



TWV Podcast #078

Exploring the Work of the Water Research Foundation with Rob Renner

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Intro: Welcome to The Water Values Podcast. This is the podcast dedicated to water utilities, resources, treatment, reuse, and all things water. Now here's your host, Dave McGimpsey.

Dave: Hello and welcome to another session of The Water Values Podcast! As my son Joey said, I'm Dave McGimpsey. Thanks for joining me.

We've got a terrific show today with a very learned individual in the water sector. But first, if you've enjoyed the podcast, please do me a favor and rate AND review it on iTunes or on whatever other podcast directory you listen. Would really appreciate it. As it stands now, we've got 29 ratings with 26 of those ratings be 5 stars. I'd like to see more reviews, though, please. Thanks a bunch.

Now for today's show. Our guest is Rob Renner, the Executive Director of the Water Research Foundation. Rob is very accomplished in the water sector. You'll get that fast, as we speak with him about his history in the water sector. Very impressive. Rob gives us terrific insight into what today's utilities are worried about and how they're solving the problems associated with those worries. You'll really want to listen to Rob's insights on utilities and financial stresses, integrated water management and climate change.

With that said, let's get on with it. Open the valves, fasten your seatbelts and here we go.

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Dave: Well, Rob, thanks very much for coming on to The Water Values Podcast. Really appreciate you taking some time out on this chilly morning to come visit with us. To start off, could you tell us a little about your background and how you got interested in water?

Rob: I'd be happy to. I appreciate the opportunity to be here. It was a little chilly on the walk over. Basically, my background is a bachelor's degree in civil engineering and a masters in environmental engineering. After graduating, I went into the United States Army. I was back in the Vietnam era. I got number nine for a draft number was going to be drafted and so signed up for ROTC. Spent a couple of years in the United States Army in the Medical Service Corps. Left a captain and during that time, basically it was like working for the EPA for the Army. In the Medical Service Corps, Army Environmental Hygiene Agency, I expected water and wastewater treatment plants for two years.

When I left the Army, I was in Denver and went to work for a consulting firm. Consulted for about twenty years. First as a designer and resident engineer and then onto operations. I had my own firm with a couple partners called Process Applications. We primarily dealt with utility



operations optimizing utility operations doing some research work with EPA from which the Partnership for Safe Water came about. And then following that, I went to work for the American Water Works Association for about eight or nine years as their chief operating officer. And then went on to another company called ISA and Research Triangle Park. Then came back to the Water Research Foundation and I've been there for about ten or eleven years.

I got interested in water, I think, in college in engineering, I didn't really enjoy it that much but as I got on in my classes, got more into the water and wastewater parts of it and as I was going into graduate school, spent time on microbiology and things like that so I got very interested in it. I think the thing that always really interested me in the field was the public health aspect. Was the protection of public health. And so that's what's driven it in terms of optimizing water and wastewater plants and working with the Association and now with the Water Research Foundation.

Dave: That's a fascinating story. I know it's not our main topic today, but you said you inspected water and wastewater plants while you were in the army. Were those package plants that were set up for units or were they water and wastewater facilities at actual bases?

Rob: Typically, they were at army posts, large posts and so they were typical water and wastewater facilities. You see, as part of the Medical Service Corps, your mission is to support troops in the field, and so we did have portable water treatment units and did work with those. But most of the work that I was doing was, it was the advent of the Clean Water Act, Safe Drinking Water Act and so the army had to get into compliance with those federal regulations so that was part of our job to make sure that the army installations were compliant.

Dave: I bet that was just incredibly interesting. That just sounds like a great experience. Well, you mentioned you're with the Water Research Foundation now. So, could you tell us a little about what the Water Research Foundation is?

Rob: Well, the Water Research Foundation is a very, very interesting operation. It is a research cooperative of utilities in the United States and Canada and Australia, and it was started in 1966 and really got going in 1986 with our subscription program when we signed up all these utilities. But the fundamental basis of the Foundation is that there is a lot of commonality in terms of the water issues across the United States and Canada, as well as world-wide.

And so utilities, rather than studying issues individually, they pool their resources to study those things. And so our research agenda is driven by my board of directors, which are twenty people who are CEOs of utilities across, there's two from Canada, mostly from the United States, all the way from New York to Metropolitan Water District. We have one in Australia. Those people know what the issues are in water, and they set that research agenda.

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And so the agenda is an applied research agenda because people have to be able to use it, otherwise they don't want to pay their subscription. The long, and it can be anything from water quality issues, it can be infrastructure issues, finance, customer service, anything related to helping a water or wastewater utility function at its best.

Dave: Sure. So you mentioned it was a research cooperative and you identified at least where some of the members are from. Are these typically the real big utilities? Are smaller utilities involved in the WRF at all?

Rob: Well, it's a mix. In North America and the United States, there's about three hundred utilities that serve more than one hundred thousand people. We have one thousand utilities, thirty-two in Australia, all the large cities in Canada, all the large cities in the United States and so, when you realize that there aren't that many that serve that many people, I would guess that eight hundred of these utilities, are from very small up to medium sized, also. So it pretty much runs the gamut of utility size.

Dave: Ok. What other aspects of the WRF, I know that you have a role in the Global Water Research Coalition, so could you talk a little about how WRF interfaces with that?

Rob: Well, the Global Water Research Coalition was started by the Foundation in 2002. It was founded in order to incorporate global perspective on research and to be able to leverage research dollars. It's comprised of fourteen different organizations similar to us. The criteria is that you need to be a national research program. And then the executive directors and CEOs of these foundations or research institutes meet twice a year, compare our research agendas, look and see where there is commonalities, and then we try to partner on research in order to leverage research dollars. So that's essentially it. The members are in Canada, in the United States and Singapore, Australia, South Africa, Germany, France, the UK, and the Netherlands at the present time.

Dave: Ok. And what seem to be the "hot button" research issues? You're spanning the globe, and I'm just kind of curious if all these utilities are, do they have common issues that they need to be resolved through research? Or what are the issues that they are looking to get solved through your research?

Rob: The issues are pretty common, and they contend to be along infrastructure issues relative to, are there techniques that you can use to assess infrastructure and new technologies that you can assess, say, when a pipeline is going to have problems, so that you can fix it before it actually bursts? Are there technologies available that can reduce the costs, linings, structural linings, things like that?



Water quality issues tend to be similar, algal toxins that you read about in the newspaper. We started studying those in '96 in Australia. Financial issues can be similar. There's just almost all the issues relative to water and wastewater, whether it's nutrient removal, stormwater control, those types of issues are pretty much worldwide.

Dave: Ok. I think I can wrap my head pretty easily around a lot of the research related to say infrastructure and for an example algal toxins. But, what does the research entail when you're looking at financial issues?

Rob: Well, in terms of financial issues, one of the big issues right now, and we just completed a study on residential end-use, but water use across the world, but in the study, which was North America and U.S. and Canada has shown, we did a study ten or fifteen years ago, we re-did the same study and water use has dropped about 25%. And it is dropping 1% - 2% a year. Water utilities make their revenue based on how much water is sold. And the issue is, with water and wastewater utilities, about 80% of their costs are fixed. They're tied up, a lot of it, in underground infrastructure. But 80% of the revenues are variable. And so when the water flow drops, their revenues drop. And this is at a time when their infrastructure needs, in terms of repair and replacement of aging infrastructure. It's also a time when there's changes in regulations in terms of nutrient removal, stormwater that has to be dealt with, water quality regulations that have to be dealt with. So there's a need for increased spending at a time when revenues are dropping. And so, some of the research we've done is looking at the rates structures in terms of what is the best way to structure rates so that a utility has the revenues that they need and a lot of it implies putting more of the revenue into the fixed area to support the infrastructure that's in the ground so it is isn't depend on the variable flow of water.

Dave: Yeah, that's a real conundrum because you want your rates to send a price signal so that people practice conservation but yet, as you say, the fixed costs are so high. When you mentioned the 80-20 split there, my mind just flashed back to one of the early rate cases I was working on where we had a sewer utility that had a flat sewer charge. And the customers and the consumer advocate party were all over us because they said it needs to variable. It was a very difficult rate case. We ended up moving to a variable rate in a subsequent rate case. But I remember our consultant said the exact same thing you are saying, "Look, these utilities' fixed costs are very steep, and it really doesn't matter if one person's living alone or if it's a family of five, the costs are not significantly different to serve them and at least on the wastewater side."

Rob: Well, that's true on both sides. When you have to dig a trench in the ground and put a pipe in, whether it's a water pipe or a wastewater pipe, it takes tremendous resources to do that. And so that fixed cost of service, the size of treatment plant on water being sized for peak demand. Same thing on the wastewater side, you have to worry about storm flows. So you end up with capacities that you have to support but then that infrastructure that's built, it's fixed whether it's above ground or below ground is sizable.

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The issue that we have with rates, and you're right, it's very difficult in terms of rate cases, whether it's a public utility that's just going to the voters or to the council to get approval, or whether it's a privately-owned utility that has go to the PUC to get that increase, it's difficult. Over the last ten years or so, utilities have been raising rates well above inflation to catch up with legs in terms of infrastructure replacement.

And so what's happening is that that cost to the ratepayers is going up and up. And the whole basis of running a utility is that it's supported by the ratepayer. It's a full cost-of-service to repair and replace what you need to do. What happens when you get into a recession like 2007, 2008, where you see revenues drop, is what utilities tend to do is defer maintenance. And when you defer maintenance, then that bill just gets pushed down the road. Which is part of the problem now and why we have decaying infrastructure, that makes it more difficult to repair in the long term.

But then the issue also becomes, in terms of a large cities, some cities having fairly low economic areas, with people living below the poverty line, when those rates are going up above inflation every year, you get tremendous push-back relative to social justice and being able to make sure that people can pay for water. So there's push-back on affordability. In fact, we've just kicked off a couple studies on affordability and how do utilities come up with programs to get the revenues they need but yet be fair to people who don't have the necessary resources. So there's a number of those types of programs that we've been working on.

Dave: I'm a big advocate of lifeline rates, where a subsistence level of service is provided, whatever that may be to people who qualify for the lifeline rates. I've not been in a jurisdiction that has statutory authority for those life-line rates at least on the water side. I know they're fairly common on the telephone side or they were before deregulation. In terms of those affordability studies, when do you anticipate the research is going to be done and that study is going to be released?

Rob: Well, the EPA is working on one now, and we're just kicking one off with a group of other organizations, the National Association of Water Companies, NACWA, National Association of Clean Water Agencies, AWWA, AMWA. It's a group that spans water and wastewater, and we're going to be kicking that off in a few months. It's going to be a relatively short study. I would guess it will be available in about a year. Some of the other work we do have completed already that we've done. It looks at things like bill discounts, lifeline rates, conservation rates, payment plans, giving to local charities. There's a lot of different ways the utilities across North American try to deal with this issue. Almost all the large utilities have those types of programs. Sometimes it's difficult to get people to use them. That's one of the things that we have to make sure that the customers are aware that there are these support mechanisms available.

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Dave: Right. When it comes to lifeline rates, I had a conversation with someone recently who, when we talked about lifeline rates, they said, “Oh well, you just make the first two thousand gallons well below cost for everybody. And then as usage increases, that’s when you catch the people who wouldn’t be as affected by affordability.” But in my mind, that’s a not a true lifeline rate. A true lifeline rate is a subsidized rate for those people who would have trouble paying. Would have trouble with the affordability issue. So, for someone who could pay, they would essentially subsidize those in need. And so the problem that I see there is that a lot of states, they don’t have that legislative mandate or that legislative authority to have that lifeline rate because, as you mentioned earlier, cost-based rates. And that’s the problem with lifeline rates is that they aren’t cost-based.

Rob: That’s correct. And I think another thing in terms of people probably don’t understand the value of water. It’s the most essential thing to human life except for the oxygen we breathe and the air. I mean you can survive about three days without it, so it’s very, very essential to human life. It’s essential to commerce, to having a good society, a healthy society, but it’s not a free thing. Some people say, “Well, water’s a commodity.” It’s really a service, because water’s free. I can look out the window here in your office and see the Platte River. And I could give you a bucket and say, “Go down and get your water, and it’s free to you.”

But, for it to be delivered to you, twenty-four hours a day, seven days a week, three hundred sixty-five days a year, at the highest quality it’s capable of you safely drinking it, that takes a lot of resources relative to people, to pumping, to chemicals, to power. And so that’s where the cost of water comes about. And most utilities, the public utilities, as well as the private utilities, they’re in the business of providing a service to people. But that service does cost money to generate.

Dave: Yeah. I agree completely with everything you just said. Let’s turn our focus a little bit to a related matter and that is integrated water management. Can you talk a little about the work that the Water Research Foundation is doing in the area of integrated water management?

Rob: Well, integrated water management has just gotten to be extremely important. And we have ten different focus areas, and that integrated water management is one of those. So we’re putting resources into that area. We’ve funded two projects just this year. One on the resilience of alternative water supplies and one on integrating land and water management. And just, I guess, for the audience, relative to integrated water management, we’re really talking about the concept of “one water” in terms of how does a utility deal with water? Are there ways that we can capture stormwater? Should we be reusing wastewater? Should we be using brackish groundwater? Should we be using desalinated sea water?

And it depends on where you are in the world and where you are North America. There’s water rich areas, and there’s relatively water poor areas in the U.S., so your water portfolio that you

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have is going vary depending on where you are in the country. But the more water-short area that you are, the more important it is that you have a diverse portfolio relative to the supply. And the planning horizons for a large utility tend to be very long. They're probably at least fifty years. Because to generate any kind of a large project takes years and years.

You could take a look at San Diego County Water Authority, and they just started up their new desalination plant. Well's that's twelve years in the making, millions of dollars-worth of lawsuits to get this project underway to be able to take sea water, desalt it, and make it suitable for domestic use. So, when you talk about integrated water management, you're talking about managing, in effect, the water cycle for the best use in terms of environmental needs, domestic needs and that sort of thing.

Dave: Sure. And you mentioned the two studies that you are looking at on integrated water management. Where – at least in North America – where do you see us going in terms of integrated water management portfolio?

Rob: Where I see it going, because I think as climate change progresses, it's going to change whether you're running a water utility, wastewater utility, stormwater utility, how you think. And what I see, on a city basis, as I would see more and more that you're going to see those utilities coming under one roof so that you can manage better, holistically, the water resource. It's happening now, and I think you'll see it more. You're going to see much more reuse of water, not just in terms of landscape, watering, irrigation and things like that. But you're going to see a large movement I think, especially in water-short areas to indirect and direct potable reuse. We're seeing that now. There's a number of questions. The technology is there to be able to treat that water. There's a few areas of research that are left. So I see that movement to that "one water" concept where you'll have regional authority in a city that's handling all that water.

Stormwater is another big issue. What's happening as you get into the Midwest and the Northeast, as you're getting the prediction that was probably put out ten years ago is that it will get less frequent but more intense storms. Those more intense storms cause significant flooding. I was talking to Dave St. Pierre, he runs Chicago Metro, and he's responsible for stormwater and the issues they've had just in the last year or two with some of the flatter areas in Chicago. When you get these huge rainstorms, the amount of flooding that occurs and how do you deal with that? Because oftentimes you'll end up with a lot of water backing up into basements and things like that. Not only cars floating around, but it causes a lot of damage to people's homes and so that's one side of the equation.

Then you go to the Southwest and the extreme dry areas. How do we manage this precious resource? How do we get a bigger portfolio? El Paso is a great example. Being down in the Texas desert essentially, where they have a surface water supply, they have groundwater a supply, they have a deep groundwater supply that's brackish water that they desalt. And so they

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have a whole portfolio that they can draw on to make sure they have an adequate supply of water. And they'll also be looking at the reuse also so that they have the full water cycle that they are employing to make sure that they have a healthy environment as well as healthy population.

Dave: I think you're exactly right on the convergence of all these utilities. And managing water, just as you said, holistically through the water treatment, water purification, stormwater cycles that are out there. You touched on it, I think, when you were talking about stormwater in particular but climate change. How do you see climate change impacting our water utilities?

Rob: Well, climate change has a number of impacts. The thing I talked about relative to less frequent, more intense storms causes issues. The big thing on the drinking water side of the equation is that water utilities have used past hydrology information to plan water supply. And as those numbers change, people don't really know – for an example, we did a study for the Front Range Utilities of Colorado on climate change and its effect, trying to figure out, “What will the yield of water be off the mountains?”

Same thing for the Colorado River, where you have seven basin states that are pretty much reliant on that. It's difficult now to use past models because we're seeing a whole different thing. One of the things that we are seeing, and it's affecting places like Seattle as well as the Colorado Basin, is that as temperatures warm, precipitation may stay the same in the mountains but it tends to be more rain and less snow. Snow is a great storage device. And without that, and if you don't have the reservoir capacity, that rain runs off.

And the other thing we're seeing, we're seeing that the snow melt occurs earlier in the year. In the Rocky Mountains, we're seeing windstorms out of the Southwest depositing dust layers on the snow that is causing it to melt prematurely. In the Northeast and Midwest, when you get the more intense, less frequent storms you get water quality issues in terms of run-off, which brings more fertilizers, nitrogen phosphorus, turbidity impacts water quality that you have to deal with. On the wastewater side you get increased storm flows that you have to deal with.

Sea level rise is a big issue. For places like Miami, most of those facilities are built low, and so we have to be concerned about that. We're already seeing, when you get storm events and those storm surges on high tides we're seeing issues. Most of the wastewater treatment facilities are along riverbeds, so flooding. So utilities are looking at all of these things, and they're starting to adapt by changing elevation of facilities, changing how they're planning in terms of water supplies. That brings in the whole portfolio thing.

So utilities have recognized this for quite a while and they have been actively acting, I'd say probably, around ten years now to start to mitigate the effects that they're seeing. But while there's public discourse relative to, “Is climate change real or not?” It seems like that is getting more accepted. The causes, “Is it man-made, not man-made?” The feeling, I would say, of utility

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managers is, it doesn't matter. The fact of the matter is we're seeing changes relative to the water cycles, and we need to adapt that. So they've begun planning and actually now constructing facilities to avoid those types of issues that we're seeing.

Dave: Sure. So what are some of the mitigation factors that you're seeing out there that utilities are engaging in in order to deal with the rising temperatures? Climate change, I should say.

Rob: I would say that in the water-short areas you're seeing the movements to broader water portfolios. You're seeing very aggressive conservation programs. You're seeing turf buy-back programs. Metropolitan Water District, I think, bought about three hundred ninety million dollars of turf buy-back so that people do more xeriscaping because outside water use tends to be the highest use in those areas. Those programs have been very active in Phoenix, in Tucson, in Las Vegas. So the amount of conservation that's been done, in those areas, has been significant. That's your cheapest water. The cheapest water you have is the water that you save.

So that's where a utility that's in a water-short area is going to start. But then you start to look reuse and desalination, those types of issues. That's part of the mitigation effort. If you're in a water-rich area, say for example in New England, but if you get less frequent storms, a lot of the smaller utilities there have relatively small reservoirs. And if you don't get consistent rainfall, that causes problems and you're going to storage increases in those areas. In areas that you're getting higher amounts of rainfall, less frequently, where you get those storm events, you're already seeing pump stations being raised. Same thing with treatment plants, so you can protect your electrical gear and things like from rising water. So there's a lot of planning studies being done relative to what is the effect.

It is very difficult with climate change models to bring them down to a regional basis. It is a very difficult prediction to try and figure out where is there going to be more rain and less rain. On a continental basis, we can kind of see that the northern part of the U.S., the Southern part of Canada will probably be wetter. The Southwest will be drier. Colorado, here, is kind of mid-line of the state but it is iffy. We don't really know for sure, but we are seeing pretty consistent results generally, in some areas. And so there's a whole bunch of things, as I said, that are being done to try to mitigate that.

Dave: Sure. Rob, I feel like we could talk for a long time about all these issues, but we've kind of reached the end of our time today. I want to thank you so much for coming in and really sharing a lot of knowledge with us about what's going on with the Water Research Foundation, all the issues you're looking at. I really want to thank you for doing that because you were absolutely fantastic describing all of this. For those who want to find out more about you and the Water Research Foundation, where can they go to find that information?



Rob: Probably the easiest thing is to just jump on to our website, which is waterrf.org. Get on to our website and you can see just about everything about us. If not, you can call me at 303-347-6150, and I'll steer you to somebody to answer your question. My staff is going to kill me for that little ditty there. Yeah, we'll pretty much out there so people can find out what we have and we're help with information.

Dave: Terrific. Again, thanks so much Rob. Really appreciate your time.

Rob: Thank you very much.

Dave: You bet.

Dave: dfg

That was my interview with Rob Renner. Terrific guy with a great understanding of issues affecting water utilities, and I use that in the converged sense, and how utilities are solving those problems.

Here are a few takeaways. First, and I think this point is easily missed, is that when Rob talked about his background, he mentioned that water utilities are really about public health. That's too often overlooked and we don't have to look any farther than the situation in Flint, Michigan, to know that water is different than most services. There's no substitute, and you can't cut corners when you're dealing with such an important service. It's one of the reasons water utilities typically are less inclined to make changes – the risks are so high because the public health is involved.

Another takeaway is the financial pressures our water utilities are under. Water use has been declining for a number of reasons. And the U.S. was in a financial crisis, so there was a reluctance to raise rates when a lot of people were having a tough time economically. That leads to deferred maintenance, which in the long run, costs everyone more money, except the ratepayers who enjoyed the below-cost price of water when the infrastructure was allowed to deteriorate. I'd really like to see innovative rate structures that allow lifeline rates to address affordability and social justice issues and that avoid the problem of water conservation leading to rate increases to avoid the inevitable customer confusion that results from using less but that causing increases in rates. Those rate structures are out there, and we need to keep researching them to see which ones work the best.

My final takeaway involves climate change and the way in which utilities are adapting. Rob mentioned that utilities have been planning for a changing climate for a decade now. As we learn

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and understand more about our changing environment, I'm going to be fascinated to see how utilities continue to adapt and plan for that future. I've got some great guests coming up that will address some of these issues, as well as some issues presented by the White House's Moonshot for Water initiative, with technologies that will be leading the charge towards that future, so please subscribe so that you don't miss those upcoming guests.

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Outro: You've been listening to The Water Values Podcast. Thank you for spending some of your day with my dad and me.

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