that's one of the reasons we're so concerned and want to really look at how to incorporate the concept of energy and saving energy within our capital investment operating decisions.

CHAIRPERSON GENNARO: Right. And with regard to the--oh, I thought I heard my name, I thought I heard Jimmy Vacca say my name, I thought I heard that. What's that?

[Off mic]

CHAIRPERSON GENNARO: Okay.

COUNCIL MEMBER VACCA: I love you [off mic].

CHAIRPERSON GENNARO: And let the record show that Jimmy Vacca who sits next to me in the council loves me and I love him too. How do you like that? So 50 years from now, when people look back at the record, they're going to say, New York City.

[Off mic]

CHAIRPERSON GENNARO: Yeah, it's great, Jimmy's a great guy. You got me, and right next to me is Jimmy Vacca and right in front of Jimmy is James Sanders and right behind me is Tish James, and the four of us constitute in the City Council what I affectionately refer to as the James Gang, so there you have it. So every hearing needs a little light moment, and I'm happy for Jimmy Vacca to provide that. All on the record, it's a wonderful thing.

And with regard to what the Mayor and Cas launched last week, the Strategy 211 to 2014 with 100 specific commitments, were there any planks in that that related specifically to what

we're talking about today?

MALE VOICE: Yeah, we have it--

CHAIRPERSON GENNARO: Okay.

SERGEJ MAHNOVSKI: Yeah, no, we have an energy chapter in the strategic plan and there's, what, roughly five initiatives in there related, some initiatives related to, you know, the issues we discussed.

SERGEANT-AT-ARMS: Microphone.

CHAIRPERSON GENNARO: Yeah, he just--the Sergeant was just saying--

SERGEJ MAHNOVSKI: Sorry.

CHAIRPERSON GENNARO: --speak into the microphone again.

SERGEJ MAHNOVSKI: I'm going to….

CHAIRPERSON GENNARO: Well hang on a second.

[Off mic]

CHAIRPERSON GENNARO: Okay. We'll just [off mic], we'll just finish up here. And that's kind of what I had for now, but Council Member Levin has some questions, I'd like to recognize him to ask questions, so I recognize Council Member Levin.

COUNCIL MEMBER LEVIN: Thank you, Chair Gennaro. Am I on? Thank you, Mr. Chairman. So just a couple of questions, first, there's one wastewater treatment facility in the district that I represent, the Newtown Wastewater Treatment facility--

SERGEJ MAHNOVSKI: [Interposing] I live right next to that, which is--

COUNCIL MEMBER LEVIN: Oh, do you?

SERGEJ MAHNOVSKI: I do.

COUNCIL MEMBER LEVIN: On the Queens side or the Brooklyn side?

SERGEJ MAHNOVSKI: Brooklyn side.

COUNCIL MEMBER LEVIN: Oh, then we're neighbors, I live right next to it too. So I just wanted to ask about, I know that there's some plans for that in terms of working with National Grid on a methane capture system. How does that factor into these plans? I noticed--

[Crosstalk]

COUNCIL MEMBER LEVIN: --obviously not hydro powered--

SERGEJ MAHNOVSKI: Yeah.

COUNCIL MEMBER LEVIN: --but….

SERGEJ MAHNOVSKI: Speaking about greenhouse gases, I mean, one of the issues for us is because our electricity demand is going to be going up, our target is actually more than the 30% reduction, we actually have, if you consider the electricity [off mic] that's going to be going up as a baseline, it's going to be like a 47% reduction. So we've looked systematically across utility at ways we can actually remediate greenhouse gases.

The Newtown Creek agreement that we're trying to structure right now with National Grid is actually pretty unique, I believe it's one of the first one in the United States, maybe one, two, or three of actually harnessing anaerobic digester gas, purifying it, and injecting it back into the natural gas grid and so let me hand it over to Anthony, he's been working on the day-to-day trying to structure this agreement with our friendly utility.

ANTHONY FIORE: Yes, and this project should make Chairman Gennaro very happy because it is a marquee project, it is leading the way in the nation, it's the first project of it's

kind that we know of that takes that bio gas and puts it into the natural gas distribution system to be used for heating homes, so we think it's a great project.

COUNCIL MEMBER LEVIN: So a kind of question about, I mean, how do you envision the-- the environmental benefit is clear, how do you envision the profitability aspect of it or the feasibility financially to do it?

SERGEJ MAHNOVSKI: And I'll let Anthony get into the details, but the basis of the agreement is that we can avoid making capital expenditures, I mean, you need basically a purifying unit that can cost something like $10 million to get it to utility grade gas 'cause anaerobic digester gas has all kinds of stuff in it. So rather than spend the $10 million, basically National Grid is going to be spending the capital, we're going to be giving some threshold amount of anaerobic digester gas, and then anything over that threshold is essentially revenue gas. And that's what we're negotiating around right now, there's some formula related to the market price for gas that the city will be

earning for any gas that it gives in excess of this threshold, so….

COUNCIL MEMBER LEVIN: Would that be going into DEP coffers or to General Fund coffers?

[Off mic]

SERGEJ MAHNOVSKI: That's to be determined--

COUNCIL MEMBER LEVIN: Okay.

SERGEJ MAHNOVSKI: --we don't know yet, but the other benefit to the project is the collection of property taxes from siting that purification system.

COUNCIL MEMBER LEVIN: Got it. And then kind of following up on that, with regard to kind of the other RFEIs and kind of potential projects on the hydropower side of things, I mean, are you looking at it from a cost benefit analysis? I mean, is that going to--I mean, I'm assuming you're doing for all the various scenarios the potential for profit to be made. I mean, how many different scenarios are you guys looking through?

[Off mic]

SERGEJ MAHNOVSKI: Yeah, we've looked at a number of scenarios for each location, from the number of turbines and the sizes of those turbines. The economics is certainly a big part of it, there are many variables going into determining the value of the project and so the economics of it is certainly an important one of those variables. We've screened different types of technology for the sites and we are fairly close to finishing up a feasibility analysis.

COUNCIL MEMBER LEVIN: Okay. And then is there like a tipping point for when a project in terms of how much is invested or is it based on the technology in terms of whether or not it's going to be economically profitable?

SERGEJ MAHNOVSKI: It's determined on how much water is available and what the capital expenses are and then the operational maintenance expenses. These projects, as I said before, the existing hydros are in our water supply conduits, there's always water flowing through those conduits. On the dam side, we work very hard to manage our water so that we can supply it to our customers. There's not as much

water available downstream from the dams, but there is some and we're looking to see if we can't leverage that to produce some power.

COUNCIL MEMBER LEVIN: And this is just a scientific question that I don't know the answer, I mean, does velocity factor into it, I mean, the velocity of the water or is it…?

SERGEJ MAHNOVSKI: Yes, the head, the amount of--

COUNCIL MEMBER LEVIN: Okay.

SERGEJ MAHNOVSKI: --elevation drop that you have is the big factor and then the volume of water that flows through.

COUNCIL MEMBER LEVIN: It's just basic physics.

SERGEJ MAHNOVSKI: Yes.

COUNCIL MEMBER LEVIN: Okay. All right, thank you, Mr. Chairman.

CHAIRPERSON GENNARO: Thank you, thank you, Council Member Levin. I recognize Council Member Crowley.

COUNCIL MEMBER CROWLEY: Thank you, Mr. Chair. I have a question, when you're generating the energy through the hydropower, are

homeowners upstate or anywhere in the state benefiting from the power?

SERGEJ MAHNOVSKI: Yes, the power is sold into the grid and so--

ANTHONY FIORE: [Interposing] You mean for existing…?

COUNCIL MEMBER CROWLEY: Right.

ANTHONY FIORE: Okay.

SERGEJ MAHNOVSKI: Yeah, the existing hydroelectric facilities, the power sold into the wholesale market and electrons are fungible and they travel all over and they do go to the New York State homeowners.

COUNCIL MEMBER CROWLEY: And you're measuring every electron, like every amount of power generated?

SERGEJ MAHNOVSKI: Yes, we know how many million kilowatt hours a year are produced.

COUNCIL MEMBER CROWLEY: And so you're generating more than the whole entire Department of Environmental Protection uses?

SERGEJ MAHNOVSKI: No.

[Crosstalk]

COUNCIL MEMBER CROWLEY: --say?

No.

SERGEJ MAHNOVSKI: No, no, no.

COUNCIL MEMBER CROWLEY: But the potential is there.

SERGEJ MAHNOVSKI: We believe the potential from the new hydros is about 15 megawatts in capacity and--

[background noise]

SERGEJ MAHNOVSKI: --about 12 million kilowatt hours per year is what's currently produced from the two hydroelectric facilities that DEP owns.

COUNCIL MEMBER CROWLEY: So the cost of maintaining those facilities is justified and more than justified--

SERGEJ MAHNOVSKI: Yes.

COUNCIL MEMBER CROWLEY: --by the amount of power? So it makes sense to create more facilities like this?

SERGEJ MAHNOVSKI: Yeah, and the trick is now, like I said, on the dam side where there's less flow than in the conduits to capture that, but from our initial analysis, it looks like there's enough power that would be generated from

these facilities combined to equal approximately the amount of power that we use at our upstate facilities.

COUNCIL MEMBER CROWLEY: And where are you in the timeline of creating more facilities, such--

SERGEJ MAHNOVSKI: So--

COUNCIL MEMBER CROWLEY: --as the ones you currently have?

SERGEJ MAHNOVSKI: --we hold a preliminary permit from the Federal Energy Regulatory Commission which provides up to three years to do the studies necessary to support a license application. We're two years into that process, we'll be filing a draft license application this fall and then our final license application would be next year.

COUNCIL MEMBER CROWLEY: And do you receive federal monies for the program?

SERGEJ MAHNOVSKI: We do not currently receive any federal monies, no.

COUNCIL MEMBER CROWLEY: It's only city dollars.

SERGEJ MAHNOVSKI: Yes.

COUNCIL MEMBER CROWLEY: Okay. Thank you.

CHAIRPERSON GENNARO: Thank you, thank you, Council Member Crowley. I just want to follow up a little bit on what Council Member Levin was posing some questions about. I was reading some of the materials when he was doing that then I poke my head up when you said there'd be something that would be of interest to me and that's to do with one of the sewer gas projects, whatever, saying that that's going to be fed right into the gas grid or whatever, right?

SERGEJ MAHNOVSKI: That's correct.

CHAIRPERSON GENNARO: Now is it at Newtown Creek or is that the one at Ward's Island?

SERGEJ MAHNOVSKI: That's Newtown Creek.

CHAIRPERSON GENNARO: Oh, Newtown Creek. So how would the gas be utilized at Ward's Island? Would that be--you'd have like a little plant there basically where you'd take that gas, you'd burn it, you run a turbine, is that what would happen there? So like that wouldn't go into the distribution system, it would just used there

onsite to create power whereas Ward's Island, you're taking the gas and you're putting it into the distribution system, right? That's….

SERGEJ MAHNOVSKI: Yes, the idea at Ward's Island would be to have some type of technology, whether it's an engine or a turbine--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --or some other technology to produce both electricity and heat--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --and so it's a district energy heating system is what we're contemplating. We would look to provide our digester gas as a fuel source for that engine or turbine--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --and receive heat back for the digester process at the--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --wastewater treatment plants. And then that electricity could be sold to anchor customers--the city, a private power purchase agreement or to Con Ed or in to the--

CHAIRPERSON GENNARO: Right.

SERGEJ MAHNOVSKI: --independent system operator into the grid so to speak.

CHAIRPERSON GENNARO: Sure, sure, sure.

SERGEJ MAHNOVSKI: So as you alluded to earlier, all business models are on the table, we're evaluating those.

CHAIRPERSON GENNARO: Right

ANTHONY FIORE: Yeah, yeah, I mean, every wastewater treatment plant has a different configuration to it, a different proximity to different types of voltage lines or gas distribution lines, so at Newtown Creek, the proximity to the gas distribution system, it's perfect for a gas injection project. Ward's Island, we do feed our digester gas into a neighboring boiler system, so the idea of generating power and heat is one that we're pursuing there.

CHAIRPERSON GENNARO: Okay. Yeah, I just wanted to draw that distinction and get a little more educated as to what you're doing.

SERGEJ MAHNOVSKI: And at a number

of our plants, we also produce power on site using that digester gas in engines that stays behind the meter, so it powers our plants.

CHAIRPERSON GENNARO: Yes, I see, and it looks like Steve has another question.

COUNCIL MEMBER LEVIN: Just in terms of the cogeneration plant, if you guys are looking for models to build on, not necessarily one that's associated with a wastewater treatment facility, but the Brooklyn Navy Yard has a cogeneration plant that I would recommend reaching out to and seeing how they do it.

SERGEJ MAHNOVSKI: Thank you, thank you.

[Crosstalk]

COUNCIL MEMBER LEVIN: --operate, so thank you.

CHAIRPERSON GENNARO: Sure. Well thank you, I want to thank this panel, we appreciate all the good work that you're doing, we're eager to see you succeed, we'll be following what you'll be doing and wishing you the best. We're going to hear from some other good folks. I would ask folks from DEP to remain if you can, I

know Rick for sure is going to stay, but--'cause I certainly look forward to some other folks that are going to be coming forward now, but I thank you for being here and I appreciate it very much.

SERGEJ MAHNOVSKI: Thank you.

ANTHONY FIORE: Thank you.

[Crosstalk]

[Off mic]

CHAIRPERSON GENNARO: Okay. This guy should be next. Okay. We'll call our next witness, Frank Zammataro, I believe. Rentricity seems is the company.

FRANK ZAMMATARO: It's a nice Irish name like yours.

CHAIRPERSON GENNARO: Okay. Good.

FRANK ZAMMATARO: Should I--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Oh, you know what, just give those to the sergeant, yep.

[Off mic]

CHAIRPERSON GENNARO: And that's going to be followed--this witness would be followed by the representative of Verdant Power,

followed by Lucid Energy Technologies, so that'll be the order. Okay. Samara, if you could swear in the witness.

SAMARA SWANSTON: Sir, would you please raise your right hand. Do you swear or affirm to tell the truth, the whole truth, and nothing but the truth today?

FRANK ZAMMATARO: I do.

CHAIRPERSON GENNARO: Thank you. Thank you very much for being here, thank you for your patience. We look forward to your statement and those of your colleagues in the industry. And the floor is yours, please state your name for the record and proceed with your testimony.

FRANK ZAMMATARO: Thank you. My name is Frank Zammataro, I am the President and Founder of Rentricity, Inc., which is actually located at the incubator called Acre at 160 Varick Street in New York City.

Good afternoon, Chairman Gennaro and members of the committee. I would like to commend the council for tackling such an important issue at such a critical time. The need to increase renewable generation is well known

throughout the country and it would be easy for the New York City Council to rest on its laurels, given the many programs already in place in the city. Considering alternatives for hydropower signals to the citizens of the city and state that the council is not content with the status quo and will continually strive to improve policy for the benefits of New Yorkers, and we believe this is admirable and we support you in your efforts.

Expanding New York City's hydropower complements PlaNYC by increasing energy efficiency and increasing the city's clean energy supply. Rentricity has efficient and proven technology solutions that can bring New York City significantly closer to its PlaNYC goals and the state closer to its 2015 renewable energy targets.

Now to the matter at hand. Developing New York City's hydropower resources would expand by one the types of energy generation that would qualify for the state RPS. I will begin by providing some industry context and describing Rentricity's unique approach to hydropower and then attempt to convey the significance that in-pipe hydrokinetic solutions

will have to the environment, local businesses, and the citizens of New York City.

Water and wastewater utilities are extremely energy intensive, consuming approximately 4% of the United States electricity production. The cost of pumping and treating water represents about one-third of a water wastewater utility's operating budget. Compounding the problem, United States water utilities lose approximately 7 billion gallons of water per day through leakage. On average, approximately 20% of all water leaks back into the environment. More water lost means more water pumped and treated, which requires more electricity to be generated.

New York's aging water distribution infrastructure is both a problem and an opportunity. Much of it is over 100 years old and in disrepair, and energy recovery and operating efficiencies are often a lower priority to the basic need of moving water. It takes a great deal of pressure to deliver potable drinking water throughout the distribution systems in New York City; however, because the pressure is typically

the result of gravity--as you know, water flowing downhill from reservoirs--there is often an overabundance of the pressure. Therefore, the pressure needs to be reduced before the water reaches its end users so that pipes don't explode and users can safely open their taps.

Water utilities and municipal water systems accomplish this reduction with valves, pressure reduction valves, or PRVs. To be specific, pressure reduction valves reduce the pressure to a specific level but do nothing valuable with the excess pressure--it simply is released as waste heat. Rentricity takes advantage of this waste to create clean, renewable electricity.

Rentricity is simply an energy recovery company. Our flow to wire systems are typically installed in parallel to PRVs and mimic their function--reducing pressure to usable levels. However, flow to wire systems use the excess pressure to spin water turbines which then creates electricity. That electricity, the production of which produces no carbon emissions, is then either sold onto the grid or used behind

the meter by water utilities or municipalities at treatment plant facilities or pump station buildings. Therefore, Rentricity provides an opportunity to upgrade water industry infrastructure with energy recovery technology and simultaneously powering what we call smart water grid leakage monitoring components.

The installation of such a system in no way impedes the regular operation of water distribution systems. Rentricity uses proven components that water managers see every day in their regular work; water users enjoy the same level of service, as always, but now the system is more efficient using a wasted by-product--excess pressure--to create a valuable and much needed resource--clean, renewable electricity.

This type of in-pipe hydrokinetic energy recovery also has additional benefits over other forms of renewable generation. For example, because Rentricity installations deal with treated drinking water within pipes far from fish and wildlife, they avoid most of the environmental concerns and excessive permitting that come along with more traditional forms of hydropower.

Furthermore, because the water flows in pipes is highly predictable and consistent, Rentricity's installations are extraordinarily efficient, in the 70 to 80% range, which is a far cry from solar at 15% or wind power at 40%, which rely on the sun shining, wind blowing, which are natural events that are obviously difficult to predict and sometimes quite inconsistent.

In a head-to-head comparison, without government incentives, flow to wire installations have a $3.50 per watt capital cost with an 80% capacity utilization and a 40-year life on the technology which provides approximately a 25% IRR, or internal return, on the project, versus solar at $4.50 a watt, 15% capacity utilization, 25-year life, and 1% IRR, and wind at $2.50 a watt, 40% capacity factor, 25-year use life, and a resulting 14% IRR. This simply means that in-pipe, hydropower costs less than competing renewable sources.

To sum up, Rentricity utilizes existing technology to take advantage of existing waste in order to create renewable electricity, all while leaving the operation of the water

systems untouched. Furthermore, it does so efficiently and cost effectively. But what kind of impact can this type of generation have? Each Rentricity system produces between 30 and 300 kilowatts of power, roughly enough electricity to power 40 to 400 average homes. However, there are many sites for potential installations within each water system so the overall potential output is much larger. At this stage it is difficult to accurately predict just how much electricity of this sort can be created in New York City, but given that over 1 billion gallons of potable drinking water flow through the city's pipelines daily, it could certainly be in the tens of megawatt level or greater, perhaps 1% of the city's total energy demand. It will behoove the City Council and other key city leaders to understand the contribution that hydropower, including in-pipe hydrokinetics, can contribute to the renewable energy goals of New York City and Rentricity stands ready to support New York City in this regard.

The Council should be pleased to learn that Rentricity has already started working

towards creating in-pipe hydrokinetic power in a number of cities around the country and recently in Canada. These slides, which you can see in the deck in front of you, represent Rentricity's approach and it's very first commercial projects within drinking water infrastructure with the largest single site being a 325 kilowatt site in Palos Verdes, California.

Rentricity has also worked with the New York City DEP to determine the potential energy recovery from wastewater outfalls at the various plants around the city. In order to continue to move forward with the New York City DEP and expand throughout the state, it is very important that Rentricity's type of power generation is recognized as a contribution towards New York City and the state's energy goals.

That's where the New York City Council comes into play. First, by including in-pipe hydrokinetic power in the city's future PlaNYC 2030 initiative, the Council will expand the city's clean energy as set out in its established goals. This would also contribute to the state's 30% renewable energy goals by 2015.

Second, the development of this form of power will provide economic stimulus to the state and work for its local engineers and construction firms. Rentricity is already working with local New York City contractors and many more stand to benefit from additional projects.

Third, by expanding the city's hydropower goals, the committee will incentivize Rentricity and other companies like it to choose New York City as a place of business. NYSERDA already provides incentives for this form of generation and firms will likely follow the programs where they choose to invest.

It has always been my personal belief that because the renewable energy field is so nascent and because there is difficult to predict which technologies will provide the best solutions, that lawmakers should strive to, number one, provide a broad and fair incentive, as broad and fair incentives as possible, and then let the market choose the winners. Rentricity believe the solutions we provide can be among the latter, the New York City Council has the opportunity today to provide the former and we urge you to do so.

So in summary, the Council should seek to understand the total hydropower, including in-pipe hydrokinetics, energy recovery potential in the New York City water and wastewater systems and its potential contributions to PlaNYC and economic development goals. And the Council should continue to highlight and explore the predictable cash flows and investment returns from hydropower and related methodologies like Rentricity that can foster public and private investment vehicles to promote greater adoption and a shared value proposition.

Finally, the Council has the opportunity to explore the reduction of permitting by the Federal Energy Regulatory Commission and like the state of Colorado, may be able to develop a memorandum of understanding to fast track projects given the low environmental impact.

I appreciate your time spent listening today and your inclusion of my testimony in the committee's deliberations and if you require more information, please do not hesitate to contact me. Thank you.

CHAIRPERSON GENNARO: Thank you,

thank you very much for being here and for your good work and giving me an education about your technology.

When I was on the phone, I guess, two weeks ago when the last hearing was canceled, we had some folks from the national lab in Idaho and they're working on their contract with DOE and we had some folks from DEP on the phone and the national lab was talking about some kind of initiative that they had to try to get local jurisdictions and figure out how they can use hydro better, but they seem to be the more traditional forms of hydropower. And when I said, gee, I was of the--I had the impression that there were other kinds of technologies, the guy from the national lab indicated, yeah, you must mean--he says, yeah, you talking about this hydrokinetic stuff which he really didn't elaborate on. And let me do the following by--this is my daughter, okay, I have to just take a break for a second.

Hello.

[Off mic]

CHAIRPERSON GENNARO: Hi, I'm chairing a hearing. Pardon? You're going right

now? Okay. So you're going to be going home now? No one's home [off mic] you know what, here's what I'm going to do, here's what I'm going to do, just hold on a second, okay? Hold on.

[Off mic]

CHAIRPERSON GENNARO: Sorry about that, you know. Her mom's not feeling well so I'm doing a lot of things today so I had a--

FRANK ZAMMATARO: Completely understand, Chairman.

CHAIRPERSON GENNARO: Yeah, so but I staffed it out, so, you know.

FRANK ZAMMATARO: Delegated it.

CHAIRPERSON GENNARO: Yeah. And so let's just talk a little bit for my own knowledge and those who maybe watch the Cserve [phonetic] ultimately televise these proceedings--I guess they'll watch me on the phone with my daughter or something. And with the hydrokinetic, is that really done--is that something that is specific to the PRV or can that technology be used in--and is something going on with the mic here? And is this kind of technology only used in concert with the pressure reduction valves or can it be used in

other places along the system? I don't fully understand.

FRANK ZAMMATARO: Yeah, that's a terrific question. There are actually three different locations with any water distribution system that can be addressed by this. The first one is called a mandated release which is typically found at the base of a dam near a reservoir, which is a requirement to fill an aquaculture, continue to flow water into an aquaculture for environmental reasons. They run 24 by 7 and it's a small system, but, again, can be addressed.

The second one is these pressure regulator vaults that are found throughout the system where pressure is being reduced so that it--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Right, and that is different than a pressure reduction valve, but serves, I guess, a similar function, right?

FRANK ZAMMATARO: Correct. And the third is what's called a transfer station. These

are larger pipelines that are moving water to either aboveground or underground reservoirs and staging it for different zones in the water distribution system.

So Rentricity's projects, the five that we currently have, are all in a different part of water infrastructure and that is the way we have kind of vetted and fleshed out all the nuances associated with those different parts of a water distribution system.

CHAIRPERSON GENNARO: Okay. Yeah, just now with regard to what the city DEP is doing, you heard their testimony, you've been involved with them, your statement speaks to that--how can I put this--what do you think DEP should be doing towards trying to embrace this kind of technology? Do you see them doing that? Do they understand it? Do they believe in it, are they pursuing it? What's your sense of that?

FRANK ZAMMATARO: Well the New York City DEP is doing many things in the renewable space so I'm, as one, looking again from a city perspective, very impressed. On the hydro side, as you heard, they are just starting now looking

at the reservoir based systems, more traditional forms of hydropower, and we did, in fact, do some work through a small NYSERDA grant this summer to look at the wastewater side of the equation. We have yet to look at the potable water side and we would welcome that opportunity to see what the opportunities are there as well.

So I would say that New York City DEP positions our form of renewable energy in the innovative stage--

CHAIRPERSON GENNARO: Right.

FRANK ZAMMATARO: --and they're looking at it, I think they're--no pun intended--testing the waters--

CHAIRPERSON GENNARO: Right.

FRANK ZAMMATARO: --and would like to continue to develop this further. But, again, it's not what I would call a huge priority. And I think part of the issue has a lot to do with the size of what we do. Each individual project is small, it's a 35 to 325 kilowatt installation, but we need to look at this at a system wide level and that is a very, very important bit of information that I think the city needs to know, what is truly

available throughout the water distribution network, the pipelines, the conduits, and how could that be supportive of PlaNYC.

CHAIRPERSON GENNARO: Right. Now when you talk to DEP and you try to approach them, DEP has its formal initiatives like it stated with the RFEI, would you be part of that or…?

FRANK ZAMMATARO: We did submit an expression of interest to participate in that RFP, which we assume--

CHAIRPERSON GENNARO: Right.

FRANK ZAMMATARO: --is the next phase of the project.

CHAIRPERSON GENNARO: Right. And there are efforts like that RFEI that DEP is doing formally, which people can participate in, and then there are people that just have good ideas regarding technological breakthroughs or whatever and then to try to approach the city on something like that, DEP or any other agency could sometimes be difficult because they have no formal process by which they're currently reviewing that kind of technology and this committee and this council, kind of speaking to staff as I say this, we did

this green tech bill that creates a model and a process by which these kinds of ideas would be considered in two ways. There was one panel that was created from this bill, which is now Local Law, that companies like yourself that have some kind of technology that might be of benefit to the city, there's a process by which this can be evaluated like through this green tech bill that we did. This would be technology that would be used by the city for its own operations and the second part of the green tech bill was for people that had some kind of innovation that the general public might be able to purchase and deploy in their homes or businesses and sometimes there's a lot of red tape in the city, it's like, okay, this is like some kind of windmill thing and Department of Buildings has no knowledge of how this could be safely deployed on a building and doesn't have proper--there's no regulatory paradigm for how it would be permitted and sometimes that forms roadblocks as well, and so the second part of the green tech bill was to help entities that had a product that might benefit the general public to figure out how the city could work through the

permitting and all that kind of thing. And so this is just kind of like a note to staff that we should see if our green tech bill that we passed with some fanfare is being utilized the way that we had envisioned it. And one of the entities within green tech was DEP and DCAS and these various technological units of city government. So you should know about the green tech bill, but this is sort of a good test case for how green tech could be and should be working.

So it would seem that you have something that you're working through the established process through the RFEI, but have you also tried to approach DEP independently, sort of outside that process so to speak to say that we have a concept that may be beneficial to DEP, could you give us a couple minutes of your time so that we can make our case? Have your tried to do that and what happened?

FRANK ZAMMATARO: Yeah, well Rentricity joined the New York City accelerator incubator at 160 Varick in July of 2009. We immediately used that basis because it was being co-funded by the EDC and NYSERDA as a way of

attempting to find a project in New York state. I mean, our projects are in Pennsylvania, California, Canada--

CHAIRPERSON GENNARO: Right.

FRANK ZAMMATARO: --New Hampshire, so we need to do something in New York, so we were very fortunate to make a connection to the New York City DEP and have been out to Flushing on two occasions which did result in a review that they sanctioned of the wastewater treatment plants and the potential energy recovery there from flow at those plants.

CHAIRPERSON GENNARO: Right.

FRANK ZAMMATARO: Our interest is obviously to complete that work--

CHAIRPERSON GENNARO: Right.

FRANK ZAMMATARO: --and continue to build a relationship with the New York City DEP and hopefully at the right time see if we can move into the potable drinking water side of the equation as well.

CHAIRPERSON GENNARO: Right.

FRANK ZAMMATARO: But our goal right now as a small company, which is always

challenging to get--

CHAIRPERSON GENNARO: Yep.

FRANK ZAMMATARO: --the attention is to continue to build a relationship with the New York City DEP.

CHAIRPERSON GENNARO: Sure, sure, well that sounds like the beginning of a wonderful story and--

FRANK ZAMMATARO: We hope so.

CHAIRPERSON GENNARO: --and I certainly wish you well and I want you to consider this chairman and this committee and these staff members to the committee as partners who are eager to know what good companies are doing and see how we may be able to open doors for anything that holds great promise for the city and its people.

FRANK ZAMMATARO: Thank you.

CHAIRPERSON GENNARO: That sounded pretty good, that last sentence, that sounded almost like poetry, that wasn't bad. Yeah, and so I'm very grateful to have you here today, I wish you and your company all the best, and thank you for trying to innovate to help our good city. Thanks very much for being here today.

FRANK ZAMMATARO: Thank you, Chairman.

CHAIRPERSON GENNARO: You bet. And where's Bill?

[Off mic]

CHAIRPERSON GENNARO: Okay, okay. But I did point out that there was going to be--

[Off mic]

CHAIRPERSON GENNARO: Okay. And next witness, move everything along, Ronald Smith from Verdant Power and, I guess it was about two years ago, I--

[Off mic]

CHAIRPERSON GENNARO: --yeah, I guess it was about two years or so, I reached out to Verdant, I don't know who I spoke to over there, but got together with somebody, and heard some things lately about what you folks are doing in the river, and this is a great opportunity to get an update on the things that you folks are doing. So I'll have the counsel to the committee swear you in, Mr. Smith, and then you can take it from there.

SAMARA SWANSTON: You please raise

your right hand. Do you swear or affirm to tell the truth, the whole truth, and nothing but the truth today?

RONALD SMITH: I do.

CHAIRPERSON GENNARO: Okay. Well thank you, Mr. Smith. Do you have any prepared testimony or you're just going to be speaking from notes?

RONALD SMITH: I do, I do, which I have--

CHAIRPERSON GENNARO: Okay.

RONALD SMITH: --supplied to Bill Murray [phonetic].

CHAIRPERSON GENNARO: Oh, fine, okay.

RONALD SMITH: But I don't have--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Okay. No, it's fine, just in that case, I'll--

RONALD SMITH: [Interposing] I've got a testimony and I've got a short presentation, but I will--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing]

Sure, yeah, just please, please, it'd be good to hear about the latest from Verdant, so please continue.

RONALD SMITH: My name is Ron Smith, I'm the Chief Executive Officer of Verdant Power. Verdant Power was established here in New York in 2000 to take the lead in a new renewable energy capability and technology, which is known as kinetic hydropower, ocean energy, marine renewable energy in various forms throughout the world. Since we started here in the city in 2002, an entire industry is beginning to emerge around the world and we here in New York City are at the forefront leading that through our Roosevelt Island Title Energy project which is being done in the East River next to Roosevelt Island. Supported by NYSERDA since 2002 and developing a technology that was originally supported by NYPA and the Department of Energy at New York University in the early 1980s to lead in the development of ocean energy, kinetic hydro.

We on the Roosevelt Island Title Energy project supported by NYSERDA with 10 awards since 2002 matching funding, in 2006 and 2007

deployed a field of six turbines in the East River, which led the industry. To-date, no other developer in the world has deployed a field of turbine systems.

On June 11th, 2007, Mayor Bloomberg and then-Lieutenant Governor Paterson were on-site to flip the switch for kinetic hydropower for New York City and state. In April 2008, here at the Millennium Hotel in Times Square, we had the first global renewable energy conference which brought together 400 people from around the world to focus on our project, but also the development of this industry. Two thousand eight also, the U.S. Department of Energy established an advanced water power program to develop this industry here in the United States.

So there's a lot of activity around the country, but certainly here in New York City has been a focus for people from around the world to come here to see this project, but also develop it. NYSERDA has publicly identified their intention to deploy 1,000 megawatts of power throughout the state by 2020 using this technology.

Now it's still pre-commercial, we're about two to three years away from commercialization, but we now are in stage three of the Wright project, which includes a final license application to the Federal Energy Regulatory Commission which was submitted December 29th and what [off mic] working through right now. So over the next--this year, we expect to deploy two turbines, next year, an additional three, and over the next three years--

CHAIRPERSON GENNARO: [Interposing] Yeah, but there was already six, right?

RONALD SMITH: There were six--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --but as a result of the activity, we have been working with the DOE labs to improve the engineering and the--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --reliability of the system, so this is Generation 5 of the technology and the--

[Crosstalk]

CHAIRPERSON GENNARO: Oh, okay, yeah, 'cause--

RONALD SMITH: --generation which will become commercial.

CHAIRPERSON GENNARO: Oh, so there was once upon a time six of, let's call them, six 1.0 version, right? And then--

RONALD SMITH: Yes.

CHAIRPERSON GENNARO: --you had six 2.0 and six 3.0, is that be a way to look at it?

RONALD SMITH: Yeah, and those six turbines were--five of the six turbines were connected to the Con Ed grid delivering 175 kilowatts of power to the grid, extremely highly efficient for these types of systems on the--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --order of 40 to 45%, so we have proven the technology, now it's a matter of to get to commercialization, developing the reliability and the economics, reducing--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --the economics. So our expectation and our plan with FERC is to receive a FERC license this year, 2011, and begin deploying up to 30 turbines and a megawatt of power over the next three years here in the East

River. That would be a showcase, it would also be the first--lead the commercialization of this industry around the world. So that's where we are--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --we've received an investment from the city as well as NYSERDA and we're looking forward to working with the city to develop this industry here in the city, in the state, and ultimately around the world, Canada's interested, the UK--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --other countries. So we're here to testify about the opportunity for the city and to identify some recommendations for the city along these lines, one of which is to support a resource assessment that identifies, just like the other technologies, what the resources are associated with this technology. Like wind, it's a function of the energy and the water which is a function of the flow speed and the depth, so we need to find those locations around the city where there's significant energy in the water that can be converted into

electricity, one of which is in the East River.

Also, we'd like to work with the city to identify and develop what the function of this project in the East River will be because potentially it could be an R&D facility for Title Energy and its applications for use around the world. So that's one opportunity.

So I'm here to engage with you--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --and the city to see how we can work together to take advantage of where we have positioned Verdant and this industry and NYSERDA.

CHAIRPERSON GENNARO: Sure, well let me just ask a little bit about the type of commitment that the city has made, what entity within the city did that, was it one time, is it ongoing? I don't understand the--

RONALD SMITH: [Interposing] It was--

CHAIRPERSON GENNARO: --the nature of it.

RONALD SMITH: --when KeySpan bought the Ravenswood facility and KeySpan bought

a couple of facilities, they were required to fund a renewable energy fund here for the city--

CHAIRPERSON GENNARO: I see.

RONALD SMITH: --so we negotiated an agreement with KeySpan and then working with KeySpan and the comptroller's office used some of the funding that was in the city's renewable energy fund, $765,000 to support Phase II.

CHAIRPERSON GENNARO: Right.

RONALD SMITH: So that was a one-time, it was a one-time--

CHAIRPERSON GENNARO: I see, I see.

RONALD SMITH: --investment.

CHAIRPERSON GENNARO: And now that the city's energy braintrust which was once within EDC but has now moved over to DEP, has that been good for you? Has that worked? Have you made that connection and--

RONALD SMITH: [Interposing] Haven't made the connection, we were pretty close to the energy department when it was at the EDC, we haven't--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing]

Right, with Gil, with--

RONALD SMITH: Well it was Gil, Jim Gallagher took Gil's place.

CHAIRPERSON GENNARO: Okay, yeah.

RONALD SMITH: So we knew them pretty well.

CHAIRPERSON GENNARO: Right.

RONALD SMITH: We do want to engage. A year ago--and part of the testimony that I supplied today was a result of our response to an EDC request for renewable energy proposals a year ago--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --so they were looking for opportunities for--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Which is now DEP.

RONALD SMITH: Now it's DEP, but--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --but our submission is a part of this testimony.

CHAIRPERSON GENNARO: I see.

RONALD SMITH: But we certainly are

interested in engaging with the DEP energy--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Sure, sure, sure, and hopefully this hearing can help to facilitate that. Rick Muller is a great contact and can help build that bridge.

And you indicated that you're going through like the FERC process now--

[Crosstalk]

RONALD SMITH: [Interposing] We've been going through it for the past two years--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --and much longer, but, yes, FERC now has in front of them our license application which is online--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --and they have accepted it and are moving forward with it, so--

[Crosstalk]

RONALD SMITH: --our hope is that within six to nine months we will receive that license.

CHAIRPERSON GENNARO: Right, and someone who's like myself who is not really any

kind of expert on that process or whatever, so your operations to-date have been in the absence of a FERC license, which is, I guess, standard for those technologies that are building, right? And--

RONALD SMITH: [Interposing] Yeah, it's not--go ahead, I'm sorry.

CHAIRPERSON GENNARO: --and this is part of the evolution for nascent or nascent, however you say the word, technologies like how they can incubate it, they grow and people make investments in them and it's tantamount to like a showcase or a pilot or like a test or like a big experiment basically and then the technology reaches a certain level of maturity and it's ready for the big time and that's when the FERC license comes.

RONALD SMITH: Well it's in a movement to commercialization--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --but that's exactly right, but when we started this and started working with the regulatory agencies here in the city in 2004, it was totally unprecedented. In

2006, we needed to receive a FERC ruling from the commissioners in order to allow us to connect to the grid with those--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Oh, I see, okay.

RONALD SMITH: --turbines, so that was new and novel. This license that we have just applied for with FERC is new and novel, it's a 5 to 10 year license, which is very different from a traditional hydropower license, which is a 30 to 50 year license. Because--

CHAIRPERSON GENNARO: Oh, I see, yeah.

RONALD SMITH: --because we cannot at this point predict the environmental impact for 30 to 50 years--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --FERC focuses us on dealing with the environmental impacts as the industry emerges and these projects are deployed.

CHAIRPERSON GENNARO: Right, right, but this is something that FERC does on a regular basis when it's dealing with new kinds of

technologies or did they have kind of like reinvent things for Verdant because they--

RONALD SMITH: [Interposing] Well they started with us, but like--

CHAIRPERSON GENNARO: --you were kind of--

RONALD SMITH: --like these other technologies--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --they see the emerging capabilities--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --responded and it was--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --very impressive and very helpful.

CHAIRPERSON GENNARO: And like you said, you want to--so once you have your FERC license, that will mean like what exactly?

RONALD SMITH: It means that we will be able to deliver electricity to the grid and collect revenue for it.

CHAIRPERSON GENNARO: I see, I see.

RONALD SMITH: Without a license, you cannot get revenue for electricity--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --you need the license to be able to deliver hydropower and collect revenue. So we will be able to get revenue, the question for us is what will the economics be associated with that, and that's where the ultimate use of this project in the East River will--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Right, right, right, and so up until now in the absence of revenues, it's been like a venture capital kind of thing or…?

RONALD SMITH: Yes--

CHAIRPERSON GENNARO: Yeah.

RONALD SMITH: --yeah, it's been a function, so far our funding has been approximately 50% government and 50% private investors--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --the investment community for these new renewable energy is very

difficult because it's not a two to three year payback--

CHAIRPERSON GENNARO: Yeah, yeah, sure.

RONALD SMITH: --so you've got to find the right--

CHAIRPERSON GENNARO: Yep.

RONALD SMITH: --kinds of investors.

CHAIRPERSON GENNARO: Yep, yep. And yeah, people think it's just about having the right brainwaves, it's about a lot more than that, and without people like yourself, Mr. Smith, jumping through all these hoops, we wouldn't have any significant innovations. And I thank Verdant for being a world leader in the kind of technology that holds promise throughout the world and may this be a great step forward for our city and for everyone. And make sure you keep in touch with Bill Murray from my staff to see how that linkage is going between you and DEP, it'd be--

RONALD SMITH: Yeah.

CHAIRPERSON GENNARO: --nice to see that blossom.

RONALD SMITH: Yeah.

CHAIRPERSON GENNARO: And let me know how that's going.

RONALD SMITH: Yeah, certainly, and we certainly appreciate the opportunity to--

CHAIRPERSON GENNARO: Sure.

RONALD SMITH: --testify here today--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --and also the support from the state and the city that we've had--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Right, and in terms of seeing the technology and like where it's deployed and like where's your control center so to speak--

[Crosstalk]

RONALD SMITH: [Interposing] Yeah, it's on Roosevelt Island, many people have been through there, right now we don't have turbines in the water, we will late this summer, and it's available for anybody to come take a tour and see the entire operation--

CHAIRPERSON GENNARO: Right.

RONALD SMITH: --'cause not only the electricity that is being delivered, it is also the environmental monitoring of potential impacts on fish and other environmental impacts that we have there. So we have--

CHAIRPERSON GENNARO: Right, right.

RONALD SMITH: --technologies that are watching fish move through the area.

CHAIRPERSON GENNARO: And when one takes a tour, obviously, this is not a tour that goes under the water to see the turbines, but--

RONALD SMITH: [Interposing] No, but we have images, it's--

CHAIRPERSON GENNARO: Oh, I see.

RONALD SMITH: --in a container, it's fairly small, but a number of computers, a number of displays that can be seen what is taking place there, some in real time, some in not real time.

CHAIRPERSON GENNARO: Right, right, right. Well just, again, just one more note to staff, this looks like the type of thing that I like to see when you have your turbines back in

the water in late summer, it sounds like.

RONALD SMITH: Well we'll certainly let you know.

CHAIRPERSON GENNARO: That would be great, and I wish you and the good folks at Verdant well in trying to do a really hard thing.

RONALD SMITH: Yeah, thank you very much.

CHAIRPERSON GENNARO: Good luck to you, okay, you bet.

[Off mic]

CHAIRPERSON GENNARO: Okay. Oh, wow, oh.

[Off mic]

CHAIRPERSON GENNARO: Okay. Okay. Next, it's my pleasure to bring up Mr. Josh--that could be Kanagy, it could be--

[Crosstalk]

CHAIRPERSON GENNARO: Okay, okay, okay. From Lucid and my counsel is whispering into my ear how that you folks came here and were all in place and ready to go from Ohio, right?

JOSH KANAGY: Indiana.

CHAIRPERSON GENNARO: Oh, Indiana?

She said Ohio, so--

[Crosstalk]

CHAIRPERSON GENNARO: --you got to take some geography lessons there. And you were here the last time and just got to look at some New York City snow and we certainly appreciate you coming back one more time and I have your testimony here. Samara will swear you in and I look forward to hearing many good things about what Lucid is doing.

JOSH KANAGY: Thank you.

CHAIRPERSON GENNARO: You bet.

SAMARA SWANSTON: Please raise your right hand. Do you swear or affirm to tell the truth, the whole truth, and nothing but the truth today?

JOSH KANAGY: I do.

CHAIRPERSON GENNARO: Okay. Thank you, Mr. Kanagy, just state your name for the record and proceed with your testimony.

JOSH KANAGY: My name is Josh Kanagy, I'm a Director of Business Development for Lucid Energy Technologies, LLP.

Good afternoon, Chairman Gennaro

and members of the committee and staff, I greatly appreciate the opportunity to discuss with the committee New York City's hydropower capacity and the opportunities that this presents to the city.

In my testimony I want to talk about that capacity for hydropower, I will also discuss Lucid Energy's experience and our core technology and the associated regulatory issues. Finally, I will describe steps for the city to take advantage of its untapped hydropower resources.

We've heard a lot today describing the potential for hydropower, so I just want to move along here a little bit. As you know, the city's water system is gravity-fed and there are great amounts of untapped pressure--or untapped energy, rather, in the form of pressure available for capture and use as water flows through the many thousands of miles of distribution and wastewater pipelines owned and maintained by the city. These pipelines or conduits that move water through the city's water distribution and wastewater collection and treatment systems form an important resource base for generating

hydropower. Power generated from the untapped energy in these pipelines is referred to as in-conduit hydropower, you've also heard some of my other testifiers here refer to that as in-pipe hydropower, so I want to make sure we're clear, we're talking about similar systems.

Large and complex water systems like New York City's are comprised of many different pipes with varying diameters, flow rates, and pressures, and, in fact, technologies exist to efficiently harvest energy across this spectrum. For instance, as you've heard, conventional hydropower technologies work well in high pressure applications where significant pressure reduction is necessary and, in fact, some newer hydropower technologies are specifically designed to replace pressure reducing valves, as we heard the gentleman from Retricity say.

Additionally, throughout the water infrastructure where excess pressure is available to extract, hydropower technology, such as Lucid's power pipe system, can be effectively deployed to generate electricity.

At this juncture, before any formal

study has been conducted, it is difficult to estimate the total power available to the city through the use of new and innovative in-conduit hydropower technologies. Suffice it to say, however, it is Lucid's experience that water systems such as New York City's lend themselves to significant power generation. Based on our testing experience in the laboratory and the field, I am confident that New York City's water system could produce considerable amounts of renewable energy from in-conduit hydropower.

So I want to talk a little bit about Lucid Energy and our technology. We're commercializing an in-conduit hydropower technology called Northwest Power Pipe and our company's mission is to develop in-conduit hydropower systems that generate renewable energy for water utilities and municipalities. The development of Power Pipe has been actively supported by our development partner, Northwest Pipe Company, a highly regarded and long-standing market leading manufacturer of steel pipes used in the water industry. In fact, Northwest Pipe has supplied steel pipe used in New York City's water

system for over 25 years. Additionally, Lucid Energy has received over $1 million from the Department of Energy in the form of two grants to further the development and commercialization of Northwest Power Pipe.

So what is Northwest Power Pipe? It's a unique in-conduit hydropower system and is Lucid Energy's core technology. So it's a vertical access turbine that captures excess kinetic energy within water systems. The payback period associated with the deployment of power pipe is very competitive with other renewable energy technologies. Power Pipe is modular in nature and easily scalable so that a system can be designed to extract excess pressure without significant impact on water distribution. In other words, our technology can generate power from a pipeline without impeding the utility's ability to move water to the consumer or through a waste treatment system.

It should be pointed out that the amount of excess pressure required for the use of a power pipe system is very low compared to conventional hydropower technologies. Power Pipe

allows for power extraction across a wide range of pressure conditions and we feel fills a gap in the matrix of conventional hydropower, allowing for gravity fed systems like the city's to generate power where it had not previously been possible.

In-conduit hydropower technology such as Power Pipe do not threaten fish, wildlife, and watersheds because they're deployed within a close conduit system. This fact significantly eases the key regulatory burden associated with the development of conventional hydropower projects.

The benefits of harnessing the city's untapped hydropower with innovative technologies such as Power Pipe are significant. These benefits are both environmental and economic in nature and outweigh the costs associated with such an undertaking.

I want to speak to the regulatory climate for in-conduit hydropower. As we've heard FERC discussed today, it should be pointed out that, again, or echoed once again, that FERC has primary jurisdiction over hydropower projects in the United States and requires an approval process

in order to commence with hydropower project development. Likewise, in-conduit hydropower projects are also subject to FERC jurisdiction, however, the good news is that in-conduit projects qualify for an exemption from the standard licensing process and the exemptions are issued in perpetuity. Obtaining an in-conduit project exemption is more expeditious and less costly than obtaining a traditional license.

In fact, in the last year, FERC has announced plans to further expedite the process of obtaining an in-conduit exemption as a result of its work to further small and low impact hydropower projects. As a result, in-conduit exemptions have been issued by FERC in less than 90 days and rarely take longer than 180 days to be issued. This bodes well for forward-thinking cities like New York City that wish to explore the potential for hydropower within its water system.

So given that, Lucid Energy believes that in-conduit hydropower presents New York City with an excellent opportunity to generate renewable energy from its water system, both economically and expeditiously. In order to

more fully understand this opportunity for the city and its constituents, Lucid Energy recommends that the following three actions be taken: I'll call it, A, resource assessment. Create a team of technical experts, draw from the government, the hydropower industry, and the city and charter that team to, number one, identify the low hanging fruit, such as sites with sufficient flow, excess pressure, and reasonably convenient access.

Number two, create an inventory of New York City's potential hydropower assets that meet the predetermined parameters.

And number three, evaluate the benefits of deploying conventional and in-conduit hydropower within the identified inventory.

B, let's talk about assessing the available in-conduit hydropower technologies, see that being done through the implementation of an in-conduit hydropower pilot study. That would, one, evaluate the performance of technologies for suitability and wider deployment; two, evaluate the impact of these technologies on water system performance; and number 3, create a tangible demonstration of the city's commitment to clean

energy and reduction of its carbon footprint.

And finally, with respect to the regulatory climate, initiate contact with FERC to develop a program specific to the needs of New York City. As we heard earlier today, the state of Colorado was able to sign a memorandum of understanding to fast track in-conduit hydropower projects, and that's had a great influence on the folks at FERC and their willingness to expedite this exemption process. New York City commands the same respect that the state of Colorado does.

So that contact with FERC would be specifically to support an in-conduit hydropower study; second, to support wide scale deployment of in-conduit hydropower in the city, and finally, to negotiate an agreement that eases the regulatory burden associated with low impact and in-conduit hydropower.

And I would add that, in addition to the federal level, include consultation with state and local officials that have regulatory responsibility.

These action items required to assess the opportunity for New York City can and

should proceed concurrently. The required assessments will take time to conduct and FERC has offered a window of opportunity to work on streamlining its process. The city should not miss this opportunity. Likewise, the committee support of such an assessment is critical for the city to benefit from its substantial capacity for hydropower deployment--or development, rather.

In conclusion, think about it this way, in the time it has taken me to give this testimony, millions of gallons of water has passed through the New York City water system. Those millions of gallons of water represent an enormous amount of energy that could be captured and turned into many megawatts of clean renewable power. This committee can help the city understand the opportunity that exists within its own water system for generating renewable energy. Harnessing the hydropower capacity in its water system will bring economic benefit to the city in the form of revenue and jobs, and environmental benefit to the city by reducing its carbon footprint in its reliance on fossil fuel-based energy technologies.

And I would add this undertaking to exploring conduit hydropower aligns with DEP's strategic plan that they just released, there are several points very relevant to what we're talking about here today.

So I'd like to thank you, Chairman Gennaro and members of the committee, for allowing me to testify, it's my hope that the city takes this opportunity to improve its bottom line and its environment. And I welcome any questions you may have.

CHAIRPERSON GENNARO: Thank you very much, Mr. Kanagy. So I'm very happy that you chose to be generous with your time and come out once again to our fair city to, not only talk about your technology, but make some very helpful recommendations regarding the role that this in particular committee can play to try to spur a detailed assessment of and deployment of this kind of technology which holds great promise for the city.

Tell me about your involvement with DEP to--pardon me--to-date.

JOSH KANAGY: Sure--

CHAIRPERSON GENNARO: Talk a little bit about that.

JOSH KANAGY: --sure, Lucid has not had direct involvement with the DEP. We are approaching a commercial product and the opportunity that working with the DEP presents to Lucid has sort of not warranted contact to-date. We have been working on pilot projects in other areas of the country and really focused on commercialization, so it is our intent to engage with folks like the DEP--

CHAIRPERSON GENNARO: Sure.

JOSH KANAGY: --especially given the interest that the city has shown.

CHAIRPERSON GENNARO: Sure. Could you tell me a little bit about where the technology is currently deployed or like where you hope to deploy it or--

[Crosstalk]

JOSH KANAGY: Sure, sure. We have a pilot project in place in Riverside, California, with a second and third project to come in Riverside this summer, and we are in the process of--

CHAIRPERSON GENNARO: [Interposing] Who's the client or whatever?

JOSH KANAGY: The City of Riverside is the--

CHAIRPERSON GENNARO: Okay.

JOSH KANAGY: --client. Riverside's in a unique position, they are both the water utility and electrical utility for the city, so that--

CHAIRPERSON GENNARO: Oh, I see, yeah.

JOSH KANAGY: --so that makes dealing with their counterpart on the utility side simpler than--

CHAIRPERSON GENNARO: Sure.

JOSH KANAGY: --is the case in other--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] How many people live in Riverside? How big a town is that?

JOSH KANAGY: I believe it's several hundred thousand--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --in Riverside, so they have created some RPS standards of their own and see our technology fitting with that. It currently our technology is deployed in a 60-inch pipeline that delivers water from the Gage Canal, as it's known, to a reservoir where it's then pumped to end users.

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: And we are also working on a pilot project with the City of Dallas, we're in the final stages of negotiating that with the Dallas water utility, that project will be installed in a wastewater treatment plant where the--in the effluent discharge line--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --so the water has been treated, it's in a 72-inch line on its way to return to a river. So--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --those are the types of locations that we look for, suit our technology.

CHAIRPERSON GENNARO: I see, and like the other technologies, it--I'm trying to get

a grip on this concept of pressure differential versus just water like going through a pipe and like spinning a turbine, I'm trying to--

JOSH KANAGY: Sure, so--

CHAIRPERSON GENNARO: --get a handle on that.

JOSH KANAGY: --so water is flowing through a constrain--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --pipe and there is pressure in that system and so you can think about the relationship of, I say, of velocity and pressure, if you have a garden hose and you put your thumb over the end--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --you create more pressure. So what our technology does is as the water passes through the turbine, it's a lift-based turbine, which is unique for hydropower, it harvests energy that's in the form of pressure. So there is a differential in the pressure in front of the turbine and downstream of the turbine.

CHAIRPERSON GENNARO: So it's not

just like the water is turning something.

JOSH KANAGY: It actually does turn the--

CHAIRPERSON GENNARO: Yeah, right.

JOSH KANAGY: --turbine, but the energy that's extracted is the energy that's there as a result of the pressure.

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: Okay. In all hydropower, two components are critical, as you heard someone here state earlier today, it's all about flow and head so the--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --speed and volume at which the water is moving through the pipe and the pressure available for extraction.

CHAIRPERSON GENNARO: Right, and so you got Riverside 1 that's up and you got Riverside 2 and 3--

JOSH KANAGY: Coming, yes, that's correct.

CHAIRPERSON GENNARO: --soon to happen, and you're working out something with Dallas now.

JOSH KANAGY: That's right.

CHAIRPERSON GENNARO: And these are big main, sizable, you know, the types of things that we would have--

JOSH KANAGY: That's right.

CHAIRPERSON GENNARO: --in the city. And the power generated from one of these devices, is it a series of them, is it one that all--how does that work?

JOSH KANAGY: Sure.

CHAIRPERSON GENNARO: Yeah.

JOSH KANAGY: So the initial installation, Riverside was a single unit and--

[Crosstalk]

JOSH KANAGY: --generates 25 to 30 kilowatts of power. The second installation in Riverside will actually be units installed in a series. We have tested this concept at Utah State University extensively, what it looks like--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] That's my brother's alma mater.

JOSH KANAGY: Really? Okay, great.

CHAIRPERSON GENNARO: Yeah, yeah.

JOSH KANAGY: What it looks like to put these things in a series and its impact of the water flowing through the pipeline. 'Cause we understand that the DEP's number one priority is deliver water, not--

CHAIRPERSON GENNARO: Right, sure.

JOSH KANAGY: --generate power, so we have to--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --play in that space. So the idea of our technology is it's modular and scalable, so to the extent that there is pressure available to be extracted and the velocity is sufficient and the pipeline diameters are in a certain range that we want to work in, units can be added in a modular nature to harvest what's there. And given that, we find that our technology, as you heard some discussion earlier, is for one, from a cost standpoint, it's equal to or better than solar, it's competitive with wind--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --and the power is predictable, the water is flowing, so we're not dependent on Mother Nature to--

CHAIRPERSON GENNARO: Sure, sure.

JOSH KANAGY: --generate power.

CHAIRPERSON GENNARO: Now the kind of operational paradigm that you're doing now in Riverside and that you contemplate in Dallas, is it the kind of arrangement where Lucid owns it, deploys it, maintains it, fixes it, and like has a--

JOSH KANAGY: Sure.

CHAIRPERSON GENNARO: -- relationship with like--

JOSH KANAGY: Sure.

CHAIRPERSON GENNARO: --the client and they still do their regular business, whatever it is, flowing water and stuff, and you guys mind your own technology there and they have some beneficial agreement with you and that they get money for this or something, right?

JOSH KANAGY: Yeah, so there are basically two models at work--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --one is a simple capital expenditure on the part of a city or client, water utility, whereby, here's the

technology, we'll help you install it and you will buy it from us and reap the benefit of the power produced behind the meter--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --to help offset costs. The other model is to use a power purchase agreement, which is common in wind and solar and conventional hydropower--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --technologies. At Riverside, we are in the--

[Crosstalk]

CHAIRPERSON GENNARO: [Interposing] Which would mean that the latter would mean that you would continue to own it and operate it and--

JOSH KANAGY: Correct.

CHAIRPERSON GENNARO: --deploy it and you sell it and you deal with people and then the people whose water you're using to generate, they get some benefit, some money or some--

JOSH KANAGY: Right.

CHAIRPERSON GENNARO: --some cut so to speak.

JOSH KANAGY: Correct, so at

Riverside initially, we provided the system in exchange for them letting us use their water, they received the benefit of the electricity and it allowed us to field test our technology--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --if you will. Now that we've had some time there with Riverside, we're in the process of converting the project that is installed in the second and third one to follow to a power purchase type agreement where the city's cost is based on the kilowatt hours of energy produced by the system. So Lucid installs the system, contracts the maintenance and upkeep of the system with a local third party--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --and we meter that electricity generated, and the city gets RPS standard credits, they accrue any type of renewable energy credits, RECs--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --if you will, tradable RECs, and so that's the arrangement that we're working with at Riverside.

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: In Dallas, we will conduct about 60 days of testing once the unit is installed and Dallas has the option to buy the system outright based on the results of the testing if they feel it fits in sort of their capital budget--

CHAIRPERSON GENNARO: Right.

JOSH KANAGY: --parameters, they'll buy it outright, the payback is good, they'll purchase it. Otherwise, we'll enter into a power purchase agreement with them, the power will stay behind the meter, they'll use it onsite to--

CHAIRPERSON GENNARO: Yeah.

JOSH KANAGY: --power some pumps at the wastewater treatment plant and we'll go about it in that regard. So there are a--

CHAIRPERSON GENNARO: Okay.

JOSH KANAGY: --couple different models to look at.

CHAIRPERSON GENNARO: Sure, yeah, and I just wanted to get some insight on how--

JOSH KANAGY: Sure.

CHAIRPERSON GENNARO: --that was working. And it's certainly my hope that you use

the opportunity of being here today to talk to Rick Muller and certainly I'd like the good folks at DEP to become knowledgeable, not only to your technology, but those that have been brought forward by the good people that took the time to come here today, and that's just something I'd like to see happen.

And so I greatly appreciate your being here today and I wish you well with your relations with, not only your other clients outside the city, but hopefully New York City will be able to reap the benefits of your good technology as well. And I really--

JOSH KANAGY: Thank you.

CHAIRPERSON GENNARO: --appreciate you being here.

JOSH KANAGY: Thank you.

CHAIRPERSON GENNARO: And so thank you. And with no one else wishing to be heard, I want to thank those witnesses that have come from near and far to give us the benefit of your technologies and to answer some questions that I have. I thank the staff for putting this hearing in place. And with that, this hearing is

adjourned.

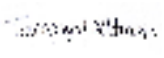
[Off mic]

CHAIRPERSON GENNARO: Just hang back for a second, guys, I want to talk--

[Off mic]

C E R T I F I C A T E

I, Tammy Wittman, certify that the foregoing transcript is a true and accurate record of the proceedings. I further certify that I am not related to any of the parties to this action by blood or marriage, and that I am in no way interested in the outcome of this matter.

Signature 

Date March 14, 2011