

NDRC: Approaches to Infrastructure Financing
Webinar Transcript
Thursday, August 6, 2015
3:00 – 4:30pm EST

Sandy Patel: Good afternoon everybody and thank you for joining us for the NDCR [Inaudible 00:00:43] I'm sorry. [Inaudible 00:00:44] Sorry about that. Once again, sorry. Good afternoon everybody and thank you for joining us for the NDRC topical resilience webinar phase II series. Today's topic is approaches to infrastructure financing. My name is Sandy Patel; I am with TDA a technical assistance provider for [Inaudible 00:01:17]. I will be serving as your host today. I am going to run through some technical instructions on how to ask questions and things like that before I hand it off to our wonderful presenters. Please turn off your cell phones and close the email and all other programs on your computer and give your undivided attention to our presenters today. If you have any technical problems you can call TJ Winfield at the telephone number on the screen or you can send a chat message to the host that will come directly to me and I can help you through any issues you might be having.

All participants will be muted during the call. Questions can be asked in two ways. You can ask a written question using the Q & A tool or a verbal question via the conference call. You can ask a written question at any point during the presentation. The panelist will collect those and answer them when we stop for questions. To ask a written question use the Q & A tool. It is located on the right hand side. You can see a screen shot of what it looks like up on the screen. If you do not see it click the triangle and it will expand the box. Please ask question to all panelists. Then just type your question in the question box and click send, again those you can do at any point during the presentation. You can also ask questions verbally. There is one step that you will need to do in order to do that. You will need to connect your phone line to your online log in in Webex. If you take a look at the participant panel you will see your name under the attendees. If there is a phone icon next to your name like there is one on the side here then you are all set. If there is not a phone icon next to your name you will need to look on the event tab, midway down the page there is an identity code. It says pound then a number then pound. You can put that into your telephone keypad at any time. When you are ready to ask a question when we pause there is a hand icon on the lower right hand corner of the participant panel. If you click on that you will virtually raise your hand. We will take questions in the order they are received. We will unmute your line and ask you to ask your questions at that point. All questions whether written or asked verbally will be answered verbally. We may not be able to get to all questions but we will try to answer common questions first. Please send additional unanswered and private questions to the email address on the screen. That is resilientrecovery@HUD.gov. With that I'm going to hand it off to Harriet Tregoning (ph) HUD's principal deputy assistant secretary for Community Planning and Development.

Harriet Tregoning: Thank you Sandy. Welcome everyone. It's really a pleasure to be with you here today. This webinar is part of a series HUD is conducting as part of the National Disaster Resilience Competition and the webinar will cover issues and approaches to resilient infrastructure development and financing. We recognize the critical role that infrastructure plays in building resilient communities and this webinar will provide information useful to groups preparing their phase 2 applications as well as communities that are seeking resilient equitable and cost effective infrastructure outcomes.

Let me introduce our two additional speakers today: Douglass Sims is the director of strategy and finance at the Center for Market Innovation with the Natural Resources Defense Council. Doug focuses on next generation energy, food, water, shelter and infrastructure investments at the Natural Resources Defense Council. He's joined in our DC Center for Market Innovation on April 2010 after many years at an

NDRC-Approaches to Infrastructure Financing – 08/06/2015

international law firm working on the project financing of energy and other infrastructure projects in Latin America, Africa and other places.

Todd Rydstrom is the Deputy Comptroller, City and County of San Francisco Comptroller's office. Prior to being appointed as San Francisco's deputy comptroller in 2014, Todd served as the assistant general manager and CFO of the San Francisco public utilities. During his tenure they implemented a 5 billion dollar water system improvement program covering over 80 projects that increased bay water supply reliability, storage and seismic upgrade resilience. Todd has over 25 years of public and private sector finance experience having served San Francisco for the past 14 years and previously worked in the pension fund industry in the US and overseas with the Principal Financial Group.

Here's an overview of today's webinar. I'm going to provide a brief update on the national disaster resilience competition and share information on the federal government's interest in resilient infrastructure; then I'm going to turn it over to Doug and Todd, followed by time for discussion and for you to ask questions. We'll hold the questions until all the presentations are done. Before we start, I want to note that the information presented in this webinar is independent of the notice of funding availability for the National Disaster Resilience Competition. While we expect that this information will be useful to understand communities and eligible applications, it should not be construed as the definitive word on any singular approach to resilience. We're not going to answer NOFA NDRC questions during this presentation, but instead you should direct NOFA specific NDRC questions to resilientrecovery@HUD.gov.

The National Disaster Resilience Competition makes available nearly a billion dollars to communities that have been impacted by natural disasters between 2011 and 2013. The competition also encourages communities to not only consider how they can recover from a past disaster, but also how to avoid the impacts of future disasters and to be more resilient. This chart highlights where we are in the competition process that star is kind of where we are right now. During phase I applicants can consider their disaster recovery needs, their vulnerabilities, stakeholder interests, resilience, community development objectives and investment alternatives. At the end of June, HUD announced the applicants that had put together the best approaches to resilient recovery and they were invited to participate in the phase 2 of this competition. We're now in the 120 days period where applicants are refining their approaches to meet the needs and objectives identified in phase 1 with specific projects. The deadline for phase 2 applications is October 27. HUD will review these applications and announce winners in 2016, early 2016. Competition applicants recently had the opportunity to attend resilience academies sponsored by the Rockefeller Foundation, our partner in this competition. Speakers from Enterprise and Refocus provide information on financing at this event. Today's webinar provides a long term perspective and offers additional information on the research and examples of how communities are addressing the financing and funding as they advance resilient equitable infrastructure proposals. Our goal today is to highlight how important it is to consider and incorporate financing strategies early in the planning process, and to reach out to funding experts and partners to better understand both the opportunities to work together and the challenges that you might face in your projects.

We're keenly aware, all of us, that the infrastructure challenges faced in communities across the nation. Our existing roads, water and sewer systems, transportation and communication systems are in pretty poor condition. As a nation we've under invested by billions of dollars in maintaining and updating what we have, as well as largely failing to fund new infrastructure to take our country into the 21st century. The private sector is interested in infrastructure investments, but many communities lack the capacity to effectively determine how to assemble complex projects or evaluate their options for funding and potential partnerships with the private sector. The processes that we use to develop and prioritize projects are lengthy and complex, so that every community has a project that they've been working – that's been working its way through the system for years, maybe even decades. But are these the projects designed

NDRC-Approaches to Infrastructure Financing – 08/06/2015

and meet the last century's needs or are they really 21st century projects where we should be investing our limited resources?

I'd argue that we're at an inflection point today. Our infrastructure needs have to be future proofed, really based on scenarios about future demands, they have to be designed to respond effectively to the rapid rate of change that we're seeing. This includes climate change where more, where more frequent and severe extreme weather require planning for different conditions.

It also means anticipating changing technology and preferences. Could we have predicted how rapidly we are changing the ways that we learn i.e. online, how we shop, get to work and once there how we conduct our businesses and our meetings? And as we are increasingly aware the needs to make sure that our infrastructure systems meet the needs of all members of the community - providing safe and affordable drinking water, making sure all the transportation systems connect low income communities with job and educational opportunities, and extending broadband services into rural areas.

Basically, we couldn't draw a straight line from 40 years to the past to 40 years in the future and be even remotely correct about those infrastructure needs. So, communities are demanding more and more from their infrastructure. We have less money and we need it to do more things for us. Communities are seeking infrastructure that's cost effective, capable of layering and multiple sources of funding, and fully accounting for life cycle costs and benefits. Communities want infrastructure that's resilient not just to handle extreme weather but other stressors that might occur such as economic down turns or even major spurts in growth. The best infrastructure projects that we are seeing, the ones with the greatest public support, start by considering first what the overall community needs are and then planning and designing infrastructure to meet those needs rather than starting with the project and seeing if you could find some community benefit down the road.

The best projects are capable of providing multiple benefits and equitable outcomes. Jurisdictions today find that their infrastructure must meet multiple needs where transportation projects incorporate other utilities and offer storm water features such as green infrastructure as just one example. As we discussed during this webinar, these multiple benefit projects create opportunities to layer in new funding sources and to work with the new partners, which might include different public agencies, private sector partners, or even philanthropy. Infrastructure investment is an administration priority. HUD is one of 11 agencies participating in the White House Build America investment initiative launched last year. Already this collaborative effort has established two centers of excellence focused on infrastructure financing, identified opportunities to provide greater flexibility and financing and partnership mechanisms, and fostered numerous conversations between infrastructure providers, potential investors, and federal, state and local agencies.

HUD is a member of Build America working group along with 10 other agencies and HUD programs play an important role in infrastructure development. For example, the community develop block grant fund are an important resource for infrastructure development, with half of state CDBG funds and about 1/3 of overall program funds spent today on public facilities and infrastructure. HUD has been particularly engaged on the topic of infrastructure pre-development or planning. This activity covers all the actions that happen before the first shuttle hits the ground: planning, design, engineering, environmental reviews and permitting, public and stakeholder engagement and funding and financing strategies. Pre-development activities can have an outsized impact on infrastructure outcomes. Think about it: this is when and how infrastructure projects are selected, designed and shaped in response to stakeholder needs.

There are several resources to help with infrastructure, including its planning and pre-development. The Build America Working Group developed a guide of existing federal programs that can be used for planning and pre-development or provide resources that can provide support to pre-development. The agencies

NDRC-Approaches to Infrastructure Financing – 08/06/2015

involved in Build America collaborate on a set of principles to guide pre-development practices to achieve the outcomes communities are seeking. These principles reflect many of the lessons we have and are continuing to learn from recent disaster recovery efforts, the work of the partnership for sustainable communities, and many of HUD's recent programs including the sustainable communities initiative, strong cities, strong communities and choice neighborhoods. Many of these place based initiatives have already helped communities do the conference and planning work at the regional community scale that can support better infrastructure projects and proposals.

We hope that the National Disaster Resilience Competition will be a great source of examples how different communities are identifying resilient, equitable and cost effective infrastructure providing multiple benefits. So I'm very excited to hear from our two speakers. Communities are considering how triple bottom line infrastructure projects can be developed in advance, but funding and financing to bring these projects to fruition is certainly complex. Doug Sims is going to start with a broader overview of how to advance triple bottom line projects, including some of the public and private financing strategies. Then Todd Rydstrom is going to take us on a deep dive into how San Francisco has been able to build major resilient water infrastructure projects over 15-20 year time frame. With that let me turn it over to Doug.

Doug Sims: Thanks Harriet, can everyone hear me?

Harriet Tregoning: You sound great.

Doug Sims: Okay excellent. So, thanks for joining everybody this afternoon. I wanted to talk to you a bit today about some work we're doing over the last six to eight months for the Ford Foundation about unlocking the market for more and better infrastructure. Next slide please.

So, start with this picture because it really shows you the core of what we're trying to avoid. The term we've used in this project is high road infrastructure. What we're trying to avoid is what we call low road infrastructure. And here's a typical 1970's era city, where you see nothing but impervious surface, no bike lanes, no ability for pedestrians to cross the road, fossil fuel infrastructure only, no bus lanes. You see unhealthy food, and if you look closely you can see a Payday and a liquor store. And the standards that's applied in this case in these environments really was one of expediency, not standards of community, development, resilience or environmental performance. Next slide please.

So, as we know from what Harriet said, we face a big crisis in infrastructure and we know there's the oft quoted number of 3.6 trillion by 2020 of basic infrastructure that's needed. There's also a climate crisis and we're talking about almost 200 billion in weather damage to cities alone in the last three years. We know that most carbon emissions are connected directly or indirectly to cities, and all of these infrastructure challenges affect competitiveness of cities and making it harder for them to compete with international competitors, even national competitors and provide the kind of quality life we all want to achieve. So, the investment infrastructure creates opportunity both for increased productivity and quality of life, as well as resilience and environmental benefits. But to get there you need standards to elevate the right projects. Next slide please.

So as Harriet was mentioning, we have a big down payment from – on the planning side. We've come a long way in our ability to pull parties together and create integrated plans for infrastructure and community development. And a lot of that great work was done by HUD sustainable communities grantees in the last two years. Next slide.

So our project takes up where planning stops. We know well that the administration has done a lot on place based initiatives, building capacities, the plans for more positive high road outcomes. And there's also – we know that there's a lot of at least talk about investors wanting to invest in infrastructure: pension funds,

NDRC-Approaches to Infrastructure Financing – 08/06/2015

regular commercial investors, impact investors, the muni bond market is actually showing some interest in doing infrastructure more broadly. But there's really no pipeline of projects to invest in and no way to have standards to lift up the better and worse projects. What we've tested in this project was: how do you improve the pre-development process? So what goes into cities to develop infrastructure is of high quality so what comes out is high quality. What are the missing tools, standards of capacity to get us from vision, which is the planning, to implementation? Next slide please.

So, the Ford Foundation asked NDRC to assemble a team on this project, and we had the full gamut from CH2M which is a major engineering firm, energy and water specialist and had experience designing some of the new tools that are helping this class of assets emerge. We've also had some experts in municipal economics and pre-development and also some people who've worked a lot in the TOD world, trans organizational development. We've also added a close collaboration with the Institute for Responsible Investment up at Harvard University, which is a gathering of pension funds who want to do better both for reasons of what their pensioners want to achieve with their savings and also to assure that those savings are properly protected in sound, long term, real economy investments. We also involved federal policy specialists and some of the community scale infrastructure and portable housing specialists in the form of Enterprise and LISC. Next slide please.

So, what have we been doing the past six months? We've been – the first thing that Ford wanted to do was try to evolve the discussion away from what this binary discussion of public/private partnerships or no public/private partnerships. That's kind of a false choice, because we need to have, as we know, the muni bond market has really been the workhorse for infrastructure and will remain that way for the foreseeable future. We want to encourage more public/private partnerships but in ways that, um, actually align with community interests and align the public and the private in the right way. So instead of that frame – the frame we've been trying to achieve is no matter how you finance the project, we want more and better public and private financing support for infrastructure. We also are looking at how do you actually get, make that investment happen so it acts actually delivers superior benefits to communities and can be – can have some visibility from project conception to implementation so we're sure that when we start, we're going to finish with the right project that delivers the right benefits. And we also had the pleasure of engaging on the ground with a couple of cities looking at their frustrations and their projects on infrastructure projects and we're working with Denver and Los Angeles looking at what's getting stuck in their pipeline, taking those projects and workshopping them with the federal government deal makers and investors. Next slide please.

So what is high road infrastructure? It's really a triple bottom line concept as applied to the public sector. It's infrastructure which fulfills its core function, whether that's providing energy, managing storm water, transporting people, but also delivers resilience environmental and social benefits cost effectively. Next slide please.

So at the core of high road projects are standards. What are standards? As we saw in that early slide, the only standards that have been applied traditionally to infrastructure have been really ones of trying to minimize the short term capital costs and to meet minimum service requirements. High road analysis starts with applying other kinds of standards, so we have environmental and resilience standards that account for the true costs and benefits that are standards related to water, pollution, air pollution, carbon pollution and also natural disaster preparedness. We have social standards, which ensure there is value added in communities who have been extracted, that means jobs, affordability, transparency of process, constant community engagement to ensure legitimacy. It also means of course, critical financial standards to include those projects that are viable over time and that actually deliver value for money. So what are those standards? Return on investment, net present value, life cycle analysis. Make sure the contracts and their structured NP3 for example have appropriate public and private risk allocations so one party is not doing

risks that it can't appropriately bear. And also they function to signal long term value to investors. Investors are increasingly are looking at these issues as signs of long term values so you hear the term ESG - these are environmental, social and governance investment screens which more and more investors use to screen out bad investments. There are also efforts in responsible investing to include positive investments and that's kind of where the high road comes in.

So investors can see when you have high road standards embedded you have national – you have hedge protection or insurance against climate natural disaster risks, you promote real economy growth and you actually increase the possibility that a project will get billed as is planned. Next slide please.

So how do these standards function and different players who are looking to do more and better infrastructure? The public sector generates a long list of capital projects, and those projects need to be prioritized other than by means of political expediency and community activism. It allows the public sector to prioritize projects and it allows the federal government, for example, to allocate subsidies, target subsidies to those projects which get the most high road benefits. Philanthropy wants to catalyze this space and it allows philanthropy to actually also prioritize, target its resources and also engage stakeholders around high road outcomes that they want to achieve in their communities. Also investors, as you've seen the previous slide, use these for vetting projects. And, most importantly, citizens when they have transparent standards which they can understand and have participated in formulating can judge whether they are being implemented in the actual projects. Next slide please.

So what happens when you apply these high road standards? You are going to elevate the highest value projects, you're going to get real results in the real economy, you're going to get resilience results, you're going to get carbon results, you're going to protect natural resources and most importantly improve quality of life. You're going to build consensus around what gets done and you're going to insure that the money that is spent is spent the appropriate way. Next slide please.

So what are examples of high road infrastructure? There's a couple ways to think about it. One way there is high road subsectors which are inherently have some aspect which we determine as socially, environmentally or in terms of resilience, high road. So the most familiar ones perhaps of the environmentally focused ones: solar, PV charging, energy efficiency, energy storage, green infrastructure for storm water. There is also a class of resilience assets which like the ones I mentioned in the environment are mostly distributed: this is recycled water, infrastructure hardening, micro-grids. But then there's also social infrastructure, so trans organizational development, affordable housing, parks and green space, food hubs and health clinics and access to jobs. Then there's the place based initiatives which aren't always thought of as infrastructure but in fact, have infrastructure characteristics. This comprehensive community revitalization will include economic development and things like district water, district energy, district waste. Place based resiliency efforts and urban renewal and connectivity to jobs and other urban assets. Next slide please.

There's also critical stuff done the right way. So – and this is mainly in many respects around making sure that some of the more unfortunate examples of public/private partnerships where you have privatizations to lower labor costs, for example, are avoided. It also involves where you cite these large projects, and what communities these large projects serve. So, any of these projects, whether community scale projects or large scale critical infrastructure, need to have a process undergone to evaluate them for high road characteristics, mainly their social environmental and resilience characteristics. Next slide please.

So, if it's such a great idea to do this kind of development of infrastructure, why isn't it being done? So we looked into that in some detail. Next slide please.

NDRC-Approaches to Infrastructure Financing – 08/06/2015

So, we mentioned some of these already, we don't have to go through each of them, but privatization for short term benefits, labor arbitrage, trying to reduce labor costs and get savings that way. Making bad decisions based on short term austerity, even though long term it makes sense to make an investment that actually benefits the community over time. Not planning or designing for resilience, not seeing or capturing synergies, this is really a critical one. When you have traditionally - as Harriet was saying, when you're designing for this century, or for the last century. In this century, we're seeing more inter-related assets. For example, we're seeing in California there's an issue with storm water management, an issue with fresh water management because of drought. But investments in fresh water are typically not handled by the same entities and government which handled investments in storm water. So how do you make – how do you cut across the silos and see that the single investment in water infrastructure could benefit both?

Also, locking in technologies which are outmoded, which Harriet also mentioned. How do we make sure that we build into the useful life of an asset the ability to upgrade it in an economic way? How do we make sure that we transform places without displacing people, so allow people who are living in a place right now to benefit from its recovery and not be forced out? These are all aspects of the low road. Next slide please.

Institutionally there's some structural road blocks; I kind of touched on this one in the last slide. There's no single entity with the responsibility and capacity to move projects forward, often cases. You may have, for example, an effort at the mayor's office in the place where there is a weak mayor / strong council, where the mayor tries to push through single vision with a sustainability plan, but can't get it through. And you'll have separate departments responsible for the different aspects of high road infrastructure. So it's hard to again, cut across those silos. There will be enabling environment may not be aligned. There may be issues where permitting for example can really slow down and distributed effort to deal with storm water through green infrastructure. We'll talk a little bit more about that when we get to the Prince George's County example.

Also life cycle costs, O&M [operations and maintenance], and capital not considered together. So, you don't look at the cost of capital and then you don't realize over time that the solution that you've chosen for O&M is not cost effective and a different solution would be better from a design for O&M. And we talk about again, technology issue and not really getting continuous feedback from the community. Often times in our research, we discovered cities will reach out early in the process to set policy priorities to the community and they won't come back. For example, when the project list has actually been determined and prioritized. Next slide please.

Importantly, even when there's the best of intentions there's a lack of capacity in many cases. And most of this is just bandwidth, time to actually do things different way. Also how do you apply and find the right standards? What are the right standards? Sometimes standards are easy to find, we're talking about MS4 permits, you know the clean water standard. What about a community engagement standard, what's that? How do you find that? What's the right one? Again, we're back to the siloed problem on budgets and decision making. There will be a lack of expertise to deal with some of the new opportunities from investors that are presenting to deliver innovative solutions for finance and delivery. And similarly, that cuts over to the ability to look at innovative solutions that involve things like, for example, social impact bonds and green bonds. Trouble identifying funding sources and financing sources for priority projects: so how do you actually align the federal grant funding with the impact investing funding with the funding from traditional financiers? Next slide please.

We won't go over these in any more detail but these are some of the things which we see on the funding side. I'll just highlight some of the key ones for some of these new kinds of assets. So those scales of projects are not aligned to funding sources. Some of the money that's out there, like in pension funds, requires 100 million dollars of investments to be made. Some of the needs in communities are more in the

NDRC-Approaches to Infrastructure Financing – 08/06/2015

10 million dollar, 20 million dollar scale. So there's a funding size mismatch there. We talked also about how do you really value some of these avoided costs and outcomes with the tools that we have; don't value those. I know there's some that are being developed and utilized in NDRC process which we hope to understand better and apply more broadly in other cities not in this process.

When there are some deals which are interesting that are philanthropically supported, that are pilots that can be too complicated to replicate, that's a problem, and then we mentioned earlier the problem about traditional public/private partnerships having a bad name because either the public sector bore too much risk, or the private sector bore too much risk. Next slide please.

So what are we doing about all of this – all these problems? There's a couple ideas that we're working with. Next slide please.

So we know that we have better planning that's under way as part of what's happening now with the NDRC competition. Sustainable Communities as we mentioned earlier has taken that a long way forward. But this really needs to become business as usual to get on the high road quickly and consistently. Next slide please.

This is one of the most important parts of our research in our findings, and this is something which we can look at in the next slide in practice. But the pre-development process doesn't lead to high road outcomes. It doesn't integrate and embed standards. And so this is a process which we've been developing a partnership with several federal agencies or pilot cities and others that tries to look at cities who have succeeded in getting this done and what they actually have done. And so these protocols if they can be followed we think really can help cities arrive at better outcomes. So what are the ones which are somewhat different than usual process? Well, step one really is establishing the framework. This is having the vision, this is having sustainability plan that aligns all the agencies about what high road means, what's being valued by the community. It's really critical to having across the board vision of what high road looks like. Also using those – that vision and the relevant outcomes from that vision to identify which projects in the pipeline have meet the standards, that's critical, because some projects won't, but you have to go through the process of using that environmental, social and resilience screen to create the pipeline and push other projects back to be de-prioritized or not completed. Early in the process, figure out the funding sources and the relevant finance delivery strategies. And also identifying screen procurement mechanisms that may not ordinarily consider in a normal process. Identify target investors, understanding what characteristics the investors have, whether they're looking at a traditional muni bond delivery project, or a project delivered through a P3 solution, or something in between. It's important to get that – those investors on the table, understand what their characteristics are, what their money can do and incorporate that early in the planning process.

And then, identify project bundling needs and opportunities. One thing that we found is some of the most high impact opportunities for social impacts don't have revenue sources, and so cities are having trouble financing them. So, what we're seeing is innovative cities are trying to bundle those non-revenue generating projects with other ones. So, for example, we'll look in the next slide, Prince George's county has really bundled some community development opportunities regarding beautification and neighborhood benefit to opportunities to invest in storm water infrastructure as an example. Another one we're seeing in Denver is where some of the CDFI's in Denver are doing some affordable housing development and as part of that they're trying to finance some connectivity investments which connect the neighborhood to other communities for jobs and amenities. But those connectivity, those sidewalks, those neighborhood betterment projects don't have cash flows so they get deprioritized, but can they be bundled? Can we systematically look at bundling as part of the pre-development process to get the high road outcomes?

The rest are sort of similar in the normal process, but it's important to look that in five, six and seven these are really an iterative process, as Harriet was saying it can take years to bring projects to fruition and we

need to be ready to go through these steps multiple times to insure that the outcomes that we want are preserved and reflected. Next slide.

So, quick example of how this is working in some innovative communities. So, Prince George's County is a place we spent some time in with – for this project and they have innovative approach to dealing with their storm water, their MS4 permit problem. So, looking at it through a high road lens, there's an environmental standard which is MS4 permit which is requiring them to reduce water pollution runoff. And the geography in the county is very diverse. There's economic driver. They need to actually raise the funds to pay for the storm water improvements and to raise those fees the city – sorry, the county from the very beginning understood that they could make the case better if they led with the social message, not an environmental message. So they immediately saw the opportunity to both have economic development, neighborhood betterment, jobs and education and reached out to design projects with the community around those outcomes. What are the barriers to achieving these outcomes? Pretty wide ranging. It's a complex construction project with sites all around the country, around the county, if it's done on a green infrastructure basis. There was not the ability in county to actually manage the complex project. The 2017 deadline, there was uncertainty about whether or not they could actually manage the storm water with the green infrastructure solution. And how do they actually figure out if they can achieve the social outcomes? Next slide.

So, how did this 10 step protocol operate in action in Prince George's County? And I want to repeat the 10 step protocol is derived from things we've observed that work. They didn't follow our protocol to get their outcomes. So they created that framework for the high road outcomes by translating environmental standard into a community development opportunity. They chose a pipeline of green infrastructure that actually both met the need of the storm water management requirements of MS4 permit but also yielded high road benefits. They did that by prioritizing sites which had both social value and environmental value. When they had done this, they were able to secure a very hefty storm water fee – 100 million dollars a year for three years across the county unanimously by the county government, because they'd actually done the work to make the case to have these impacts. They also, just to mention on the side, they also reached out to local church groups who have massive impervious surface requirements and they created a program where those church groups could mitigate their fee by agreeing to manage the green infrastructure themselves and teach church members about the importance of storm water management. They can mitigate their fee in that way; got the churches on board from that.

Then they identified the delivery mechanisms. They realized that had 100 million dollars per year, they didn't have the ability to manage the project so they decided to do a design, build, operate and maintain. They're financing it themselves, but they have an interesting contract structure um which allows them to both to have performance criteria related to job creation and social outcomes as well as the environmental outcomes. And to achieve that process they – they designed a very specific RFP, request of qualifications, which allowed them to target firms which have both environmental efficacy and also experience partnering with public entities and achieving social outcomes. So the winner of that process was a consortium including Corvias, which is a military housing specialist which has a lot of experience with sort of P3s with the military, and CH2M, which is a water firm. That combination beat out other firms that were only water focused because they didn't have the social aspects. Having this embedded in the process, the standard of wanting to deliver social and environmental was critical to the RFQ structure and the selection of the winning team. I mentioned before they prioritized sites with high social application value and where they are now is they are finalizing the contracts and implementing the plan to do a county wide initial 2000 acre project. So that's an example of the protocol in action. Next slide and I'm going to be wrapping up.

So, that's the T3 example. I wanted to quickly touch on a new sort of [Inaudible 00:42:50] which shows the standards are actually percolating through traditional muni-bond market. What we're seeing is that there is

a growing class of investors who actually want to – who are typically just looking at credit characteristics of bonds who also want exposure to environmental characteristics. This is called a green muni-bond market, and it's really a way of just doing a muni-bond offering and isolating the green projects and getting some independent views on whether or not these projects actually will achieve green outcomes. And then agreeing with investors that are going to report and monitor the green results of these projects. Here's representation of how that process works and we can discuss that a little bit later if we have time in the Q & A period. This is the last slide. Oh no, sorry one more slide.

So how do we implement high road infrastructure more systematically? As we've heard there's a capacity gap, there is a problem with sort of these new markets, and there's a problem across government. So what we're seeing is that what's needed is different kinds of intermediation functions to help the private market and the cities to really create this new asset class with these characteristics. So we're seeing importantly, probably in the most mature way with, for example, the West Coast Infrastructure Exchange and Partnerships BC, project preparation intermediaries - finance and development experts who help cities as if they were investment banks, but actually they're publically non-profit investment banks to design procurement processes and negotiate contracts and also leverage peer learning networks. So we talked about the environmental finance center and the new transportation efforts in this regard, which are very important efforts in addition to West Coast Exchange and Partnerships BC.

There's also market transformation intermediaries. These are efforts to really get these markets going, to help investors, the money sitting out there, to really have something to invest in. And this is more early stage and we're seeing these entities really rise as these public energy banks, the green banks in New York and Connecticut and actually now in Hawaii there's a similar entity, and there's other ones popping up everywhere. And they're really focused on helping the market and public sector create new opportunities to invest. And then of course, intergovernmental alliances where we're seeing a lot of place based work or work around assets where a lot of smaller and smaller neighborhoods or small municipalities are banding together to share knowledge and procure collectively high road infrastructure. So one of the examples is in Illinois, the Calumet storm water collaborative which is an effort for I think 700 towns and cities in Illinois to work together.

So I'm going to close this by thanks for your time and we'll have time for questions at the end.

Harriet Tregoning: Todd I think we're ready to hear from you if you can get Sandy to change, switch control to you which I think has just happened, great.

Todd Rydstrom: Today I would like to take you on a virtual tour of what we've been through over the last 15 plus years here at San Francisco. The trip and the journey was really that of a very large team and I was serving as the CFO and assistant PUC for the last six plus years when we were in the middle of what was our largest construction program underway to date and at that time. And so I'll walk you through a couple key areas of interest for you and I invite you to take whatever slides and materials you have and make them your own and what's meaningful for your community. But this was specifically what worked and what helped in our community in San Francisco as well as the larger Bay area where we serve water to over 2.6 million people.

So I'm trying to advance the slides right now but if I can have someone at HUD advance them for me. If you'd go to the next slide. Thank you.

So, to start our virtual tour today this is the area that we serve, specifically the area in orange and it's about 2.6 million people in the Bay Area and this is a schematic of San Francisco all the way to the east of the Yosemite Valley National Park where our large reservoirs are housed. That is the source, the Yosemite Valley National Park, of about 85% of the water that serves the greater Bay Area you see there noted in

NDRC-Approaches to Infrastructure Financing – 08/06/2015

orange. And it's significant because if you can flip to the next slide, we were dealing with improvements here that totaled nearly 5 billion dollars, 80 different projects. We were going to be tearing up people's yards, inconveniencing them with detours and building very large infrastructure that was able to move hundreds of millions of gallons of water every single day and reliably provide it in a way that we could assure folks that we could bring back on winter daily deliveries or basic service delivery needs within 24 hours of a major seismic event. It's a system that affects seven different counties, and we were telling them that to do something this big and this wide scale it was going to be over a decade worth of inconvenience. We apologized up front for all that but it was going to take a lot of time to do it. We're on track for a 2019 completion. If I could have you toggle to the next slide.

For the Bay Area we have the – the – I guess the opportunity to address what our major vulnerabilities and earthquake faults is one way to describe it. You'll see here on this slide that there's three red lines and these are three of the nation's most active fault lines, the San Andreas, the Hayward and the Calaveras. And in particular, the Hayward Fault intersects four critical pipelines for our water system and that's a fault that typically goes off every 140 years or so and has last gone off 147 ago. So, we wanted to address and have planned redundancy and backups for a potential critical need on that area of the pipeline. The magnitude of this is about an estimated seven foot shift in the earth, and so the virtual tour, just take a moment to think about where you're sitting and the earth moving seven feet and you're delivering hundreds of millions of gallons of water and pipes don't like to move and they don't like to scrunch and they're very difficult you know to address, and so we wanted to have planned redundancy as well as do mitigations to make sure that we were providing as much safety and critical delivery as we could. So you're going to hear more about that as we go through this. But it's a very large scale number of projects as well as the area that we covered. How did we get to where we got is on the next slide and the why.

After the Loma Prieta earthquake, which was in 1989 here in the Bay Area, a number of things were done of the vulnerability and what risk mitigation steps could be taken. We were very active participants, San Francisco city and county, along with a number of our wholesale customers who were critical partners in this successful capital program. So both retail as well as wholesale customers and the political oversight bodies, the councils and supervisors, as well as our state legislatures were having some level of involvement. The why was we knew we had risk of potential no water if the system were compromised and that could be anywhere from 10 to 30 days dependent upon that service area that I showed you on the previous slide. It would adversely affect up to 2.5 million people at the time and provide significant economic losses which, at that time about 15 years ago, we estimated anywhere from 20-30 billion dollars depending upon whether it was another earthquake on the San Andreas fault or on the Hayward fault. So it was big enough to matter and so what came of it is this 5 billion dollar water system improvement program.

The next slide gives you the flavor of how the program started and we recall our tipping point Loma Prieta in 89, and what that allowed us to do is what will often happen, and you've probably seen it in your communities, is that big programs like this it often the needs get fully recognized and immediately recognized only after a devastating event. But if they do, you want to take that opportunity to make sure you can do right by your customers in your community and have a program teed up and be helpful when you can public service. That's what we did here in San Francisco and it was a very much a team effort. And the political will to do it was there as well and so that's pretty critical because of the costs that can ensue. We came out of this after Loma Prieta, by 2002 we had a long term strategic plan, a long term financial plan and also a capital improvement program in place and we knew we had enough of the ducks in a row to go to the ballot to ask our customers if they were willing to pay for it. And when I say pay for it, we're talking – we asked them if we could triple their water bill in order to do this. So it was a significant discussion. Next slide.

NDRC-Approaches to Infrastructure Financing – 08/06/2015

Talking about pre-development. For us, it lasted about six years, even after all the master planning work that had gone in to inform those 2002 decisions. So you can see, for a large scale project like ours, you have to be able to have the funding and enough of the resources in line to make sure that you can do a lot of the necessary infrastructure scoping as well as the important planning and environmental design, and also the review work even before you go into major construction. For us what that meant and what it meant for our team involvement was that we had to go before various approval and permitting agencies for over 80 projects that were subject to California's Environmental Quality act, or CEQA, and also many of the projects had multiple state and federal permitting agencies - over 100 different permitting agencies of which there were often times multiple ones that we were required to get approval on our various 80 plus projects. We were all intensely motivated, and you'll see on the next slide we took several of our customers as well as our rate payers, on the next slide please, back in time to show and remind folks who maybe didn't live here at the time and maybe moved to the Bay Area after 1989, or other very earlier disasters, but made them acutely aware of why we were trying to do what we were doing.

And we routinely tried to distill each of our messages whether it was investors, or whether it was environmental stakeholders, concerned citizens or rate payers, wholesale and retail, what we were doing, why it was important, and how were going to pay for it, and how we needed their participation and partnership in doing that.

On the next slide, the big lessons learned for us, I break them down into four. The value of assessing vulnerabilities and realistically sharing with folks what you know, what you don't know, how much you know, how much you think you'll know, when you'll know it. But be frequent and be consistent with that messaging. Communicating the risks, which risks can be mitigated and which risks can't. You can control some but there's a lot that you can't control. Always communicating the needs and the costs and benefits in ways that were meaningful for them, and I have several slides that I'll walk you through as examples that we used routinely, usually annually or every time we did rate increases, to over 100 neighborhood groups including the Chamber of Commerce and other concerned citizens.

So the final area is really the ability to pave a pathway to program and project success when it's a big one like this, because that takes a building of trust, clear messaging which helps build that trust but it also is a conversation and a partnership of how you build community support and political support when it's a very large capital project. And you're not going to know all the soil conditions or other potential hiccups along the way, but truthfully and as best as you can, make sure you're communicating that. And our outreach team at the San Francisco public utilities commission and many others were really instrumental in that effort.

So on the next slide, where we've been and where we are, this again is another snapshot of our system and you'll see those three same fault lines there and you'll also see boxes that we broke down our various 80 plus projects into areas and made a project manager and a team responsible for the delivery of those areas just given the massive scale of it. And we're talking a system that covers regionally over 280 miles of pipeline with 60 plus tunnels, 11 reservoirs, fire pump stations and then once you get into the 49 square miles that is San Francisco, you'll see up there at the top of the peninsula there is over 1250 miles of local pipelines, 12 reservoirs and 9 storage tanks and several pump stations. And so it's a lot of conversations and a very significant outreach effort that we had to undertake.

On the next slide you'll see where that outreach also involved our key partners, our wholesale customers. They often will take delivery – two-thirds of the deliveries out of Yosemite or the regional water system are delivered to our wholesale customers before the water even hits San Francisco's county line, and then once in San Francisco, customers here would use about a third of the water. The revenue is broken down about

NDRC-Approaches to Infrastructure Financing – 08/06/2015

half and half as far as that count goes. But you'll see we have a very diversified group of wholesale customers in what is a very highly economic and strong Bay Area region.

On the next slide, we'll go through what the needs and the risks were. And the pictures that you'll see on here are some of the ways that we had our customers and our investors virtually participate with us along the way. Not everybody would see it or be inconvenienced by the construction but every year we offered our investors a snowfall and outfall tour - investors who were current or potential to let them actually see what the system was like, what they would be buying into if they invested in our revenue bonds, and what it meant for our criticality and our key system delivery and our level – our service level goals.

The recommendations here are going to be covering various risks and needs and the next several slides I'm going to walk you rather quickly through some pictures, but to give you a flavor of the complexity of this and you'll of course have your own complexities locally; so next slide.

Here is one example and is our largest project, our Calaveras Dam replacement which we've been able to only have water levels up to about 40% for several years because of seismic risks. And so we needed to rebuild and replace this dam and so you'll see the level and scale of this one. It's about 718 million dollar project in the 5 billion dollar total, and it's on track to be completed around 2019. You will find that as you're working on big infrastructure, you will find additional surprises: On this one when we did more core borings we had found various ancient seismic risk and landslide risk so we had to do more than what we had originally anticipated.

On the next slide, you'll see an example of the first tunnel underneath San Francisco Bay, so the unique risks of working under ground as well as underwater, and this is the first pipeline and tunnel under the Bay, the rest of the pipelines including the BART high speed railway commuter option here is a tunnel that was submerged. And so this one actually required a tunnel boring machine to go through the earth as well as rock and connect on each side. It's a very significant one, all together about just over a half a billion dollars. We put this one into service in October of 2014.

The next slide gives you another flavor of some localized construction work from the Bay Division pipeline, and this is part of that pipeline system that crosses especially vulnerable Hayward Fault line where we wanted to be able to be prepared for a seven foot shift or displacement in the earth.

The next slide is a picture of our new Crystal Springs Bypass tunnel. Wherever we could our risk management strategy was to have planned redundancy. We knew that we wanted to be able to bring back on water deliveries quickly, and so just in case we were wrong with the planned redundancy, we also put on the east side of that fault line a pipe making machine that could be used for any size pipe making for emergency repairs to be able to meet that level of service. Very quickly we'll go through a couple more pictures here, the Calaveras Dam is next. Another illustration. The next one after that is the University Mound Reservoir, again doing both regional and local projects because regionally about two-thirds of the water is used before it even gets to San Francisco. The New Irvington Tunnel is on the next slide, and gives you a picture of that one. And then this was always popular on our investor tours as well. On the next slide you'll get a picture up close and personal of what is a road header machine and how – one of the various tools that we've used to make tunnels for our pipelines across the range, the coast range.

The next slide here is the Tesla Treatment Facility. Because we are unfiltered water system, we do have two levels of treatment requirement and this one allows us to meet EPA standards for cryptosporidium and so this specifically is a UV facility that's out in the valley.

On the next slide is our water treatment plant expansion, and both for treatment as well as storage. And next, I'll transition then after you've had a bit of a flavor for the virtual tour around the Bay Area here and

NDRC-Approaches to Infrastructure Financing – 08/06/2015

show you how we distilled those pictures into then what it was going to cost per customers. And that's all about meaningful messaging and we used these slides with customers, but we also used them with potential investors so they knew how we were mitigating and addressing various political risk as well as financial risk for individual families.

The next slide will show you that the key task ahead of us, as the finance team at the time as well as the communication and outreach team, was how we were going to pay for, how they were going to take that 2002 voter approval that we asked voters if we could triple their water rates to make their water system more sound. And then also what it would mean to our wholesale customers. So for us it gave us the opportunity to renegotiate an expiring contract, a 25 year contract, renew that for another 25 years in 2009 and then also match it with options to renew so that as we were messaging the revenue stability, the rate stability with investors that they knew we had more closely matching revenue stability with the duration or maturity that we were asking for 30 and 40 year bonds.

On the next slide, you'll see what this meant to our retail rate payers and so we communicated with them in terms of what does this mean for your average monthly household bill and your average household budget. So you'll see how we stacked up in the middle of the San Francisco PUC's water and sewer bill and showed how it was going to be less than their local gas and electric as well as their cell phone bill at the time.

On the next slide, we also showed how that average water bill – and these were slides we update every single year in front of these 100 plus community meetings we were doing during the rate discussion. We showed how our average bill compared to other jurisdictions in the state as well as across the region and various parts of the country.

On the next slide, we also walked back in time, as well as forward in time, and told them how closely were to that original voter information pamphlet statement that said we would triple the bill, where we were and ground truth how closely we're being so that they could hold us accountable and we could also say where we were doing better or where we were doing worse. And you can see very large rate increases, 15% for several years and we overwhelmingly had significant community support, and I'll mention a little later when we didn't and how we addressed it.

Next slide. We put it into meaningful metrics and this was my favorite I think, and we put what it costs, and what the value of water is in pennies per gallon. Our retail customers got these slides, you can see of that cost of being less than a penny per gallon for water coming from Hetchy out of the taps of San Francisco came for less than a penny and we were going to need to raise that to not quite two pennies by 2032. But the reason we were doing it was because of capital; so we broke down that penny into both capital and operating costs, both retail and wholesale.

On the next slide is an example of how we also did that for annual rate increases, and what that required rate increase to pay for the debt service coming online would be. And it was always a friendly discussion with our wholesale customers, because as they then had to message to all theirs, the rate increases, I asked them kindly to not give us too much credit for the total rate increase they had to do because you can see here on this slide how much the yellow added to an example for their specific community's rate increase for that year. So we wanted to own what we were responsible for and we wanted to be able to communicate that, and we had a good wholesale customer group who were partners with us along the way.

Next slide. Talking about revenue stability, this really had two key messages: one was that we were trying to balance the risk of rate payer fatigue with also the credit strength of having multiyear rate increases, rating agencies and investors loved that we have really the political will and rate payer acceptance and

NDRC-Approaches to Infrastructure Financing – 08/06/2015

you'll see that even after doing six years of 15% rate increases, and also the wholesale customers and us coming to agreement with 25 year agreement that included other contingencies and resilience for drought and emergency pricing if they were needed.

Next slide, there are a couple more examples of how we also talked in acre feet when needed and then what the average monthly bill then translated to as far as over a 20-30 year look and how the various components were driving those rate increases. And so you can see largely it was a capital story for us. It wasn't our 24/7 staffing by the hard working men and women at our public utilities commission. It was our capital investment as the voters told us to do.

The next few slides here. Again some more examples on the pennies per gallon. You can use these as well after the webinar today. The next slide translated that into acre feet. On the next one is an example of further breakdowns by year in acre feet. On the next one is also how we brought it home to San Francisco to say that we're responsively doing 10 plus year capital plans and financial plans so, customers, rate payers, here's what we know and what's coming down the pipeline. We know we're largely having the equivalent of what you have when you have a 30 year mortgage, when we issue these 30 year and 40 year bonds, revenue bonds in our case. And here's what it would mean then for your water and sewer cost in pennies per gallon in that time frame.

On the next slide, we did the same thing in more detail for both water and sewer, in this case its sewer. And then we did one more and we tried to put this into a more meaningful metric as far as how this might look for your average household income. We used median household income and we looked at what the cost of the water and sewer bill would typically be as a percentage of that household income over those years. And we used our average household income of about 71,000 and inflated it at 3% over that timeframe to have a more of a standardized or common sized affordability rating.

On the next slide, you'll see some of the examples of our accountability and public service value proposition. We did the rate payer outreach. We did the disciplined financial planning and capital planning, those ten year looks, and we also had a transparency and citizen oversight. That was required also when the voters gave us the funding approval back in 2002. There was a rate fairness board that oversaw any changes as well as a revenue bond oversight committee. Any dollar that was spent of revenue bond funds, we had a citizens advisory committee, as well as a commission of board of supervisors and a mayor. So you can see that we had the opportunity several times a year, if not a month, to have that conversation and to be clear and concise with our messaging. And then we also made sure we messaged this in our financial statements, our bond disclosures and documents, as well as our popular annual financial report.

On the next slide please. Additional rate payer accountability was to go back and revisit our level of service goals, how reliable we were making their water supply and our communities' water supply each time. Regularly did quarterly reporting and still continue to do that on all the projects. Went back and ground truth what the voter mandates were and we adopted at the San Francisco public utilities commission a rates policy, and became I think one of the first in the nation to have a rate payers score card where an independent review body, in our case the San Francisco City Comptroller's office, reviewed how well we were doing on various geometrics for the water, sewer and our power department.

The next couple slides here you'll see that in California we have to do Prop 218 notices, so whenever we wanted to do an annual or bi-annual for a five year rate increase we had to send out over 230,000 notices. And so you will see as far as the order of magnitude and public support, this one we had done with our five year rate increase, we received only 170 protests and so I would call it overwhelming public support. That was on the heels of about six years earlier when the program was newer, when we had a small auditorium full of people concerned, but in this last round we had only a couple people show up for public hearing and few protest letters. You'll want to do your community outreach, you'll want to have your website ready to

NDRC-Approaches to Infrastructure Financing – 08/06/2015

go, your rate calculators, your construction update videos, your bill inserts, but you'll also just want to have every person on your team whether it's on a discussion with the neighbors, on the street, mowing the lawn or get a dining room chat: what it's going to cost in pennies per gallon and how soon it's going to be done. Make that a very fluent message within your agency.

We were planning for an earthquake. We got in 2013 what was the third largest wildfire in California's history, the Rim fire, and that affected that service map area that I showed you before up in Yosemite, where large acreages about the size seven times the size of San Francisco were severely burnt. It burnt and that fire burnt over on top of our hydroelectric plants and so you'll see we have some other strategies that we had also employed. We put into place reserve policies, we annually updated those plans I mentioned, we put into place contingency policies.

On the next slide, you'll see that the fund balance reserve policies here, we factored in how much vulnerability we had to revenues as well as expenditures, and as well as debt service coverage when we set those policies.

On the next slide, you'll see how we assumed to spend those reserves if they were fully funded and then on the next slide the reserves were regularly quarterly reported out to our commission as well as the public so they knew how much we were setting aside and how we were protecting them. And that has really come to bear currently, because as California is in a major drought this is an example of how we track the drought and how much we're asking our customers to conserve. That conservation effort is a double edged sword. It's really good because it saves water but it also unexpectedly means your revenues can be short, and so this is part of the discussion and one of the tools that we use on the water supply side.

On the next slide, drought pricing was anticipated in our wholesale contract as well as our retail rate setting so we had that in place. We've not needed to do it yet, but we are watching our customers and their wonderful reaction, and they're stepping up on conservation has been what we needed to date; so no drought pricing yet for California. And then the Rim fire, as I mentioned earlier, we had to react to that. And so, on the next slide you'll see an example of resilience, and we would think about resilience in three ways: one people, one place and one virtual. This is an example of virtual resilience and how we were able to track and make sure that the hard working men and women that were going into the fire zone to make sure the infrastructure was protected, that they knew where the thermal hot zones were and how that fire was progressing. All of the vehicles had GPS tracking on them as well, and so I encourage you to have something like that in your agency if you can.

And then thinking about what you might be able to control and not, non-drought emergencies and what that will mean in your budgeting process. So your next steps – there's just a whole heck of a lot. You'll have to customize this for your agency. But what was helpful for us was to go through a very high level, and we do it routinely now, is what were the problems and risks, how are we going to mitigate them or manage them, where could it be done in our capital plant, how could we look at the alternatives and the enterprise risk management lens or through an operating strategies, and where there might be financial strategies. If you're a utility and you're watching this webinar, here's some of the considerations that you might also want to take into consideration as well listed there.

And then on the next slide, what are the criteria that you're going to want to use and what are your customers, what are your citizens, what are your environmental stakeholders care about? Make sure you have those as criteria as well as what you're investor criteria is going to be, because you'll want to distill it into a message, and that message is what the tradeoffs are going to be, the pros and cons so that you can tell your story to your governing board as well as the rate payers and anybody else who you know needs to know that.

NDRC-Approaches to Infrastructure Financing – 08/06/2015

So with that I'm happy to answer any questions and the mic will go back to Harriet.

Harriet: Thank you Todd, that was great and thank you Doug. Basically I – we have participants on the line. If there are any questions that people have, we're happy to take them. In the meantime, I've got some questions that I can get our panelists started with. The first question I'd really like to ask is kind of the screening for projects. Todd kind of referred to how the bond rating agencies were looking at their risk management and that the fact that they had long term commitments to higher rates and long term contracts with their wholesale customers was important to those bond rating agencies, even in the absence of an official screening tool that a bond rating agency might have. So let's talk for a minute about how these high road infrastructure projects might result in more favorable treatment by investors, anyone can jump in; either of you.

Todd: Yeah, a high road for example for us would also be on our sewer system side, Harriet, because we've had investors as we've done those snowfall to outfall tours that includes our sewer plants, we've had investors specifically ask us about where are the opportunities on other types of investing where you're doing innovative work: converting cooking oil to bio-diesel for example, or on carbon sequestration and resource reused, turning waste into energy. We've noticed over the last five years in particular, investors actually asking us that question first, and for us that resulted in San Francisco's first green bond issuance back in May, where we sold green bonds to the tune of about 32 million dollars to fund our upcountry hydroelectric generation needs. And we – they were very well received by the market scene, oversubscribed by 40%, so I think there's a growing investor community that some that have green funds or have socially responsible funds who want these types of credits in their investment portfolio.

Doug: Yeah, Harriet I would agree with that, that's what we're seeing in the market. I think another sort of well-known example of there being a benefit to trying to signal that you've taken steps to look at the long term sustainability of your project can be seen in other green bond last year that DC Water did where they had major tunnel project restoring water which they were going to market for, and they worked with their underwriters to get a third party to look at whether or not it's sustainable or not so they paid another advisory fee. But that fee allowed them to up the size of their initial bond offering by 50 million bucks, it started at 300 million, with 350 and they had – it was oversubscribed by three times and they're saying that they got 15 basis points difference. So this is an early indicator of this trend, and it's by no means something which we've seen a lot in the market but there is this demand – also just mention New York City is doing a lot of thought leadership about green bonds and it's investors, some of the largest investors in the muni bond market in the country have been encouraging New York to do a green bond and have it be very transparent in terms of what the investors can see in terms of reporting. So I think there is more of this to come and it's going to eventually show some much more consistent benefits for issuers over time.

Harriet: So thank you. I'm going to encourage our participants again to write a question under the Q & A tab, if you have any. But in the meantime I'm going to keep on with our panelists. I think the examples that you've just given are really, really encouraging but this is in the absence of any kind of a formal screening tool. You mentioned that DC Water went to the trouble of hiring a third party advisor to evaluate their offering along those kind of greener sustainability dimensions. But do you think it would accelerate the pace of this kind of investment opportunity that might be more favorable for these high road projects if such a tool exists? And if it did exist, who would need to be administering it? Would we need a third party accreditor like a LEED for high road infrastructure or could it be a tool that could be self-applied or applied by a third party?

Doug: Todd, do you want to take that or should I jump in?

Todd: A couple of thoughts on that one I would say, Harriet, is because so much of the market whether it's nutrient trading or carbon trading or green bond trading or whatever that market is is relatively new, I

would say – I mean you do the best you can as someone who is trying to build it. Get what your credit strength are, what your vulnerability mitigations are, what you – the best story you can tell on your operational resilience, your financial resilience, where you have reserves or otherwise and how your people are prepared: tee that up in a slide deck in a presentation so that you can start to hone that message. Because even if you're only going to sell revenue bonds that aren't green, it's still a value because we try to regularly do that, and we did do that regularly for the public utilities water and sewer bonds, and we had routinely well over, you know, 100% subscription trying to buy those bonds. And they weren't even called green back then, because green bonds weren't even necessarily available at that time. So, telling the story: you can do it whenever you have the opportunity and don't wait for those markets to develop. Just watch them and try to find the lowest cost money that you can for your rate payers.

Doug: I think that's – I agree with all that, and I think you are seeing a couple of different things happening in the market which you can benefit from and which don't cost anything. But I think the market probably is going towards more of a, I would guess in the medium term, towards some sort of verification process. There is the green bond principles which is a set of transparency standards that the major underwriter banks have put out which focus on setting up sort of processes like the one – like some of the ones that Todd was mentioning. So you need to have a way to sort of discuss in your disclosure what your projects are, what their impacts are. You need to be able to segregate the proceeds of your bond issuance only to those projects that meet those criteria, and then agree to report back. There's also another trend in the market which is smaller, but I think will grow which is independent third party voluntary standards, which look at specific asset classes and say this asset, this water investment is better than that one. Those are much more in [Inaudible, 1:24:03] they exist for things like solar; I think there's one for bus rapid transit, one for wind. And a lot of them are in the pipeline and NDRC is actually part of developing those standards. So we think that the investors we've talked to will ultimately want that, even though there's a lot of transparency already provided by cities, in the long term I think the investors will want more third party oversight.

Harriet: We have a question – one of the things that you're talking about is thinking about categories of investor risk and then almost in a narrative way describing how your green and high road approaches reduce those categories of risk. But one of the things people care about is how are you going to pay this back? So we have a question about revenue sources. What are the most effective revenue sources that you find in terms of backing these green bonds? Are utility payments or property tax increases the only real option that localities have here?

Todd: I would look at all of them. In our case, we're using our power utility revenue for our power green bond that we just issued and having that as the revenue pledge. But you should also look at general obligation pledges as well as other things like cap and trade revenue. In California where we're subject to AB32 and the greenhouse gas reductions, there is a well-orchestrated market for carbon sequestration allocations as well as offsets, the latter requiring some of those independent verification agents. So I would say look at everything, figure out what's the cheapest and what you can actually monetize or securitize in a bond offering because the tricky part is really trying to figure out how to pay for long lasting capital that will last 30, 40, 50 plus years in a way that is inter-generationally fair and also affordable. And so you really have to, as a CFO, from that perspective and want to look at it all and not take anything off the table.

Harriet: I will also say the same questioner mentioned how things might apply to coastal restoration projects and talking about general obligation and tax – general tax increases, even a dedicated sales tax is also potentially a possibility. We haven't really talked about private parties like insurance and how that might play into it, but I'm afraid that's going to have to be a question for another webinar.

NDRC-Approaches to Infrastructure Financing – 08/06/2015

So with that, I want to thank Doug and Todd for their really great presentations and I'm sorry that we didn't have even more time for discussion because I think there are a lot of questions out there. We'll have today's webinar available as a pdf and as a podcast in about a week so start to look for it around August 13. What should you take away from today's webinar? That resilient innovative and equitable infrastructure is not only possible but it's coming our way. Think about funding and financing early when planning resilient triple bottom line infrastructure, not at the end of the process. In fact, a great first step that I think Todd will agree with might be to have your community CFO watch this webinar. Thanks for participating. We'll see you later.

[The webinar ended. End of audio.]