

*David Nemptzow:* I'm sorry. I don't know if you can hear me. I'm having technical problems. I can't hear the session, if it's started.

*Male:* Yes.

*Rachel Gutter:* You're good.

*David Nemptzow:* Can you hear me?

*Male:* Yes.

*Rachel Gutter:* Yes.

*David Nemptzow:* Okay. Great. Are we ready to start, Hannah? Have we already started?

*Wendell Brase:* Start.

*David Nemptzow:* Okay. Thank you all. Sorry for the technical difficulties. It's 2020. I think we're all used to it. This is David Nemptzow and I'll introduce myself and our illustrious panel in just a moment. We're at the Better Buildings Summit, our virtual summit, of course, and we're at the closing plenary where we're describing the path forward perspectives on prioritizing energy efficiency because it may be the closing plenary, but of course, our work is still in front of us. And we have several panelists from different perspectives, different experiences, different expertise who are going to share their views on going forward, especially in these remarkable and out of the ordinary times we find ourselves in.

We thank you all for being here today. I just want to say, and I know there many of you, hundreds of people on this call, we've just had a great week of this virtual summit, you know, starting with DOE under Secretary Mark Menzes and Assistant Secretary for the Office of Renewables Daniel Simmons. We had opening remarks, I'm just going to name a few names and then we'll fence to those I haven't named over the course of this week, Kim Basluck from Fiat Chrysler, Tina Jones, Chesapeake College comes to mind, John Chadwick from the Arlington Virginia County Public Schools.

They shared their insights with us as well as their challenges, which we all face and how do we elevate the responsibility of energy planning and why energy planning and distributed resources are so valuable to buildings, not just for energy efficiency's sake, but for resilience and for performance and

especially as many of you look forward to not only trimming your bills, but to really making big changes in your facilities all the way down perhaps to zero energy ready buildings and increasing use of renewables.

We had a lot of tag-ups within our industry and so it's been really, I think, quite a productive week. I wish we were doing it in person as we have other years, but the good news is that at least with the virtual approach, we've been able to have more people than we might have otherwise.

Let me also just note, I know you're all thinking about it and it's come up, our nation right now is in the midst of three crises that are happening simultaneous to each other and not unrelated to each other. Of course the pandemic, the COVID pandemic and social distancing and what that means to our workplaces and our whole society, and the challenge is, the direct challenges that it represents to energy issues.

Second crisis is the recession, the deep recession that our country is and the industrial world has fallen into, and the record level of unemployment. Just this morning, another one and a half million of our compatriots filed for unemployment. Of course 40 million Americans have lost their jobs in the past few weeks. Some – past few months. Some are starting to get them back, mercifully, but that's of course a big challenge to all of us.

And thirdly, the one that broke into the open two or three weeks ago after the death of George Floyd in Minneapolis and that is the racial tensions and racial violence. So these three crises impact everybody in America and in the energy efficiency and building operations field. And none of us are exempt. I just want to say that. We will talk about – we'll certainly talk about coronavirus and COVID and how to manage around the pandemic on this panel, but I think all of us in America are thinking about those issues all the time, both how they're relevant to our workplace and how they're relevant to us as a society outside that.

So let me turn from the – from that to the prosaic, from the big national issues to some housekeeping. So, I do want to say I think you know all this, but I do want to say for the record that we are recording today's session and so please know it is being recorded and we will archive it on the Better Buildings Solution Center and we certainly will follow up with all of you when today's recording and slides and all the others from this week are made available.

Next, of course, you know you're in listen-only mode. I apologize for that. I wish it weren't the case, but with some thousand or so people on this, we had no choice and so I hope you can hear us, but if not, please use the chat function and my colleague will help keep track of that. I am, as I mentioned, David Nemptow. I'm director of the Building Technologies Office at the US Department of Energy and our office, well, I'm going to tell you about it in just a moment, so I have a slide with a shameless plug from my office, the Building Technologies Office and I do want to give a shout out to many of my colleagues immediately at BTO who have worked tirelessly this week, but one in particular is Hannah Debelius who helped organize, who did organize today's panel and is one of our stars at BTO.

I want to tell you about, if we could advance the slides, I want to tell you about Slido. I think by now I hope you're all experts in Slido. It's a great tool and it's been very helpful, so if you're new to this, please go to Slido. You see the URL right there on a different device or on a browser. Don't mess up with the window that you're participating in this on, of course, and go to that and then pick #BBSummit, but even then you're not quite done. You still have to pick the right session, so go to that dropdown menu and pick "Closing Plenary." And that's how you'll be in our little Slido world right here. So we're going to ask you polling questions in the course of this, so everybody sit up straight. We need your input please. But also, Slido is the tool for asking questions.

We're not going to be closely monitoring the chat function in or monitoring all the chat function in Zoom. We're going to be using Slido's questions feature, so please keep that open on your cell phone or your tablet or your browser window, whatever else you got going on. And so we'll let you know about that, and do make sure you're in the right session, if you'd be so good.

Next slide, please. Are we ready for a question, Hannah? Are we starting with a question or are we giving them an example? All right. You keep clicking it and we'll all be ready. Where are you calling in from today? And we don't mean kitchen or living room exactly. Thank you. That's exactly what we mean. Look at that. Winnipeg I just saw. Great. Glad to have our Canadian colleagues here. Chicago seems to be dominating the action. Is this thing rigged? Our panelists are from all over and I can see you are too, Washington DC naturally showing up and great. Look at that diversity as the word cloud keeps updating this in real time. Hawaii, lucky you. Glad to have you.

Just for the record, as being somebody from the Washington DC area, I want to add together those who added DC to Washington DC so the word cloud will properly represent my part, though I'm in Maryland right now. Good. That's nice to see all that diversity and there's even more that doesn't show up in the word cloud. You can also see, by the way, if you haven't noticed this, the little odometer like counter on the upper right to see how many folks are participating in the survey. See, we have many more who are on the call. South Carolina, good to see you. Okay. Why don't we keep going?

Ah, here you go. This one's – this is a good one. Higher education has snuck ahead. Going to wait until we have a couple of hundred responses, please. Glad to see you and actually the diversity of different folks here. Interesting. Well, look at that Wendell, you're in good shape here. Wendell's with UC Irvine and Wendell, you have a lot of colleagues here in higher education today. So when it's your turn to speak, you can use the secret handshake with your higher education brethren and sisters.

The next one is an essay question – well, it's not an essay question. It's one or two words. It's not multiple choice. What energy projects are you most excited about. I'm trying to – I'm also looking at our panelists. I'm trying to decide if we're allowed to answer these or not. All right. We'll see what our colleagues out there – thermal storage, building commissioning, ISO 50001, microgrids with an exclamation mark.

You know, I find the heat pump people in the microgrids people tend to use exclamation marks. They're always particularly very enthralled and excited about their own. Smart campus, back to our educators. I don't have my Slido window open, but when I did this the other day on the other panel, you can also upvote on some of other people's things. I don't know if this will allow that or not. Co2 reduction, onsite solar, campus resiliency, more retrocommissioning, microgrid with five exclamation marks.

Okay, you're getting carried away now. You're just going to start a competition. Thermal wastewater, very interesting. A lot of BTUs going down the drain, literally, with wastewater. Electrify, electrification, naturally that's important to folks recently. Equitable recovery, how interesting. Thank you. That's a very interesting answer. Electrify everything with lots of emphasis. Cogen. I can see somebody wrote cogeneration, so they're over a certain age. They would have written CHP if they were under a certain age, so that's fine. More commissioning. I'm sorry.

More exclamation marks does not get your more votes, but it does catch the eye. Building envelope analysis, boy that's only been around for a couple hundred years and yet it still remains an important, exciting technique. And I'll just say while this is coming in, because of social distancing, we in my office, the building technologies office, are paying attention to building envelope analysis that can be done remotely through remote techniques such as drones or even virtual techniques.

So, I think many of these things including building envelope analysis I personally think we're not going to go back to the old normal. We're going to have a meaningful change that we will go back to. Smart furniture. Haven't seen that in a while. Hydrogen, all caps, six exclamation marks. There you go. Grid interactive efficient buildings. Well, somebody is playing to me 'cause that's my very favorite thing in life, so thank you whoever entered that. I am partial in these matters. Good. This is a great list and we will capture them and if we can, we will consolidate them a little bit and just so we get some insight into what you're excited about.

And notice we did say, by the way, and I hope you notice this, what energy projects are you excited about and like to complete, so we're not just asking about energy issues or policy. We're asking about projects. So thank you for that. Why don't we keep going. We'll have more questions for you down the road.

All right. Let me tell you a little – I'm going to speak for a minute before we turn to our panelists. First, I want to tell you about buildings. I think you know this. I know it's the Better Buildings and Better Plants summit, but let me just tell you about buildings. Buildings are big. Buildings are the biggest sector. They consume more energy in this country than industry or transportation. That's 39 percent of energy use. When we look at electricity, of course it's a lot more. It's about three quarters of all US electricity is consumed by buildings and on this graphic, you'll see buildings are green with the res in a different shade than commercial, res is on bottom.

On peak, we had trouble separating res from commercial and it varies greatly by region, but again, buildings in total are three quarters of US electricity use and in most of the country, 80 percent or more of peak demand because of air conditioning. So we can't deal with these issues unless buildings are the heart of the solution. CO2 emissions is very similar to energy use, but a little bit lower share of course because of gasoline and the transportation

sector, but still well over a third of US CO2 emissions come from the building sector, 5.1 billion tons per annum. And finally, the bottom line is how much are we paying for the energy.

This, by the way, is just the utility bill, gas and electricity doesn't count gasoline or diesel, but just the gas and electricity, we're paying over \$410 billion per annum in this country of ours to heat and cool and light buildings. Nothing wrong with that until we say, "Oh wait, over 20 percent of that is wasted, maybe a lot over 20 percent of that is wasted and so that \$410 billion of which easily \$100 billion is unnecessary, is a drag, of course, on your companies and your organization's bottom line, and American households, of course, on the nation as a whole. Next slide please.

This is a Rorschach test, this next slide. First, I'm going to show you three lines. You can see this is from 1980 to 2018 where we have data. Three base indicators, GDP, obviously it doesn't show the current economic condition, but GDP has grown prominently in this country, floor area in the building sector has grown and population has grown. That's the baseline. Next, please.

Then if we overlay on that in dark blue building sector electricity use and building sector energy consumption, you can see those have also gone up and you can see the comparison. Electricity use is at a greater rate than square footage. Energy use is at a lower rate than square footage and fortunately, they're both below the rate of GDP growth. Next overlay, please.

So if you do the math on that, you can see CO2 emissions went up for a number of years and have been coming down for a number of years. This is within the building sector and energy use intensity, in other words, energy per square foot has gone down and you can do the division in your head. So why do I say this is a Rorschach test? Let's look at those last two lines, the red for CO2, the green for EUI. The good news is they're going down. The bad news is, they're not going down fast enough. And I'll let you decide if this is – if we're winning or losing, if we're doing better than you thought we would or if you think we're not doing as well as you think we need to, but this is – these are just the facts here and I'll let you interpret them, but we know our challenge is still out there and we know our opportunities are enormous. Next slide, please.

This is the shameless plug slide. So, at the Building Technologies Office, this is what we do for a living and we work with all of our colleagues in efficiency and renewables at DOE and with other offices as well as our friends and colleagues at EPA and HUD and

general service administration as well as state and local government and the private sector and the nonprofit sector. So, we support research and development, working with our national labs, working with universities and other to do – to help develop new technologies that will help make energies more productive. We've been active over the years and decades with everything from LED lights to double pane windows to advance building and energy modeling.

That's not good enough, of course. We need to integrate those new inventions and those new developments that you've been part of, into the marketplace, both the commercial and the residential there, and we also work naturally to help develop consumer-facing tools. The informed consumer has a fighting chance in making smart energy decisions and we want to help them do that as well as be able to validate and test technologies and of course integrate them. What works in the lab may or may not work once integrated with other technologies. And then as they become standard business as usual, perhaps through ISO 50001 or because all of you good people who are Better Building challenge partners have adopted them in your facilities, you know that they can be used throughout the country and at the state level and local level, they may be locked in via building codes or at the federal level, locked in through appliance standards.

Work, of course, isn't done then even when they're locked in through standards because it's backed for the whole thing to shampoo, rinse, repeat, then it's time to go back and invent something new, just as we help with Lawrence Berkeley Lab develop now a new technology called thin triple windows, which will, we hope, someday replace double pane windows at a same cost, better performance, better energy. That's what we do for a living at BTO and Better Buildings, of course, is a key part of that.

So can we go to the next slide, please?

Here's our panelists today. I think you can read their bios. I hope we posted that. But as you can see, the diversity, we have Jon Utech from the world famous Cleveland Clinic that provides healthcare, and if you heard John's, I want to say CFO, maybe see your COO last year when we were in Cleveland, gave a very inspiring keynote address. Wendell Brase, Wendell's with the University of California in Irvine, one of the gems of the UC system, but Wendell also beyond his responsibilities on the campus at UC Irvine. Works directly with the UC president, Janet Napolitano looking at the overall energy performance of the UC

system. Jonathan Bauer from The Tower Companies based here in the DC area and Tower is, a major real estate force and Jon – I'm sorry, Jonathan, look at, we have a John and a Jonathan, we'll keep it straight. Laura Capps is with Efficiency Vermont. Efficiency Vermont works in many states, not just Vermont, many states as well as, of course, the District of Columbia, providing energy efficiency services directly to end users, typically working with utility companies and rate payers and regulators, but Efficiency Vermont is a very entrepreneurial group and they'll work with anybody who will have them and they do a great job.

Rachel Gutter is the CEO of the International Well Building Institute. Look, we all know, it goes without saying, but I'll say it, all the energy efficiency in the world won't do us any good if our energy efficiency technologies and practices lead to an office or a restaurant or a home or a hospital that is uncomfortable, that is unsafe, that is unproductive.

So we have to make sure that at the same time we're promoting energy efficiency, we're making sure that we're not reducing those other essential benefits. And finally, we'll have today Bill Perhacs. Bill is with Bristol Myers Squibb and I don't think that company needs any introduction, of course a major player in the global pharmaceutical and healthcare business.

So you can see the diversity of our panelists. You can imagine what we're going to talk about. So, again, just before we hear from our panelists, I just – who are going to talk about our path forward as we – we're coming on this last session, I do want to make sure you're not having technical difficulties. If you are, please use Slido, we'll do what we can. And we're going to hear briefly from each of our panelists and then we're going to have a conversation with them.

So Jon Utech, if you would get us started and give us your perspective.

*Jon Utech:*

Perfect, Thank you, David. And certainly, we are living in unprecedented times. Between the COVID pandemic, the recession and recent protests against structural racism, we're all dealing with a world that's changing rapidly and dynamically. Cleveland Clinic, I'm the director of the Office for a Healthy Environment. Has been in the midst of a pandemic response in Ohio and Florida and Nevada and parts of the US where we operations.

We're proud that we've worked with local and state officials to try

to get coordinate our own healthcare and state level responses to the pandemic and have stood up recovery hospitals and all kinds of unimagined things to try to alleviate the pace and breadth of COVID. We have given guidance to the governor of Ohio and in Florida on return to work, so all these things are – all these trends are impacting us. Certainly, we are known for delivering world class healthcare. We've been rated number two globally as a hospital system and in the top two and four nationally. Next slide, please.

So really, why are we connected to this work? You know, if you look at the social and environmental determinates of health, environmental factors, the things that we can influence through our usage and sourcing of energy are 10 percent of health factors in the US and 25 percent globally.

So we view it as an integral part of our mission as a healthcare system to have a fulsome sustainability program to try to impact those factors both in our communities and around the world and I think we've all seen with COVID due to the shutdown that has gone concurrent with this pandemic, reductions in air pollution, which have shown health vulnerabilities related to transportation, other sectors and certainly it's a bit of a test run for changes that we're trying to make, reduce air pollution, water pollution, other pollution in the future. Next slide, please. It's really, you know, the work that we've done and we're proud that we've achieved in 2019 our Better Buildings Challenge commitment, which was a 20 percent commitment 2010 to 2020. We achieved 22 percent as the end of 2019, so we've exceeded that. And really, the work that we've done in energy efficiency has given us confidence on a stair step basis, along with other work in resilience of our own healthcare facilities in our communities to make a climate carbon neutrality goal and resilience goals because we kind of view transformation of the usage of energy is fundamental to the future of the health of the world's population.

Next slide, please. And really, the drivers of that work are energy efficiency which I have mentioned and this is just percent reduction in our carbon footprint. The large bars here are our total carbon footprint and the red line is our reduction of carbon intensity. So that red line shows that we're down more than 30 percent in our intensity per square foot, 2010 to 2020 to date, and again, most of that has come from our work in concert with the Department of Energy, the EPA, in energy efficiency, LED lights, setting back both our operating rooms and other energy usage, a variety of technology solutions with the Better Buildings Solution

Center. We've made our care fleet more efficient. We've gone to less carbon intensive anesthesia gasses and the grid's gotten greener.

As we look forward, we're doubling down. We're going to 30 percent energy efficiency goal. The new buildings that we're building, we commit to building better. We're going to be sourcing renewable energy, getting offsets and we've seen this tremendous transformation in healthcare, in-person visits and energy intense buildings for virtual healthcare, which is a trend that we see continuing and impacting the healthcare sector usage of energy. So, looking forward to the discussion and pleased to be a part of it. Thank you very much.

*David Nemptzow:* Thank you very much, John, and thanks for the work that Cleveland Clinic does. Next, we're going to hear from Wendell Brase with UC Irvine in the UC system.

*Wendell Brase:* Thanks, David. Okay. First, a few facts about the University of California Irvine. It's one of the larger UC campuses, 40,000 students, 16 million square feet of space including medial inpatient and outpatient facilities. It's – see the Sierra Club – this is actually from their magazine after we had won recognition from them as one of their top ten cool schools ten years straight, actually. Next slide, please.

We developed a Smart Labs design platform that provides the foundation of DOE's Smart Lab accelerator program. If you want to know more about the Smart Labs program, the DOE has produced a very nice seven minute video that provides a nice overview. Next slide, you'll see the – that shows you the link for that video, if you're interested in looking at it.

We are also proud to have been the first participant in President Obama's Better Buildings Challenge to improve overall campus energy efficiency and [audio cut out] seven years early in 2013. Okay, that's enough bragging. So let me say a few words about how we've done these things. We've developed a program of deep energy efficiency design performance standards that have managed to reduce energy consumption by more than half in both newly constructed buildings and in whole building energy retrofits. Let me show you some results. Next slide, please.

This graphs results that didn't happen. It shows what campus energy consumption would have been if we'd continued to build new buildings to code as the campus grew.

Now this lower curve, the green curve, shows what actually did happen. Notice at the point of inflection, three key things occurred. Number one, the University of California made a commitment to become carbon neutral, two, we adopted the goal of deep energy efficiency, which focuses on energy retrofit projects that could cut energy by half or more and third, we also adopted very aggressive lead goals to avoid digging a deeper carbon hole as the campus expanded.

So why these goals? Well, using less was seen as the most logical first principle and it was actually something we thought we knew how to do and make the first big bite out of our carbon footprint. But there was also a larger logic as well. Both then and now, we anticipate that decarbonized energy, whether electricity or gas, will cost more than fossil energy. As the investment in our deep energy efficiency program is paid off, the savings will be liberated. To absorb this added cost, we anticipate for decarbonized energy.

So, what you see here is not just an aspirational energy plan, but rather a feasible business plan to become carbon neutral. Finally, one more thing about this chart. Keep in mind that you're not looking at a chart for a building, but for an entire campus. Another way to look at this is, we've doubled the size of the campus in the last two decades. We're using the same amount of energy. That's it. Thank you.

*David Nemptzow:* Thank you, Wendell. That's inspiring. Jonathan Bauer, sustainability director of the two – The Towers Company.

*Jonathan Bauer:* Thanks so much, David. And I have to say, I'm extremely humbled to be on this panel alongside some great people, so thank you for having me. And first and foremost, the DOE and the Better Buildings Challenge team for putting on this virtual event and making the summit still as awesome as it is. I wish we could all be together as well, but at a minimum, it's nice to see so many colleagues over the last week. And if you can go to the next slide for me, please.

So first, thank you. And second, a little bit more about Tower. Tower is a family owned privately held commercial real estate developer, owner and manager of about six million square feet of commercial office, multifamily and retail properties in the DC metro area. And I want to just say a little bit more on being a developer owner and manager and how important that is because

we're really involved in the entire buildings life cycle, not just from design and construction and for a few years, but for many, many years in all operations.

So we care deeply about short and long term operations, which really informs and allows us to do some really unique and aggressive sustainability, things with sustainability and wellness. And of course, one of our company pillars is sincere sustainability and we've been practicing this for over two decades because really we recognized long ago that we needed to be a part of the climate change solution and we figured out that that's not just beneficial for the planet, but also for our business. Next slide, please.

And so with that, we really set up a program and have a lot of course pieces and elements and a lot of your probably recognize these, but for example, 98 percent of our portfolio is LEED certified and I'm actually working on the last one right now to hit 100 percent, so that'll happen this year, hopefully. Eighty percent of those buildings are ENERGY STAR certified with an average score of 86. Of course, we're proud to have achieved the Better Buildings Challenge 20 percent energy and water reduction goals in 2017 and 2018.

We've also been a Fitwel champion since 2018 when we certified the first multifamily apartment building in the world with that certification system and since then, we've doubled down and done two more office buildings and we're working on six projects over the next year. And of course, we have many other partnerships. I won't go into too much detail on them now, but we'll get a lot more into health later, I'm sure. Next slide, please.

And, I'm really glad to see that so far, at least, a lot of people have put their charts up. So, here's our chart and what you're looking at here is that blue line shows you the raw energy consumption reduction we have seen since 2010. It's about 25 percent and that's measured by the Better Buildings Challenge. And alongside that, the green line is the avoided energy cost we have experienced over that same time period.

So we're talking about six million square feet of real estate and almost \$17 million avoided. So what that means is basically cumulatively, we have saved \$1.7 million a year compared to that 2010 baseline. So those are big numbers. And it really gets into the drivers of why we do what we do.

Why do we do sustainability and wellness? There's a business case

for it. Another driver is mitigating risk and so for example, regulatory risk, a lot of folks probably on this call have heard about building energy performance standards and those are cropping up and pushing buildings, regulating buildings to be more energy efficient. Well, for example in DC, we have several office buildings and they're all above the median, far above the median, so we don't really have to worry about the regulatory issues as much as others, so it's mitigating risk.

And then lastly, another driver is always strong leadership and company culture and I want to just stress that that's not just mandates coming from the top down, but I think they're core to advancing sustainability and wellness. It needs to be a sandwich approach where you have top down mandates and bottom up participation where everyone in the organization is engaged and involved, and that's really the way to move forward on a lot of these initiatives. So again, thank you and back to you, David.

*David Nemtzow:* Thank you, Jonathan. Next, we'd like to hear from Laura Capps and Efficiency Vermont.

*Laura Capps:* Hi, everyone. Next slide, please. My name's Laura Capps. I work with Efficiency Vermont. We service small, commercial customers, large commercial customers, residences and industrial buildings. Over the last 20 years, we've helped our customers save over \$2.6 billion worth of energy costs and avoided 12 million metric tons of pollution. I had the honor of working with the emerging technologies and services team and our focus is to bring innovation to the state.

You heard yesterday from my colleague, Lauren Morlino, on her integrated lighting work. She always works on controlled indoor agriculture as well as the shift to natural refrigerants. Other products in our current portfolio include bio digesters for small and medium dairy farmers. Looking at the non-energy benefits of our work, specifically health and greenhouse gasses, so not just the GHT associated with energy consumption, but with the measures that we're incentivizing, the materials that we're putting into place. We also worked on smart and connected homes and buildings and flexile load management. We feel like core to our success is the customer value design proposition that we build into every product we work on. Next slide, please.

My main focus over the last three years has been on healthy buildings in homes. This is a project that my colleague, Brian Justin in 2017 where he demonstrated that we are having high

levels of carbon dioxide buildup in residences in the bedrooms at night, regardless of whether that residence is tight with ASHRAE standard ventilation or leaky, with or without ventilation. And leaving the door open at night did not solve the problem. So we knew there was more we could do in our market to look at the helpfulness of the spaces that we're working on and have deeper relationships with our healthcare partners. Next slide, please.

So over the last few years, here's a few of the projects that we've been bringing to market. We have pilots running with three different hospitals looking at lower respiratory disease as well as fall prevention. So what measures can we install at the time of weatherization and what impact would that have on the health of the occupants in those homes.

We also have a program where Vermonters may borrow an indoor air quality monitor and monitor their homes over the series of a couple of weeks and from that, identify behavioral changes as well as energy efficiency improvements that can help improve that indoor air. They can also receive a healthy home energy visit, which we're working to take virtual now, or a comprehensive healthy home energy assessment from one of our partner contractors if they're looking to move forward with a comprehensive retrofit project.

We've taken all of these lessons that we've learned over this time and we've put them into an energy plus health playbook with the support from E for the future so that other program administrators can do the same. Last year, I started working on healthy buildings, really digging in, how do we take this experience from the residential market and apply it for our commercial customers?

And at first, it was challenging to get the customers interested in the project, but as you might imagine, the phones are ringing daily now with questions from customers about indoor air quality and meeting COVID recommendations. So we're excited to learn from this panel today to take some ideas back and to support our customers, whether it's contractors trying to protect themselves and their client while they're in the home or the business or an entire office building looking to keep their employees safe or maybe a school with students. So thanks for having me and I'm looking forward to learning from you all.

*David Nemtzow:*

Thanks, Laura, and as you can imagine, we're going to be asking you about the energy plus health issue that you guys have been

championing. Speaking of which, let's hear from Rachel Gutter from IWBI. Rachel?

*Rachel Gutter:* Thank you. Thank you so much for having me. Thank you for the promotion. I do want to point out that I'm not the CEO of IWBI. Rick Fedrizzi is. I'm the president, but thanks for that 'cause that's hashtag future goals. I also want to thank other –

*David Nemptow:* Put yourself in for a raise, Rachel.

*Rachel Gutter:* Good deal. I want to thank all of the DOE leadership, really, especially those that are involved in the Better Buildings initiative from you, David, to Maria Vargas and all of the other key staff, including Nate Allen and Hannah Debelius who are both former USGBC colleagues of mine. It's pretty clear that the Better Buildings Initiative might be one of the most successful partnership programs that the federal government has ever launched with nearly 400 partners and practically \$5 billion worth of savings and so I'm just really excited to know that the Better Buildings Initiative and the staff that work on it are exploring the intersections more deeply between energy efficiency and human health and the extent to which we can blend both of those in the fight against COVID-19.

So I'm from the International Well Building Institute. We are a for-profit organization that's headquartered in New York City with staff spread out across a dozen countries and supporting projects in more than 60 countries. We have a mission to enhance the places and spaces where we all spend our lives to improve human health while being productivity and performance. We're best known for the well building certification, but we also have pathways for communities and now for organizations through our well portfolio program. And just this week, we announced the launch of a new product called the Well Health Safety Rating for operations and management, which is designed to help buildings and operators move toward recovery in this fight against COVID-19.

We organize our universe according to ten concepts or categories, all of the different ways in which the built environment can impact health and wellbeing, air, water, light, thermal comfort, sound, materials, nourishment, movement, mind, and community. During my time at USGBC as the founding director of the Center for Green Schools, I was learning firsthand that in our work to advance health for the planet, we were also advancing the health of people. I met teachers who no longer suffered from the 2:30 headache, which was a term that they had coined for just how sick

they felt at the end of the school day after spending a full day inside of that building. I met students who no longer needed their inhalers three times a day after coming to their new certified school.

We see our work at IWBI as a kind of second wave of sustainability. That's a term that Rick coined, having founded the US Green Building Council and migrated to IWBI. And just like you, just like the US Green Building Council, we believe in the wisdom of the triple bottom line, people, planet and prosperity and shooting for the intersection of those three.

But what we also believe is that in shifting the center of gravity towards human health, we can tap into a kind of universal imperative that we all share now more than ever a desire to be healthy for our families to be well, for our business to be growing and our communities to be thriving. We also though see human health and planetary health as inextricably related. You really can't have one without the other. What our buildings breathe out, the people on the street breathe in, and as John said in his opening remarks, COVID-19 has proved this to us in a monumental way because outdoor air pollution is essentially a preexisting condition at a community scale when it comes to COVID-19 fatalities.

So the beautiful thing is that we don't have to choose, especially not anymore between energy efficiency and human health. And it turns out that if we overlay evidence based strategies for human health like the ones found in Well atop of energy efficiency solutions, we can dramatically improve the ROI that we can articulate, which I think is the key to unlocking a ton of potential new funding, financing and resources for energy efficiency projects. So, really excited to explore some of those themes and intersections in the panel today and thanks again for having me.

*David Nemtzow:* Good. We're going to do just that. Let's hear from Bill Perhacs. Bill, tell us your title so I don't mess up, please.

*Bill Perhacs:* My title? Director of global energy and sustainability services.

*David Nemtzow:* Thank you. Good. Tell us about Bristol Myers Squibb and the work that you're doing, Bill, please.

*Bill Perhacs:* Well, thank you David, and thank you to the DOE. I'm honored to be on this panel with some very impactful people we've already heard from. So Bristol Myers Squibb, for those of you who don't know, is a global biopharmaceutical company. WE have sites in

over 50 countries around the world. Our mission, actually go to the next slide, if you would, David, so I – our mission is to discover, develop and deliver innovative medicines that help patients prevail over serious diseases. This mission unites us as employees. It obviously has a lot of relevance today as our whole world is going through a pandemic, not that we have a solution to it, but we all are into wellness and health of our population. We focus on cancer and cardiovascular, but our products go beyond that.

As you can see in the bottom timeline, we've been around since the 1800s doing this, so penicillin during World War II to our current biologics for cancer. And at the very bottom, we just merged at the end of last year with Celgene, which is another very large biologics company and we're spending a lot of time right now combining our programs, our sustainability as we go into the future with new goals together. So very exciting time for Bristol Myers Squibb. Next slide, please.

So we like to call our key – one of our key ingredients to our medicines is our environmental stewardship and we're very proud of that. You can see in the numbers there from an environmental perspective since 2015, we're down 21 percent, in our absolute GHG emissions, 11 percent in water consumption and we also are very proud of and have received a lot of benefit from our cogeneration plants that we have. You can see 20 percent of our corporate electricity globally is cogenerated, which helps us out from a cost perspective, environmental perspective and it also increases the reliability of our sites around the world as well.

So from a – also from a project perspective, you can see since 2010, we've done quite a few projects and we've – we're saving upwards of \$129 million cumulatively since 2010, kind of in line with the charts that were shown earlier by Jonathan etcetera, very proud of that and that does get people's attention outside of the world of the green environment, the green dollar does get people's attention on savings and helps drive your program even further.

So from a partnership perspective, we heard earlier about a lot of people talking about LEED. We're very engaged in LEED as well, 17 certifications. Most all of our new construction does receive LEED certification. We have others pending right now. So we're proud of that. It reduces our footprint as our network grows to support our new products.

Additionally, very, very happy with the support we get from our government, you know, from the government side, first with

ENERGY STAR. We're an ENERGY STAR Partner of the Year, Sustained Excellence for six years. We do – our buildings get certified and it tells a story to people walking into the buildings and it's a very – we're very proud of that Partner of the Year recognition.

And then finally, you know, better Plants Program Department of Energy, we only joined in 2016, so we're probably very young compared to a lot of others. We became a challenge partner in 2019 and we set a goal of 20 percent and we're at 16 percent, so we hope to reach our goal, hopefully within the next year or two. And we also joined the waste reduction pilot last year. Again, the DOE, I think we've only just started understanding all the areas the DOE can help us with and we're very excited about all the areas we can attack and be part of within this group. So thank you again. So back to you, David.

*David Nemptow:* Thanks very much, Bill. We're going to put up a poll question in a moment and so be ready for that and then ask some of your questions and some others. I want to ask you this first before we do that. Here's our question. Okay. So tell us at your organization how the economic downturn, what impact it's having on your efficiency projects. And while they're doing that, I think that'd be the first question I'm going to ask, at least to you Bill and Wendell and Jonathan on the panelists if you could also – and when we get some results here, tell us how the recent downturn, what do you think is going to be the impact on your projects. Let's see what our audience thinks first.

So, it started out with the budget people answered quickly and now the delays and schedule people are coming up. So it's interesting. We're not seeing much so far at least on the last one, we're not seeing a downscoping of projects, but we are seeing schedule, which could – if we say schedule, I assume some people are stretching out the schedule for projects and some are probably starting them much later and waiting to see what happens.

And you'll see the percentages add up to over 100 percent, which we're letting folks answer with more than one choice. Okay. That seems stable, so we see the different impact that it's having. So again, Bill and Wendell and Jonathan, you have buildings, you have projects, how would you answer this question?

*Wendell Brase:* Should I jump in first? Most of the deep energy efficiency I mentioned is actually done. We got a jump on that starting in 2008 or so and it was all financed with 15 year revenue bonds and our

credit is good. I guess in a way, we sort of wish that we had more projects to do that we could use more borrowing of that type to do because interest rates are going to be favorable for the next couple years, I think. For the new projects, we finance those by – we have a framework that we use that we created 15 years ago that there were certain things in the design standards of buildings we were not going to do in order to save the money that we needed to put into life cycle performance.

So that – we basically don't get any more money to finance let's say a lecture hall or a science building or a rec center, anything we build, than any other campus, UC campus, but we've made a decision that – and this is a paper we share with anybody. Quite a few other universities use it. It's basically got a table in it that says, here's a list of the things we're not going to do in order to pay for this side of the table. There's no free lunch. This table actually works and that's how we're paying for exemplary energy efficiency. By the way, the last 19 projects built on this campus LEED Platinum all of them.

*David Nemptzow:* John – oh, sorry Bill or John, you – who's up next?

*Jonathan Bauer:* I'll jump in quickly on that. So, -

*David Nemptzow:* Jonathan.

*Jonathan Bauer:* Can you hear me?

*David Nemptzow:* Yeah.

*Jonathan Bauer:* Okay, good. I'll start by saying that, you know, our core focus has not shifted. Right? We're still laser focused on sustainability and wellness, but that's not to say it hasn't been challenging. I think a lot in the industry have felt that. Certainly it's been a hard time because non-essential spending has probably been pulled back, and we've seen that and I would agree kind of with the poll results that the biggest hit is really schedule as everyone has kind of shifted all resources or almost all resources to obviously addressing the needs at hand and so that's been a strain on schedules and in some cases, budget.

But, on the flip side of that, I also think COVID-19 is accelerating the pace at which we're moving on some things. Right? So for example, we're working on six Fitwel certifications and those have all been accelerated by months. They were supposed to be done later in the year and now they need to be done very, very soon. So

we are obviously moving forward on a lot of our wellness initiatives. Same thing with a lot of energy efficiency strategy. It becomes important because if you think of it as resiliency, we can reduce operating costs and that's something that helps us get through a crisis when times are tough and in the future, if something else happens, we're in a better position with better energy efficiency.

So, that all is to say, it's also that tenants are demanding these things. When we move towards reopening buildings, we think about the future, these things were already trends and they're just going to grow and become even bigger trends. And so, if tenants are demanding it, then we need to respond and it needs to be fully integrated and our business is to rent space and we need to serve our tenants and that's what a lot of people are asking for.

*David Nemtzow:* Jonathan, real quick, speaking of tenants, you talked about your energy efficiency investments, who pays the bills, The Tower Company or your tenants and if it's your tenants, why are you being so charitable.

*Jonathan Bauer:* So in most cases, the tenants, there's not triple net leasing in most cases, in retail there is, but in office space, we have gross modified leases with a base year and so they're not paying directly for their utilities. And a lot of our multifamily complexes, we have master meters, so we're also paying the bill. So in most cases, Tower is responsible and able – we don't have as much of the split incentive, but that's not to say that there isn't in some cases still issues or challenges, and so we are a green lease leader and we have been for years and so that's kind of the foundation of our sustainability program is partnering with our tenants on not just energy efficiency but all sustainability solutions and to be honest, we're not going anywhere if we don't work with the tenants. The tenants control a lot of the stuff in the buildings and we need to partner with them. And a lot of them are eager to do that and the green lease is the best way to kind of move forward on that.

*David Nemtzow:* Good. Good. John, tell us about Cleveland Clinic and also when you answered that question about how it's impacting you, you're in the healthcare business. You've got a lot of sick people to deal with. So tell us how it all – what's happening in your daily life.

*Jon Utech:* Sure, thank you David. Yeah. Boy, it's been a – just a really challenging time for Cleveland Clinic as we sort of – you know, starting in mid-March shut down our normal clinical operations and focused on COVID and shut down voluntary surgeries,

outpatient procedures and it's sort of an unprecedented shift that for us in Ohio and Florida actually reduced our energy intensity. We were able to setback buildings, the standards that we relied on allowed us to sort of set buildings back.

So in the short term, it's reduced our energy usage. In terms of investment, we as an organization decided to invest in people so we have not, as an organization, have not laid off a single individual through this pandemic. Other healthcare organizations have, you know, other businesses have done so.

So what we have chosen to do is delay our capital schedule so in the polling, it would be a scheduling response. We're just delaying capital investments. I was actually at the Better Buildings summit. I think it's four or five years ago, I can't remember right now, talking about our green fund. So we have an ongoing commitment to invest a certain percentage of our capital in energy every year. In this pandemic world, we've sort of put a pause on that, but we're certainly committed to continuing to do that going forward. What we have seen is three big trends that I see dramatically changing the energy impact of the healthcare sector.

Number one is, coming into the pandemic, a very small – less than 25, 30 percent of our physicians had actually done a virtual patient visit and now more than 90 percent have. And so the way the healthcare services are being delivered has radically shifted in the last several months. It's not to say that we've returned back to normal, but healthcare, which is ten percent of the US carbon footprint and a huge percent of the energy footprint is going to dramatically shift both short, medium, and long term and the investments that we make both in our acute care and outpatient facilities is likely to shift pretty dramatically going forward. The other trend that we're seeing is, we've surveyed our administrative workers.

We have 67,000 employees in Ohio, Florida, and Nevada and we've done a survey of our administrative workers, which are, say 6,000, about ten percent of that. More than 50 percent at the moment are committed to permanently working from home. So, in previous days, we have – there was a suspicion that working from home, how would you know what people are doing and how would you monitor the workflow and you know, that in and of itself is going to radically reduce our own scope free carbon footprint, our own emissions and a variety of things that will have dramatic health improvement in the communities that we serve.

And then finally, I'd just say we're going to use the technology and all the information that we've – we're building better buildings and I think we're using this time to redesign and really rethink the way that we build more flexible, smarter buildings, We have more than six million square feet of LEED certified buildings in our portfolio, done lots of great things. We can and need to do better. We need to incorporate more renewables as a part of that portfolio to reduce our impact. So those are three big trends, David, that I kind of see as getting shifted and accelerated given everything that's happened the last couple months.

*David Nemptzow:* Interesting. Bill, did you – Bill or Laura, did you want to field that one or should I move on to the next question?

*Laura Capps:* Why don't you go on. Get some variety.

*Bill Perhacs:* Thank you. I can –

*Laura Capps:* Oh, sorry Bill.

*Bill Perhacs:* No, I think we're – Bristol Myers Squibb, we're pretty fortunate because our products have not really been significantly impacted by what's going on. Our manufacturing facilities have been operational. We've been able to supply our medicines to patients around the world without interruption, so we're very fortunate in that regard and what I will say is, you know, from an energy project perspective, you saw the big bar on schedule impact. We have some pretty significant projects that are underway right now. One, we were supposed to have a cogen starting up right now in New Jersey and that's pushed off till October.

So we're expecting to – you know, expecting value out of that project in a lot of ways. And we're also purchasing a micro grid application. That wasn't me with the five exclamation points, by the way, on the earlier Slido. But, we are pursuing micro grid at one of our sites in Puerto Rico that, you know, can help the site in a lot of ways. So we are seeing impacts in the area of schedule, but from a funding perspective, we're fortunate. I guess time will tell. We start our next budget process in a few months and we'll see how well these projects are approved going forward, given everything that's going on right now. So, maybe come back to me in September, different story. But right now, it's pretty –

*David Nemptzow:* Look, you guys come up with a vaccine, you can have money for all the projects you could dream of. So be ready for all \_\_\_\_\_. Listen, earlier Rachel said something that I think was very

interesting. She talked about the ability in the job that she and IWBI do is articulating the benefits of a healthy indoor environment and that's, of course, on the commercial and residential side, but let's talk about on the commercial side.

So if I got you right, Rachel, you talked about the articulation. But I want to ask you and the other panelists how we're doing on the – with the articulation and the quantification of the health benefits. Again, in this audience, I think you have a friendly audience, we get it, but how do you think we're doing with folks who aren't as familiar with these issues and who may not understand the nexus between energy decisions and HVAC and lighting and indoor quality. Again, the articulation side, but also the quantification side. You want to tackle that for us, Rachel?

*Rachel Gutter:*

Yeah. Big question. I'll at least give it a try and then other panelist can chime in. I know you heard from Joe Allen earlier at the summit and I see his work as some of the most formative and catalytic work on this topic and actually I knew it when we were running a green school summit. We were doing this like round robin where people cycle through and give their ideas at one table, then they move on really quickly to the next and I was running one on data and measurement around health and every single person, and this was a green building event, was coming forward to talk about this study.

Like, they had all heard about it from different places. They didn't know that we had been involved with it, you know, or supported it at all, but are saying like, now we're having different conversations with our clients than ever before. We were asking them, "Do you want green lockers or red lockers?"

Now we're saying, "Do you want to prioritize energy efficiency to shave money off of the utility bill or do you want to prioritize air quality?" So I think in general, the community of practitioners have dramatically increased their fluency around talking about the co-benefits. I also think that the research has progressed leaps and bounds.

You know, I feel that Joe and his team are one of the first to touch that holy grail of sustainability in demonstrating that improvements to things like indoor air quality can have an impact on human health, on cognition, performance, and productivity. But the research now is mounting in that direction. For instance, there's this incredible new study from Pacific Northwest National Laboratory where they basically looked at a small subset of energy

efficiency conservation measures that have particular alignment with health outcomes and they basically, by the way, this was totally unbeknownst to us, but they took the Well criteria and they overlaid it on top of those energy efficiency measures.

And what they were able to find was that even though the standalone business case for the measures of energy efficiency reductions wasn't that strong and therefore those types of measures could be overlooked, when they added health benefits on top of it, they were finding that it represented from anywhere between a 50 to 100 x return compared to the energy return on the investment alone. That is game changing information. By the way, that amounts to 15 to \$30,000.00 a year – sorry 15 to \$30,000.00 over a ten year period net represent value per employee.

Where I think that we still have a lot more work to do has to do on strategies for quantifying the co-benefits at a project scale. So I think more tools are necessary and more frameworks are necessary to guide project level assessment of what the co-benefits of health are going to be. I think we've already proven that that exists. We've also proven that energy efficiency and human health measures go hand in hand. The majority of Well certified buildings to date have also achieved a green building certification and there's quite a bit of crossover between our feature set and five additional points that Well adds into the mix to incentivize the yes, and, as opposed to the either, or.

So, I think it's mostly in articulating the economics at a project scale where we really need to apply our attention going forward, some great opportunities for the federal government to team up across agencies to do that.

*David Nemptow:*

Thank you. So Rachel raises a bunch of interesting questions and challenges. I'm going to start with one she just said at the end and ask you, other panelists, Rachel just said this is an and statement. You can have energy performance and better indoor health. It's an either or. I'm not asking you your own views right now. I'm asking when you talk to your colleagues in your companies who don't do this full time, do you think they understand that or do they say to you, "Bill, or Wendell or Jon or Jonathan, okay, which one do you want? Do you want the health project or do you want the energy project?" How do the other smart people at your organizations think about that point Rachel just made. Wendell?

*Wendell Brase:*

Rachel shared a couple points that I think are relevant that I can share. That program I mentioned where we cut energy use intensity

in half on our campus, the centerpiece of that was that Smart Labs program that I mentioned because laboratories in a research university typically use two thirds of the energy of a research university. Everything else uses the other one third. And we did that by basically cutting air change rates in laboratories in half but backed up by a huge informatics system that measures in real time using sensors and software air quality on a zone by zone basis, on a minute by minute basis. Now, our goal going into that was not to compromise any safety for the benefit of energy efficiency, but the great surprise we had after we did this was safety actually improved and it improved for two reasons, actually three reasons.

One reason was this big informatics system that I mentioned will detect faults in the complex mechanical system of a laboratory within minutes or hours. It used to be probably decades before we discovered some of the problems in a laboratory mechanical system.

The second thing is, now that the air is going roughly half as fast in all of our buildings that means it's going half as fast through the air filtration media. We've been able to upgrade our filters to MERV 14 filters. That's one notch below a HEPA filter. That means fewer particles are – biologists who work and medical faculty who work with infectious airborne hazards are ecstatic about that because most pathogens, they're hitchhikers. They ride on particulates. So we're safer in that respect as well.

The third thing is, in this process, we learned that quality of airflow and ventilation and exhaust is much more important than the quantity. And so having a smooth sweep across a zone where we're – like a laboratory where we're trying to control airborne hazards is much better than just pumping in all kinds of energy through a bad diffuser, which is mixing it and spreading that hazard around the entire space. And so that benefit and what we've learned there again has helped to make our bottom line where we have data, our labs are safer now.

And everything I've just said is relevant to patient care environments where infectious disease transmission is a factor and we're actually using these results now in combination with Kaiser Permanente's chief engineer to resist the more is better idea, which is often the knee jerk reaction when people say, "Oh, we need more ventilation. We need more outside air. We need more, more, more. No. Maybe not. We need better.

*David Nemptow:* That's very interesting, Wendell, and as you know so well and others may or may not know, ASHRAE as well as Riva, their European counterpart, each have statements out looking at the quantity issue. I'm not saying they're agnostic on quality, but they focus on quantity and so your point is a very interesting one and something that I think we're all going to learn a lot more about over the coming months and years as leading HVAC and building scientists look at that.

Back to that question about how other folks in your organizations or Laura, the clients you deal with, do they get it? Do they understand this linkage or are they challenging it or are they saying, "Show me the numbers. Show me the sites." Anybody want to characterize how informed they are and what they're asking you?

*Laura Capps:* I can speak to that. I feel, my feeling is that in Vermont, energy efficiency, we've been here for 20 years, so people start to get that first and energy efficiency is the backbone of improving indoor air quality, in my opinion, in a healthy building. And so I think if we come across someone who is challenged to – they feel like they need to do one or the other, well, as you start to look at indoor environmental quality, energy comes into the equation right away. If you are going to increase those ventilation rates, you're running your motors that much more often and all of a sudden, an ECM looks much more attractive than it previously did. So I think that we can engage on those discussions.

For anyone that I've struggled with on the importance of indoor air quality, I go back to talking about their home because I think that's where you feel it the most directly and immediately in your own life and the other thing I would say is we look at partnerships. So we've had wonderful relationships with our hospitals in the past on the energy efficiency of their buildings. Now that they're moving to value-based payment structures, it's very interesting to talk about those social determinates of health and how can we work together to improve their population health as a whole, whether it's at work or at home, and what impact would that have on their bottom line.

So, I think that there's a lot of opportunity to have those conversations regardless of where the person's starting from and help them not only see the numbers on a spreadsheet but see the numbers on an air quality monitor that you put into their office or into their home so that they can experience that difference in air quality and what that feels like.

*David Nemptzow:* But at the same time, I'm not challenging anything you all said, there are times, especially if people don't install technologies as well as they should and there's always an issue with QY and QC. We all know that, or if they don't operate, that there can be negative tradeoffs and conflicts between these different goals. So, are you seeing that and are people saying, "You know, ever since we did that energy efficiency stuff, the air has been stale in here or the lighting's been crappy," or you know, and even if it's not the technology's fault, is that part of your world?

*Laura Capps:* I think that that graph I showed displayed it perfectly where bedrooms that had met ASHRAE were still underperforming and so it goes back to what Wendell said, which it's not just meeting the standard, but it's the design behind meeting that standard as well as the installation. And that's where quality control comes into play and you look for certified contractors to do the work or contractors that are participating in a network with ongoing training.

*Jonathan Bauer:* I can jump in.

*David Nemptzow:* We need to turn it to the audience – yes, please, Jonathan and then we're going to turn it to the audience questions.

*Jonathan Bauer:* Yeah, I'll just add, I just – I want to agree with Rachel and Laura and anyone else who mentioned this. I really don't think that energy efficiency or greenhouse gas goals or sustainability or any of these topics are – they're not mutually exclusive when we're talking about health. Honestly, I think what it is, it's a definition problem in the way that we've been thinking about it. People think about green building and health in silos and they treat them that way and I think what we're trying to do is thinking of sustainability, the expanded definition of that to include wellness because the shift is from focus on the environment and natural resources to the sustainability, the resilience and the energy of human capital and people. And all of those things need to work together.

So if you think about it in a silo, that's where there's challenging and that's a communication problem more than anything else, but of course there's a balance, right? We talk about outdoor air. If you're in downtown DC and you just want to like start bringing in 100 percent outdoor air when everyone's saying, "We need more outdoor air," obviously, that's going to lead to problems and probably actually more detrimental health problems with humidity.

Right? So there needs to be a balance, but I think to Rachel's point, we're talking a lot about this now and we're looking at these things together as one thing rather than as separate things and I think that's progress.

*David Nemtow:*

That's right, the holistic approach. Let's look to the audience. First of all, I have to say the audience, the participants in today's plenary have corrected me. There aren't three national crises. There are quite a few more crises, of course, going on. No surprise. And the one that got the most upvotes of everything on Slido, 54 upvotes is from Brittany Ryan, fourth crises – climate change. So – and there are many crises here so you're absolutely right. I'm only – thank you, three is enough for me for today, but of course, our nation has to balance a lot of action. I think it fits into what Jonathan just said, we're trying to walk and chew gum at the same time.

Here's a question we got from anonymous and it's a very important one, especially those of us in government service. What are the – to the panelists, what are the biggest challenges to ensuring – oh, I'm sorry. Sorry, I was reading it wrong. A question from anonymous is, what stakeholders are you working with in the last few months as the COVID situation has some and have you found their input to be helpful to your work? Anybody want to tackle that? Anybody want to say your stakeholders have been a pain in the derriere and not helpful?

Tell us about the role of stakeholders \_\_\_\_\_ during these new days.

*Rachel Gutter:*

I'd love to start. We have well over 5,000 Well accredited professionals now in our midst all over the world and a broader community of participants. We, on the same day that we announced to our staff that we were closing down our New York City headquarters and moving everyone to remote capacity, it was also the day before we were scheduled to have a vote by our governance council to bring Well version two out of pilot and I grabbed our chief engineer, Nathan, and I said, "I really feel like we have to press pause on this and do one more scan of our system to make sure that it really is emboldening building in the fight against COVID-19. So we stood up the COVID-19 taskforce. We had some incredible co-chairs who we invited and who agreed to participate like the \_\_\_\_\_ who's the immediate past head of Robert Wood Johnson, one of the largest public health funders, a previous US surgeon general, Dr. Richard Carmona, the former head of China's center for disease control and prevention.

But what was so incredible was that when we put out the call to the

community for other members of the taskforce, we expected we'd get a couple dozen great responses. Instead, we had nearly 600 individuals, virologists, practicing medical doctors and nurses on the frontlines. We had architects, engineers, energy efficiency specialists, federal employees, state and local government representatives, just an unbelievable outpouring of support and within a 45 day period, we collected hundreds and hundreds of points of input, then turned to all of our various concept advisories, volunteers who are experts in air, water, light, those concepts I ticked off earlier, and they are now in the process of partnering with our standard development team to finalize those changes in record time.

*David Nemptzow:* That's great. Congratulations. Anybody else want to talk about stakeholders, either the ones you've dealt with in the past or non-traditional ones that are part of your life now?

*Jon Utech:* Sure. I'm happy to talk about that. Again, at Cleveland Clinic, we had to rapidly sort of shift both our operational priorities, our clinical priorities and I'm very pleased to say that in a crisis, the stakeholders that we've relied upon for energy efficiency were tremendous allies in that endeavor, including the DOE, which hosted a number of healthcare calls where healthcare systems shared their challenges and kind of short, medium and long term challenges with shifting in a pandemic mode.

The Ohio Hospital Association here in Ohio and down in Florida, Florida Hospital Association held similar workgroups. ASHRAE, you know, all the groups really sort of shifted their mode to how do we deal with this issue in the best way possible. And you know, the DOE was at the top of the list along with that. And certainly, if you look in the world that Rachel's talking about, which is the built environment, you know, kind of the officer world, the healthcare world, everyone now is trying to figure out how to go back to a world in a safe and healthy fashion and those conversations are proliferating. We've been involved in some of them.

Dr. Malena, one of our physicians, has put out a toolkit, freely available to folks, to try to encourage people to do it, kind of what are the best practices. And people are looking to physicians in healthcare to sort of provide answers in a volatile and uncertain world where the choices aren't entirely clear because this novel coronavirus is so new and we're not entirely certain the modes of spread and how different HVAC strategies, social distancing strategies, cleaning strategies, all layer to make a safe and healthy environment for folks.

So I think the collaboration that we're seeing globally, both kind of at the federal, state, and local level is fantastic and I think we're trying to navigate this as agilely as possible and it's really been a wonderful re-endorsement of the human spirit, the collectivist approach for a positive future.

*David Nemptzow:* Yeah, thanks Jon. Looking at the clock we're going to squeeze in a couple of questions. We're going to turn them into lightning round questions, so Hannah Debelius, just throw the next one up there and panelists, just jump in with two feet and give us some lightning round answers.

What other types of private public partnerships need to be formed to – oh, that's hard to answer, lightning round, but give it a shot folks. If you can do it quickly and we're going to squeeze one in after this.

*Rachel Gutter:* I think more work with the investment community, specifically around aspects of impact investment, better ties to ESG through various metrics and frameworks and really helping, again, to articulate what that ROI is so that we can scale the dollars that we need to address this enormous opportunity.

*Laura Capps:* I would like to see –

*David Nemptzow:* Anyone? Anybody else?

*Laura Capps:* I'd like to see even more collaboration with the health energy nexus, so looking at healthcare partners and energy partners as well as building owners and taking this opportunity to do some pre and post testing of spaces and monitoring of people's health 'cause we're going to be making a lot of changes to buildings. What impact does that have and what can we learn from it?

*David Nemptzow:* Yeah and I'll say, Laura, and no big secret, sometimes even we in government could use a little partnering with each other and for example, we in BTO have, with our national labs, have the best HVAC scientists in the world, but we're not epidemiologists and we're not virologists and CVC has the latter, but they don't work on airflow in commercial buildings. So your point is taken and we need to do the same ourselves. Hannah, throw up one more real quick and we're going to do that and then we're going to turn to a video and let you go.

Okay. This is important. Workforce, special expertise. Why don't

we start with you, Jon, and just is there a special expertise that you really need to see in hospitals and healthcare facilities as of June 11, 2020?

*Jon Utech:* I would say two things in a lightening fashion. One is looking at the air exchanges that are actually required for human health and Wendell referred to this, we're working with Kaiser and others to sort of look at what the optimal air exchange rates are that sort of improve human health in a built environment because that's a restrictive factor that increases our usage.

And then really the second thing is, how do we deliver healthcare and how do we do it in a more distributed way where clinicians can actually get and meet with patients and get the information they need in a virtual fashion that might allow us to spread that out of less commuting and reduce the energy intensity of the healthcare delivery. So those are two big trends I would say for the next decade.

*David Nemtzow:* Anybody else have something real quick before we get the hook?

*Wendell Brase:* Could I add – yeah, when I meant quality is more important than quantity, I meant it's not just the flow rate and that, but you know, we've changed a lot of diffusers in our laboratories because we were trying to reduce air changes, but improve safety and in fact safety actually improved. We changed a lot of diffusers which had a very bad flow pattern, which created a lot of unnecessary mixing in space, which just actually spread around airborne hazards so more people were exposed. And so we're going with the kind of diffusers that actually have a very laminar kind of flow pattern across a lab and that's absolutely pertinent to infection control in a patient.

*David Nemtzow:* Real quick, Rachel, Laura, Jonathan, any – Bill, any final words before I wrap up? You've been great today, given us a lot to think about.

*Laura Capps:* Well to that one comment, another thing that comes to mind is pressure diagnostics and building science so knowing how to measure a building and know where that air is moving. Thanks.

*David Nemtzow:* Yeah. Yeah, thanks. That whole issue, you can see a lot of attention to, as I say, that folks are working on it globally. Buildings are buildings even though they vary so stay tuned on that. Well, in wrapping up, we're going to have a video for you.

We wouldn't let you leave without a video, but before that, I just want to also make sure everybody, all our participants know that the Better Buildings Summer webinar series is starting up in July and we have our Better Buildings residential network calls going on, so of course, all you have to do is go to the Better Buildings Solutions Center and click on that and make sure you're registered. You'll also get an e-mail from us, of course, requesting your feedback on not just today's fabulous closing plenary, and you must select fabulous 'cause you just heard these – all our great panelists, but also on the whole virtual experience. We hope to see you next year in person, but we're not sure, so we could use your input.

And again, I will – before we turn to the video, I just want to thank this great panel who gave us a lot of knowledge and a lot to think about, Jonathan Bauer and Laura Capps, Rachel Gutter, Bill Perhacs, Jon Utech, and Wendell Brase. Let's look at a video and I hope everybody stays safe and we will keep working with you, please. Hannah?

*Bill Perhacs:* Thanks, David.

*[Video plays]*

*David Nemptzow:* Again, on behalf of the US Department of Energy, thank you all for your participation in this year's virtual summit and please stay in touch with us. Thank you. Bye-bye.

*Bill Perhacs:* Thank you.

*Rachel Gutter:* Thanks

*Jon Utech:* Bye all.

*[End of Audio]*