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DISRUPTER SERIES: SMART COMMUNITIES

THURSDAY, MARCH 16, 2017

House of Representatives,

Subcommittee on Digital Commerce and Consumer Protection,

Committee on Energy and Commerce

Washington, D.C.

The subcommittee met, pursuant to call, at 10:00 a.m., in Room 2123 Rayburn House Office Building, Hon. Robert Latta [chairman of the subcommittee] presiding.

Present: Representatives Latta, Harper, Upton, Lance, Bilirakis, Bucshon, Mullin, Walters, Costello, Walden (ex officio), Lujan, Clarke, Dingell, Matsui, Welch, Kennedy, Green, and Doyle.

Staff present: Elena Brennan, Legislative Clerk, Oversight and Investigations; Jordan Davis, Director of Policy and External Affairs; Blair Ellis, Digital Coordinator/Press Secretary;

Melissa Froelich, Counsel, Digital Commerce and Consumer Protection; Giulia Giannangeli, Legislative Clerk, Digital Commerce and Consumer Protection/Environment; Bijan Koohmaraie, Counsel, Digital Commerce and Consumer Protection; Katie McKeough, Press Assistant; Alex Miller, Video Production Aide and Press Assistant; Paul Nagle, Chief Counsel, Digital Commerce & Consumer Protection; Olivia Trusty, Professional Staff Member, Digital Commerce & Consumer Protection; Michelle Ash, Minority Chief Counsel, Digital Commerce & Consumer Protection; Lisa Goldman, Minority Counsel; and Caroline Paris-Behr, Minority Policy Analyst.

Mr. Latta. Well, good morning. I would like to call the Subcommittee on Digital Commerce and Consumer Protection to order, and the chair now recognizes himself for 5 minutes for an opening statement.

Good morning and welcome to our second Disrupter Series hearing this week, and I want to thank our panels for being here to testify today. And we certainly appreciate your flexibility as things moved around due to our full committee markup last week, so we really appreciate that. The topic for today's hearing is Smart Communities. One of the hallmarks of the Disrupter Series is looking at emerging technologies and platforms to understand how technology is bringing new benefits to the consumer while disrupting traditional markets and regulatory models.

Today we have the opportunity to look at these issues from a slightly different perspective and hear from the experts on the ground evaluating new technologies in their communities. In some ways, no marketplace is more important than the local government where every service is paid for with hard-earned tax dollars using new technologies at the local level in our hometowns so they may efficiently deliver better services to their constituents.

Many of us sitting on the dais have experience in local government. While many of the challenges and peculiarities are similar if not the same among who we serve, the speed of technology

can also be measured by how many of these technologies were available to us years back. Leveraging new technology to provide, measure, and improve service to constituents in our communities is the ultimate goal. There are opportunities to improve education, traffic, and health. We can drastically increase mobility and access to jobs. From safety to sanitation to the environment, communities that wisely invest in technologies can make a real difference in Americans' lives.

While funding is an issue we all face, the first step is identifying the local issues that can truly be transformed by connected and other technologies. I am looking forward to hearing from our witnesses on the panel about their ideas and experiences, solving the most pressing local issues with the new technology.

I would also like to extend a warm welcome to Jennifer Gallagher from Columbus, Ohio, on the panel this morning. As the winner of the Department of Transportation's Smart City Challenge, Columbus has quite a bit of work ahead of them to implement on their goal of reducing infant mortality. If there is one thing I am sure about is the ingenuity and grit of my fellow Ohioans to deliver to our constituents.

I would like to thank you all again for adjusting your plans to be here with us this morning and I look forward to your testimony. And I have some time left on the clock, are there any

other members? The chair recognizes the gentleman, the vice chair from Mississippi.

[The statement of Mr. Latta follows:]

**********COMMITTEE INSERT 1**********

Mr. Harper. Thank you, Mr. Chairman, and thank you for calling this hearing today on Smart Communities, the second hearing this week in our Disrupter Series which provides us the opportunity to examine and better understand how these advancements will affect our daily lives in a rapidly evolving world of interconnectivity.

It is no secret that infrastructure management is a growing problem in the United States. Improving infrastructure management and maximizing investment in roads and bridges and other infrastructures not only improve our quality of life, it also safeguards the flow of commerce, strengthens our economy, and ensures we are competitive both locally and globally.

I am proud to say that a Mississippi company, Camgian Microsystems, headquartered in my district in Starkville, Mississippi, at the home of Mississippi State University, is driving innovations and pioneering efforts to address the problem and help to find cutting edge solutions. Camgian's award-winning product, Egburt, released in October 2014, is a complete internet of things cloud service comprising software, hardware, and communications.

Egburt utilizes proprietary sensing and information processing technology to deliver real time, actionable intelligence designed to be used by commercial and government customers for a broad range of remote monitoring applications

ranging from retail operations to infrastructure for both bridges, dams, and other items. By leveraging the experience and success of Egburt's software platform, Camgian engineers, in conjunction with U.S. Army Corps of Engineers, developed the intelligent decision support, or IDS, system to improve the performance and reliability of critical infrastructure.

In May of last year, Camgian engineers completed the installation of the IDS system on the Markland dam bridge and locks system which is 1,395 feet long and a key part of the Ohio River navigation system. It has been successfully operating since that time. As a result of this contract, we could see groundbreaking development in infrastructure, health, and management that could serve as the cornerstone for the design and build of next generation infrastructure management systems.

I am looking forward to hearing from each one of you today, and I appreciate the chairman calling this hearing and I yield back.

[The statement of Mr. Harper follows:]

**********COMMITTEE INSERT 2**********

Mr. Latta. Thank you very much. The gentleman yields back. The chair now recognizes the acting ranking member of the subcommittee, the gentleman New Mexico, for 5 minutes.

Mr. Lujan. Thank you so much, Mr. Chairman. It is a pleasure to sit next to you today for the hearing in the Digital Commerce and Consumer Protection Subcommittee on Smart Communities. I want to thank the ranking members for working together to convene this hearing today, the chairman and the majority, and I thank all the witnesses for their attendance today as well.

Let me begin by noting my appreciation for the title of today's hearing, Smart Communities, because in a state like my home of New Mexico it really is about building smart communities. And as I think today's hearing will show, there are exciting innovations happening everywhere from the assembled cities here in Columbus, Chicago, Pittsburgh, and Portland, including New Mexico where we have two national labs and Intel.

Take what is happening in Santa Fe. In New Mexico, water is a precious resource which is why Santa Fe is deploying cellular smart meters to track consumption and to identify leaks and other problems. These types of advancements improve quality of life, save money, and help policymakers make better decisions. However, there is no reason that these advancements should be reserved for just cities and Silicon Valley. We must act to

prevent the development of a new digital divide by helping communities of all sizes adopt smart infrastructure and solutions.

To guarantee that smaller and rural communities aren't left behind, I am working with Senators Maria Cantwell and Congresswoman Suzan DelBene to develop legislation to promote the use of smart technologies while protecting privacy and guarding against cyber attacks.

Our draft legislation seeks to enhance federal coordination of smart community efforts and provide communities with a resource guide and technical assistance, leverage the expertise of our national laboratories including Los Alamos and Sandia to help communities adopt smarter infrastructure and real solutions, launch regional demonstration efforts to test and advance smart community technologies and systems, and promote the development of a technology-skilled work force to support the deployment and development of smart communities. We believe this effort will make communities across the country more liveable and sustainable, and there is no reason this effort shouldn't be a bipartisan effort.

I believe that this committee and the Congress has the responsibility to work together to ensure that every corner of America benefits from the infrastructure of tomorrow, which is why critically it isn't enough that we work together to advance

the ideas under discussion today, we have to work together to deploy broadband infrastructure that reaches all Americans. I often joked with the previous chairman of the FCC that if we are having a conversation of having broadband at 30,000 feet from Los Angeles to New York, surely we can be talking about having broadband in all parts of America on the ground.

In the weeks ahead I look forward to working with my colleagues. I want to thank Mr. Latta again for holding this important hearing and with that I yield to Mr. Doyle of Pennsylvania.

[The statement of Mr. Lujan follows:]

**********COMMITTEE INSERT 3**********

Mr. Doyle. Thank you, Mr. Chairman. I want to thank you for hosting this important hearing today on Smart Communities and for featuring my hometown and district, Pittsburgh, and I want to welcome Alex Pazuchanics -- we call him Paz, for short -- for being here today.

You know, Pittsburgh has changed a lot. You don't have to wipe soot off your car in the morning anymore and the sky isn't full of dust and ash anymore. We have become one of the most liveable and innovative cities in the country. Pittsburgh has deployed a range of technologies and on its smart cities platform and as Alex will point out in his testimony this isn't just sensors and connected infrastructure, it is cloud computing and data analytics on the back end too, taking that data and using it to improve traffic patterns, reduce vehicle idle time, improve air quality, and make our city more liveable.

Now at the risk of sounding biased, I think Pittsburgh is in many ways a perfect test bed for the city of the future. And as these technologies develop what the city is doing is creating a modular infrastructure that will allow for the rapid deployment of new technologies and capabilities. I know last year was the first round of the Smart City Challenge at the federal level, but we have been doing this stuff in Pittsburgh for a long time and we are going to continue to do it in Pittsburgh, but we need to continue federal support. And I want to thank all my colleagues

here today for demonstrating the importance of this work at the federal level and I want to thank all the panelists for your testimony today. And Mr. Lujan, thank you for yielding me this time and I will yield back.

[The statement of Mr. Doyle follows:]

**********COMMITTEE INSERT 4**********

Mr. Lujan. I yield back, Mr. Chairman.

Mr. Latta. Thank you very much. The gentleman yields back and the chair now recognizes the chairman of the full committee, the gentleman from Oregon, 5 minutes. Thank you.

The Chairman. Thank you, Mr. Chairman, and I want to welcome our witnesses. We appreciate your testimony and how our local communities are leading in innovation and great ideas in every sector, because I believe they are laboratories for American innovation and new ideas.

As we will hear today, many communities across our country have adopted technology to improve their citizens' quality of life, but counties, cities, towns, and parishes all face the same question when they evaluate new technology and projects. Many communities are still working to understand how to adopt and when to adopt technology that will improve efficiency, increase accountability, accessibility, and streamline everyday tasks for their citizens.

Several organizations, including the Department of Transportation, have worked to discover what projects local governments were interested in pursuing and hear from residents about the projects they think would be most advantageous in pursuing. In total, 78 cities have submitted applications for DOT's Smart City Challenge, and today I look forward to hearing from some of the finalists about your proposals and I appreciate

your testimony, particularly how you have engaged with people in your communities to gather ideas or encourage adoption of them.

The innovation agenda for this subcommittee includes promoting many technologies that have natural applications for local governments, but we must acknowledge the challenges. These ideas may face difficulties with both funding and adoption. There are also important data sharing, cybersecurity, and privacy issues that need to be addressed when government entities are engaging with private companies to provide transportation, energy, or other community services, so my hope is we can explore many of these issues during today's hearing and into the future.

Today we have a chance to hear from several cities and other experts who are on the front lines of finding the value proposition for deploying smart community technology, and despite my colleague's comments about Pittsburgh which is a wonderful city, it ain't got nothing on Portland.

I would especially like to thank Mr. Chisek from my home state of Oregon and the from the City of Portland. He is here to talk about projects that Portland is working on, as the City of Portland has been a national leader on these issues for a long time. So I want to thank you for making the trek back here, and we appreciate all your innovation. It is really a fun part of this job, I think, for all of us is to hear what is going on on the ground and how we can help facilitate it and learn from it and take the

innovation from our local laboratories, maybe even apply it to the federal government. So with that, Mr. Chairman, I yield back the balance of my time and I thank you for your leadership on these issues.

[The statement of The Chairman follows:]

**********COMMITTEE INSERT 5**********

Mr. Latta. Well, thank you very much. The gentleman yields back. And at this time, the chair would recognize the gentleman from Vermont who is claiming the ranking member's time.

Mr. Welch. I thank you very much. Mr. Chairman, as you know, the challenges facing rural America are acute. There is a significant population shift into urban areas. Rural America has enormous challenges. You and I have started a rural caucus and it is because we believe that there has to be a solid future in rural America. That can't happen unless we have solid internet. We have to have the same speed, we have to have the same access and the same quality in rural America as in urban America and we can't turn our back.

And folks who are here today, including Kurt Gruendling -- thank you for coming -- from Waitsfield Telecom, are doing the hard practical work to make certain that rural America has the resources they need, the infrastructure they need in order to be viable. So I am delighted that we are having this hearing and that Mr. Gruendling from Waitsfield Telecom is here.

You know, he in addition to being vice president of business developing and marketing, he does all kinds of things in the community. You understand that if you are in rural America you have a job and you have another job and then you have the community service and you have more community service, and that is what you do in addition to raising his twins who are 15 years old. But

Waitsfield Telecom is three generations of ownership in the same family; it has been around for 113 years. They serve Mad River in the Champlain Valley areas and it is really crucial to our schools, to our businesses there; it is like 28,000 people.

But how do you deploy and provide service in small rural areas that have mountainous regions and technical challenges? The big carriers don't want to do it because they can't make as much money as they want, but I also think they don't do it because they aren't as smart as the small carriers like Waitsfield Telecom that figure out practical solutions to real problems where they have an ongoing commitment to the people in that community.

So this hearing is very important. Our work on the rural caucus and in this committee is incredibly important. Our chairman of the full committee has a pretty broad rural district, so my hope is that this committee more than any other committee in this Congress is going to stand up for rural America. Thank you.

[The statement of Mr. Welch follows:]

**********COMMITTEE INSERT 6**********

Mr. Latta. Thank you very much. The gentleman yields back and that concludes our member opening statements. The chair would like to remind members that pursuant to committee rules, all members' opening statements will be made part of the record.

We want to thank all the witnesses again for being with us today and taking the time to testify before the subcommittee. Today's witnesses will have the opportunity to give opening statements followed by a round of questions from the members.

Our witness panel for today's hearing will include Jennifer Gallagher, director of Public Service for the City of Columbus, Ohio; Kyle Chisek, director of Bureau Relations in the office of Mayor Ted Wheeler of the City of Portland, Oregon; Ms. Brenna Berman, commissioner and chief information officer at the Chicago Department of Innovation and Technology; Mr. Kurt Gruendling, vice president of Marketing and Business Development at Waitsfield and Champlain Valley Telecom; Dr. Jennifer Clark, director of Center for Urban Innovation and associate professor of public policy at Georgia Institute of Technology; and maybe I should just go with Paz too -- and Mr. Alexander Pazuchanics, the policy advisor at the office of the mayor for the City of Pittsburgh.

We appreciate you all being here today and we look forward to the panel and the discussion today, and with Ms. Gallagher you are now recognized for 5 minutes to give an opening statement.

Thanks very much.

STATEMENTS OF JENNIFER GALLAGHER, DIRECTOR OF PUBLIC SERVICE, CITY OF COLUMBUS, OHIO; KYLE CHISEK, DIRECTOR OF BUREAU RELATIONS, OFFICE OF MAYOR TED WHEELER, PORTLAND, OREGON; BRENNA M. BERMAN, COMMISSIONER AND CHIEF INFORMATION OFFICER, CHICAGO DEPARTMENT OF INNOVATION AND TECHNOLOGY; KURT GRUENDLING, VICE PRESIDENT OF MARKETING AND BUSINESS DEVELOPMENT, WAITSFIELD AND CHAMPLAIN VALLEY TELECOM; JENNIFER CLARK, DIRECTOR OF CENTER FOR URBAN INNOVATION AND ASSOCIATE PROFESSOR OF PUBLIC POLICY, GEORGIA INSTITUTE OF TECHNOLOGY; AND ALEXANDER PAZUCHANICS, POLICY ADVISOR AT OFFICE OF THE MAYOR, CITY OF PITTSBURGH.

STATEMENT OF JENNIFER GALLAGHER

Ms. Gallagher. Well, good morning. Again my name is Jennifer Gallagher and I am the director of the Department of Public Service for the City of Columbus, Ohio.

I would like to start my testimony today by thanking Chairman Latta, Vice Chairman Harper, Ranking Member Schakowsky who is unable to be with us, Chairman Walden, and Congressman Lujan, and all members of the subcommittee for providing me the opportunity to represent my city and the work we are doing on behalf of Smart Columbus, which is the term coined by our community upon winning the Smart City Challenge. For full details of our Smart Columbus Demonstration Project, please refer to the written testimony that was submitted to your committee.

I appreciate the subcommittee's looking ahead of the curve of disruptive technologies, and I am delighted to have the opportunity to talk about what my community is doing with the collaborative support of our local governments, our research institutions, and our private sector. This hearing is hopefully part of many activities that will help disseminate what works and what doesn't work as communities address these same challenges.

Keep the spotlight on Columbus. We want to make sure that lessons learned in Columbus can empower cost effective, technology enabled solutions across the country, and hopefully inform public policy decisions going into the next decade. Mayor Ginther's vision for Columbus is shared prosperity for all residents. He is working to make the City of Columbus America's Opportunity City. In the mayor's vision, Columbus will be the place where you are more likely to move to the middle class and beyond than anywhere else in the nation.

We believe access to transportation is a key component of turning this vision into reality. Our application for the U.S. Department of Transportation's Smart City Challenge focused not on how to move people from point A to point B, but how to move people to ladders of opportunity. We believe our focus on opportunity was our key to success in light of rigorous competition from 77 other great American cities. This federal grant has changed our city. Cities in the competition,

including some represented on the panel, challenged themselves to push for innovation and sustainable solutions in transportation and energy sectors. Throughout the process, the competing cities learned from one another and we continue to do that today.

I am encouraged that the Congress and the President have been talking about infrastructure. For urban areas, the key to continued growth in the future isn't just about building new highways or adding more lanes to the highways we have, we want to make sure that the discussion provides flexibility and options for disruptive technologies in the cities that want to move in that direction.

Today, Columbus has about 850,000 people. Some estimates have our region growing to three million people by 2050. With this growth we have to be smart in order to be sustainable, which is why what we are doing in Columbus is so important to the future of mobility. What we learn and put into action over the next few years won't just change transportation in Columbus, it will be adaptable and scalable to cities around the country and around the world.

We have learned that technology, indeed disruptive technology, is an enabler, but not an end-all for us to accomplish our goals. As this demonstration project comes to fruition, we look forward to reporting to you and your colleagues on lessons

learned and our suggestions for best practices and not best practices moving forward. As your committee considers the development of new standards as these technologies emerge, the City of Columbus looks forward to providing you information on our experience and best practices to better inform you on your decision making process.

Mr. Chairman and other members of the subcommittee, thank you for your time this morning. I am happy to answer any questions now and in the future.

[The prepared statement of Jennifer Gallagher follows:]

**********INSERT 7**********

Ms. Gallagher. And we do have a video that we showed during our presentation for the Smart City Challenge, if I may show that now.

[Video shown.]

Mr. Latta. Well, thank you very much. And the chair now recognizes for 5 minutes, Mr. Chisek for your opening statement. Thank you very much.

STATEMENT OF KYLE CHISEK

Mr. Chisek. Thank you. Good morning. My name is Kyle Chisek and I serve as the director of Bureau Relations in the office of Mayor Ted Wheeler. Previous to my role with Mayor Wheeler, I was the project manager for the City of Portland on the Smart City Challenge grant application to the U.S. DOT. The City of Portland appreciates the opportunity to provide feedback to the House Committee on Energy and Commerce as a part of the Smart Communities Disrupter Series. Portland has been a national leader in Smart City policies specifically as they relate to utilizing innovative technology, improving public health, and supporting energy efficiency. We support Congress' efforts to fund Smart City infrastructure investment and to better understand the challenges and opportunity facing our communities today. Infrastructure is more than just roads and bridges, and it includes technology to help make the transportation system function better. New technology, big data, innovative partnerships, they all have the ability to change our communities for the better, and in Portland these changes are already happening. Our government and agency partners, our Metro regional government, Multnomah County, the Oregon Department of Transportation, our Port of Portland, and TriMet are all crucial to delivering an innovative transportation system that allows

citizens to access information and services quickly and easily.

Whether it is the launch of America's first modern streetcar system or our first statewide road user charge, OreGo, or even our cutting edge academic research on Smart City policy, Oregon is trying to lead the way. Portland State University hosts the National Institute for Transportation and Communities. It is one of five U.S. DOT national university transportation centers and it links the study of transit and transportation, urban planning, housing, and computer science together.

PSU's Business Accelerator has spawned the Smart City startups like Globe Sherpa which is now called Moovel. PSU is also working to design and implement an open data cloud, building on a history of open data and development of open data standards in the Portland region. Portland was one of the first cities to adopt an open data resolution that created an open data portal, CivicApps, back in 2009. Portland's regional public transit agency, TriMet, has partnered with Google in 2005 to develop a standard for how real time transit schedule information is structured. This standard, the General Transit Feed Specifications, is now used by transit agencies around the world allowing software developers to build transit apps that work consistently across jurisdictional boundaries.

In 2016, TriMet was also awarded the Mobility on Demand Sandbox grant from the Federal Transit Administration. This

grant will allow Portland to build on the success of its Hop Fastpass ticketing system to incorporate multimodal and shared use mobility options into its trip planning. So basically this is the goal of allowing Americans to plan, book, and pay for car sharing, bike sharing, public transit, and all from one single application. In fact, it was a common theme through all of the final cities on the Smart City Challenge to be able to do this, so we are very happy to be moving forward on that.

Smart cities must also be safe cities, so Portland is committed to safety through its Vision Zero policy. This policy has been adopted by other American cities and states that no loss of life is acceptable on public streets and that government has an affirmative obligation to eliminate traffic related fatalities and serious injuries. So we are very committed to using Smart City technology to achieve this goal, whether it is deploying speed cameras, gaining data at intersections so the city can address safety issues before crashes occur, or ensuring autonomous or automated vehicles increase safety rather than pose a hazard to our citizens. There is huge benefits for safety with autonomous vehicles. Ensuring access to opportunity and allowing our transportation network to enhance social mobility is also a key. Transportation is a key to employment and that was one of the focuses in our Smart City Challenge grant application. Lastly, public-private partnerships provide

cities with the alternative and innovative project delivery options. So it is not a replacement for federal funds, but it is something that can help cities be able to deliver projects better, faster, and quicker. These partners can help fund new infrastructure, and my current boss, Mayor Wheeler, when he was state treasurer, helped create the West Coast Infrastructure Exchange to facilitate these partnerships. He tried to pioneer them and we have a history of doing so.

In conclusion, with increased federal investment related to Smart City initiatives, the federal government will realize significant returns on its investments in the form of energy efficiency gain and leveraging land use patterns to create vibrant cities and strong economic growth. In addition, by testing these in cities, rural communities can benefit from our lessons learned and our mistakes made. Thank you.

[The prepared statement of Kyle Chisek follows:]

**********INSERT 8**********

Mr. Latta. Thank you for your testimony today. And Ms. Berman, you are recognized for 5 minutes for your opening statement. Thank you very much for being here.

STATEMENT OF BRENNA M. BERMAN

Ms. Berman. Thank you, Chairman Latta, Ranking Member Schakowsky who could not be with us here today, and members of the committee, for inviting me to speak today about smart cities. My name is Brenna Berman and I serve as the commissioner for Chicago's Department of Innovation and Technology and CIO for the City.

Chicago, as you know, is the third largest city in the country, a global city with world class architecture, universities, and cultural institutions. As one of the most dynamic cities in the world, we seek to equip our communities with leading edge technology that engages, informs, and empowers. Mayor Emanuel's vision for achieving this is built on a commitment to modern infrastructure, smart communities, and technological innovation.

In Chicago we have applied Smart City tools like open data, predictive analytics, and sensor technology to public health, public safety, and improving our environment, among other public challenges. These tools have helped us to become more responsive to our community, faster and more efficient in our service delivery, and smarter about our investments and policies. Step one for us in becoming a Smart City was examining and changing the way that we collect, share, and use data.

In 2011, Mayor Emanuel launched the city's first ever open data portal, providing hundreds of city datasets to the public for the first time ranging from business licenses to conditions of our beaches to the largest crime dataset available in the world. One million people visit the data portal annually. These students, journalists, professors, and programmers use the more than 600 datasets available to increase their understanding of the city and produce apps that are useful for others.

We also took a closer look at how we in the city could better use the data we collect to drive decisions or predict issues. We began applying predictive analytics to help the city run more efficiently and effectively. For example, we have been able to devise algorithms to help our Public Health Department forecast food inspection violations 7 days sooner than without the use of data which helps them address threats to public health more quickly.

We have applied predictive analytics to things like rodent baiting, E. coli levels in Lake Michigan, and West Nile virus across the city, just to name a few. But now, data is moving outside of the IT department to become embedded into the physical infrastructure of the city, helping to function in unprecedented new levels of efficiency and effectiveness. This is what everyone means when they talk about the internet of things, new data being collected automatically through sensors telling us

what might come next, truly becoming a Smart City, and that for us requires partners.

Chicago is home to some of the leading universities and research institutions in the country, as well as Fortune 500 companies and innovative startups. In 2015, UI Labs, a consortium of Chicago research institutions and corporations, launched a Smart City accelerator called City Digital to harness the collective energies of more than 300 organizations to apply cutting edge technology and integrated data solutions to urban infrastructure challenges in Chicago. With our City Digital partners we can tackle bigger problems like storm management and flooding. While data can tell us what areas in the city are likely to flood, with our partners and new technology we can actually do something about it. For example, recently we combined green infrastructure solutions such as water-retaining plants with sensors and a secure network to actually collect data about their effectiveness and apply a dashboard for the Water Department to manage these solutions. That allows the city to easily see the impact of the solution and make better investment decisions in the future.

Chicago is also committed to efforts that merge our built environment with our digital environment. Right now we are doing this through two projects: the largest Smart Lighting Project so far in the country, and the Array of Things. The Smart Lighting

Project will install new LED lights across the city. Not only are these lights more energy efficient, but they will communicate with each other and city systems.

When a streetlight goes out we won't have to rely on a neighbor reporting it, the streetlight itself will alert relevant city departments. We know that simple streetlight outages are associated with small spikes in crime. Being able to respond quickly addresses the need to be able to fix the light and improves public safety.

With funding from the National Science Foundation we are working with the University of Chicago and Argonne National Laboratory on the Array of Things, a first of a kind urban sensing project that consists of a network of interactive, modular sensor boxes installed around the city essentially serving as a fitness tracker to collect real time data on Chicago's environment, infrastructure, and activity for research and public use.

The data generated by the Array of Things will help anticipate floods, traffic safety incidents, and improve air quality. With its data being made open to the public, the initiative supports researchers, policy makers, developers, and residents alike to work together and take specific actions that will make Chicago healthier and more liveable. These initiatives from those at City Digital to the Array of Things, all fall under Chicago's bold and comprehensive vision for being a Smart City.

That vision is guided by informed, data-driven decision making, and a collaborative, inclusive process for fostering and promoting innovation. Indeed, while technology is evolving far more quickly than ever before, the principles of efficiency, sustainability, and a better quality of life for all of our residents still ring true. The city is committed to collaborative urban innovation and to share its insights with the world so that we may all grow together in this process. Thank you very much.

[The prepared statement of Brenna M. Berman follows:]

**********INSERT 9**********

Mr. Latta. And again, thank you very much for your testimony today. And the committee now recognizes Mr. Gruendling for 5 minutes. Good morning.

STATEMENT OF KURT GRUENDLING

Mr. Gruendling. Good morning, Chairman Latta, Ranking Member Schakowsky, Congressman Welch, and members of the subcommittee. Thank you for the opportunity to testify today on Smart Communities. I am here on behalf of Waitsfield and Champlain Valley Telecom and NTCA, the rural broadband association which represents about 850 small, rural telecom providers in the U.S.

As many of the subcommittee members are aware because small telcos serve your districts, we provide broadband and other advanced services to the most rural areas of our country. Broadband helps solve the problem of distance by opening up new education and job opportunities for rural Americans, allowing them to telecommute remotely to companies in urban areas while helping rural businesses tap into global markets, enabling countless possibilities for commerce. Broadband connects rural veterans and others with healthcare specialists and helps farmers and ranchers use the internet to analyze livestock and crop data. It also provides a convenient means of maintaining strong social connections with friends and relatives, no matter how far away they may be. And when people want to escape the city for a change of scenery and some R&R, broadband is the driver of the tourism economy helping to connect to the ski resorts of rural

Vermont and countless other tourist destinations in your home areas.

While Vermont might be best known for its picturesque landscape, world class skiing, and quaint inns, look deeper and you will find a vibrant high-tech business community served by a state-of-the-art telecommunications network that continue to evolve. In our service territory, all schools, many of the larger businesses, and some residential customers are now served by fiber-to-the-home technology offering speeds up to 1 gigabit.

Vitality of any community is dependent on its access to robust economic opportunities, first-rate health care, education, and public safety services. Rural communities in particular face unique challenges to accessing these types of benefits. Smart Rural Community is an initiative of NTCA and for most of the development and deployment of broadband-enabled applications that the community can leverage to improve these vital services.

Smart Rural Community recognizes that broadband access is foundational to community success, but it is just one part of the equation. These communities understand the importance of embracing and relying upon dedicated local leaders and from many fields and industries who work collaboratively to develop broadband-enabled solutions to create and improve opportunities in rural America.

Since 2013, 44 NTCA members have been recognized with the Smart Rural Community Showcase Award for demonstrating excellence in collaborating with other local leaders to improve broadband-enabled services. My company earned this award in 2014 for working with government and business leaders in the Mad River Valley.

After Hurricane Irene hit Vermont hard in September of 2012, the state sought to relocate more than a hundred employees that worked in the flooded state office complex in Waterbury, Vermont, to a vacant space in the Mad River Valley Business Park. Our company worked closely with state and local economic development officials to quickly wire the building with fiber optics and deploy a state-of-the-art phone system to meet their needs so they could quickly relocate to their new office.

In 2015, our company also secured a Smart Rural Community Collaboration Challenge Grant which matched community funding to provide free Wi-Fi coverage to over a hundred local businesses in tourist areas. There are many great success stories from the Smart Rural Community initiative. NTCA companies have deployed connected health cards in public schools whose students are challenged by persistent poverty. They have worked with the U.S. border control officials to support critical security functions along our nation's southern border, and they have enabled local firefighters to view reported fires and locate nearby hydrants

before firefighting teams arrive.

To not have access to high-speed internet today should be unimaginable, yet millions of rural Americans have limited or even no access to robust broadband. Smart Rural Community depends upon a mix of private entrepreneurship, public and private capital, and universal service programs. These resources enable not only network deployment, but also the ability to ensure that the services provided over those networks remain robust and affordable and can be upgraded over time.

We have made great progress in deploying broadband, but we still have many locations to reach and upgrade and sustaining such progress is a separate challenge. Recent reforms to the Universal Service High Cost Fund have unfortunately resulted in a budget shortfall that will result in fewer locations being reached, comparatively slower speeds being delivered to locations that are being reached, and higher rural consumer broadband rates.

This budget shortfall hurts small businesses like ours that still need to upgrade portions of our network and it undermines the ability of those companies to deliver and keep delivering on the promise of broadband that create smart rural communities.

In conclusion, rural telcos have made great progress and are eager to continue deploying infrastructure and delivering services that rural America and, frankly, all of America needs to participate in the global economy. The Smart Rural Community

initiative highlights what is possible when consumers, businesses, and other organizations work together to make that a reality. Thank you for the opportunity to testify and I look forward to your questions.

[The prepared statement of Kurt Gruendling follows:]

**********INSERT 10**********

Mr. Latta. And thank you very much for your testimony this morning. And the chair now recognizes for 5 minutes for your statement, Dr. Clark. Thanks for being here.

STATEMENT OF JENNIFER CLARK

Ms. Clark. Good morning and thank you. My name is Jennifer Clark. I am an associate professor of Public Policy at the Georgia Institute of Technology and the director of Georgia Tech's Center for Urban Innovation. I would like to begin by thanking Chairman Latta, and also thanking the members of the subcommittee for making this opportunity available to us to testify to you today.

Smart communities are critical to the future economic competitiveness of the U.S. Over 90 percent of the country's GDP is generated in metropolitan economies that is cities and their suburbs. Smart communities are not just an opportunity to increase economic growth and opportunity, but they present a challenge as well: Does the U.S. invest in intelligent infrastructure to build the 21st century economy and plan for what is beyond? Or does the U.S. miss the moment when targeted investments and integrating information and communications technologies into infrastructure systems could form the foundation of an industry 4.0 level cyber-physical system?

The economic opportunity presented by smart communities is threefold. First, the data produced by intelligent infrastructure promises to increase the reliability of local government services and performance of infrastructure systems.

The data paves the way for building interoperable and cross-platform systems that build efficiencies and ultimately allow localities to provide higher quality services at a lower cost. The result is the opportunity to expand services and maintain more reliable and efficient systems ranging from waste management to transportation.

The second opportunity is that smart communities' data systems can enhance and inform the strategic planning capacities of local communities, large and small, with real world data on how infrastructure systems are used by citizens and businesses and how that infrastructure is performing in real time. Further, the sharing of data amongst smart communities partners and participants helps to build networks for diffusing policy strategies and technology models.

These strategic partnerships form the foundation for the third economic opportunity that flows from smart communities: entrepreneurship and market leadership. The data generated by and for smart communities systems and the systems that produce that data form the foundation of new enterprises and new products and services and as a consequence function as platforms for further economic development.

The making of smart communities follows a model of technology diffusion familiar in the private sector context. This, however, is technology diffusion in the public sector context where there

is a necessary focus on the broad provisioning of reliable and efficient services and a consideration for building access to data for enterprise development.

In the U.S., the national innovation system largely relies on publicly funded basic research and development conducted within the network of world class research universities and national labs throughout the country. For decades, these universities and national labs have served as the research and development backbone of U.S. industry as well as of national defense.

Research universities have extensive experience partnering with industry and government on technology diffusion projects. Research universities are built to test new technologies, evaluate alternatives, assess investments, evaluate economic impacts, measure distributional consequences, and certify processes, materials, products, and standards. As with any new enabling technology, research universities can play a role as a neutral third party with specialized technical expertise.

Universities also are embedded in local communities and often have long term working relationships with local and state governments. Research universities also have vested interests in upgrading and maintenance of intelligent infrastructure in the cities and communities in which they are located. World class industry partners, star scientists, and the next generation of

entrepreneurs all look for intelligent infrastructure to support their research and commercial enterprises. The absence of this infrastructure makes universities less globally competitive for talent and for capital, and as stated before such absences make local communities less globally competitive as well.

There is a significant amount of research required to move smart communities' technologies from design to development to deployment. There is a growing need for education and training. In research universities like Georgia Tech, we are developing new curriculum to integrate teaching and learning about innovation and communities, technology and cities and regions.

We are also investing in research centers like the Center for Urban Innovation and the Institute for People and Technology that take an interdisciplinary approach to moving innovations in engineering, sciences, and computing into a complex real world context of communities, entrepreneurs, and industries. How to design and deploy intelligent infrastructure to efficiently and effectively support smart communities is one of the central questions going forward for the country as a whole and for local communities in specific. Building the replicable models and dissemination networks for the broad and sustained implementation of information and communication technologies into the next generation of national infrastructure is the opportunity and the challenge before us.

[The prepared statement of Jennifer Clark follows:]

**********INSERT 11**********

Mr. Latta. Dr. Clark, thank you very much for your testimony this morning, and Mr. Pazuchanics, you are recognized for 5 minutes. Thanks for being here.

STATEMENT OF ALEXANDER PAZUCHANICS

Mr. Pazuchanics. Thank you, Chairman Latta, acting Ranking Member Lujan, all members of the House Energy and Commerce Subcommittee on Digital Commerce and Consumer Protection. On behalf of Mayor William Peduto and the City of Pittsburgh, I want to start by thanking you for the opportunity to speak with you today about Pittsburgh's emergence as a smart community. It is a pleasure to be here.

The City of Pittsburgh is a resilient city. Investments that were made by philanthropists and industrialists decades ago have helped to position the city to be on the leading edge of revolutions in health care, technology, and advanced manufacturing. A high quality of life and low cost of living attracts new residents from across the country and around the world. For the first time in a long time, we are managing growth instead of managing decline. Given this new opportunity, the City of Pittsburgh is attempting to reshape the way that residents interact with our local government.

An initial challenge of our smart cities work has been defining what it means to Pittsburgh. During the U.S. DOT Smart City Challenge, the definition was provided to us through the twelve Beyond Traffic vision elements including urban automation, connected vehicles, and sensor-based infrastructure. While

these applications are vital to the city of the future, they are not goals in and of themselves. The city has been building a three-part framework for smart cities, collaboratively using technology to measurable improve the quality of life of our residents and visitors, building a data utility for government, industry, and citizens to use, and preparing our systems and our residents for future disruption.

Our Smart City initiatives start with a simple question: what is the challenge we are trying to solve? Instead of letting the latest and greatest technology drive our decisions, we are oriented around real world problem solving. For example, the city has partnered on a number of projects with the Traffic21, Metro21, and newly created Mobility21 institutes at Carnegie Mellon University to use academic research to solve real issues in traffic management, infrastructure preservation, and transportation safety.

An example of a successful implementation of this method can be seen in the city's SURTRAC development. SURTRAC was designed by robotics researchers at Carnegie Mellon to solve system inefficiencies that occur as a result of fixed traffic signal timing. By detecting the volume of traffic at an intersection and providing that information to other signals in the network, the adaptive signals are able to provide more efficient light timings, reduce travel times and stops for vehicles. Future

applications include additional capabilities to minimize not just vehicular delay, but also pedestrian wait times and using vehicle-to-infrastructure communications to optimize the flow of heavily occupied mass transit vehicles.

The second pillar of the Smart City strategy is a data infrastructure that allows for the city to operate more efficiently and to allow the public and private sectors to build on top of our resources. In much the same way that our electric grid, water systems, and roadways and bridges allowed for Pittsburgh's success in the 20th century, our Data Utility will advance Pittsburgh into the 21st.

We have been laying the technical groundwork on this work for several years. The city, county and University of Pittsburgh are partners in the Western Pennsylvania Regional Data Center, a regional effort to make public non-sensitive municipal data. For Pittsburgh, this collaborative structure has been a tremendous success and has brought a number of outside partners to the table to publish their own datasets. Over 150 datasets provided by local government, public agencies, university partners, and nonprofit organizations help citizens engage with the communities they call home. Trainings, hackathons, and partnerships with local libraries are producing a vibrant ecosystem of civic tech that engages with us, creating a feedback loop.

The final pillar of Pittsburgh's Smart City strategy is the need to build a policy and planning framework around the considerable disruption technology is going to continue to play in the way that we deliver services to residents. Many of the innovations in the Smart City space are in the private sector. Some of them, such as autonomous vehicles and transportation network companies, rely on access to public right of way for their business models to work, and an appropriate and even-handed framework that balances safety with innovation is required for the good of our residents.

Pittsburgh's strong working relationship with the Pennsylvania Department of Transportation and our recent designation as an Autonomous Vehicle Proving Ground will allow us to continue to represent these concerns of our residents on the subject.

The potential for autonomous, connected, electric, and shared vehicles pose significant uncertainty for cities. For example, the City of Pittsburgh receives nearly 15 percent of its general fund revenue from parking tax, a source that could be reduced as a result of autonomous vehicles. Likewise, changes in parking demand have significant effects on the financing of public garages and parking minimums for development. And perhaps most importantly, technological development will create disruptions in employment for the transportation and logistics industry,

requiring thought on the future of work and the pathways to advance manufacturing, cybersecurity, and data science jobs of the future.

The City of Pittsburgh is approaching our Smart City deployments by keeping these three concepts in mind. We are trying to harness the promise of new technology to benefit our residents first. We believe these initiatives and others that will come can improve the quality of life of residents by improving safety, reliability, efficiency, and resiliency of our networks. Slowly but surely, we are making the investments and finding the partnerships to advance those goals. Thank you.

[The prepared statement of Alexander Pazuchanics follows:]

**********INSERT 12**********

Mr. Latta. Thank you very much for your testimony, and thank you again all of our witnesses again for the testimony today. And that will conclude the testimony from our witnesses and we will go into questions from the committee. And I will start off with my questions this morning and this is actually for all of the panel and if you could all maybe give a brief answer.

Safety is regularly mentioned as a benefit of improving local transportation, infrastructure, energy delivery, and health care including emergency services. What improvements in safety have your communities experienced or are trying to achieve with your smart communities initiatives?

And Ms. Gallagher, if we could start with Columbus.

Ms. Gallagher. Chairman Latta, thank you for the question. I think on the side of safety for us, we all, most of us here know that 37,000 deaths occur on our nation's freeways every year, so if you do the quick math that is over a hundred a day. That is unacceptable, and anything we can do to fix that is obviously a positive.

So one of those things are just making cars safer in taking the human element out of it. The second is giving people other options and opportunities to perhaps not have to drive that car themselves. So with our Smart Columbus program, a few of the things that we are doing on the quick end is putting Mobileye on all of the buses in Columbus, where the Mobileye will scan as buses

are going up and down the streets and check for pedestrians, bicyclists, other things that maybe you can't see in a COTA bus, all the way to towards the end our demonstration period, the autonomous vehicles, and taking that human error out of the driving experience and all things in between.

Mr. Latta. Thank you. Mr. Chisek?

Mr. Chisek. Well, in Portland, one of the things we are looking at, and I alluded to it in my opening statement, was focusing on intersections where we know we have problems and finding out about problems before they result in crashes and fatalities.

So in east Portland you are about three times as more likely to die in a fatal crash than anywhere else in the city, but by focusing on these high crash locations or corridors where we know we have a lot of crashes, with video infrastructure, with other sensors to gather data, we can track near misses and that can tell us ahead of time that oh, there are a lot of near misses with pedestrians and vehicles or bicyclists and vehicles at particular locations, and we can then use our civil engineering groups to create a fix for that before anybody gets seriously injured or killed since we would have the data on that. So that is one of the things we are looking at.

Mr. Latta. Thank you. Ms. Berman?

Ms. Berman. So we are actually doing something similar to

Portland because we are part of the Vision Zero project as well. One of the key roles of the Array of Things is to focus on intersection safety. There is a lot of data about actual accidents but there is very little data today about those near misses. And the Array of Things is calibrated to calculate those data, or to calculate data around near misses without actual need of the civil engineers, so it actually creates those calculations so that we can understand better those near misses.

We also actually are using safety cameras across the city to provide safety data and analytics to our police department to help them better understand what is going on across the city to create better safety situations as well.

Mr. Latta. Thank you. Mr. Gruendling?

Mr. Gruendling. So I come at it from the service provider side, so you know we have worked obviously with local and state officials to connect cameras to view road conditions real time. This is certainly very relevant with the snowstorm that we just experienced. You know, when I left Burlington I saw that it was 29.9 inches of snow and over 40 in the mountains.

So there is different locations throughout the state that are set up, including one that we service with fiber optics up on Route 17 that allows people to check real time to see what the road conditions are, and you know that they can deploy resources, snow plows, whatever, using that technology in addition to having

all the snow plows now GPS-enabled to see, you know, on a map what has been plowed, where additional resources are needed, et cetera.

Mr. Latta. Thank you. Dr. Clark?

Ms. Clark. I can speak to this from the research that we are doing in collaboration with the City of Atlanta. And one of the research projects that we have just started has to do with working with the Safe Routes to School program, which is an existing program, and working with having young people use sensors to help crowdsource, get crowdsource with the information about what the safest route back and forth to school really is for them and their families. And so we can actually then take that information and make recommendations about where improvements to intersections, improvements to sidewalks can also be made.

We also are doing that with bicycle routes so that we are crowdsourcing bicycle routes, so users who are actually telling us, using an app, what the safest routes are, what the more dangerous routes are, and then that information can be fed back to the city in order to make specific infrastructure investment to mitigate those problems.

Mr. Latta. Thank you. Mr. Pazuchanics?

Mr. Pazuchanics. One of the new projects that we are quite excited about is a Smart Belt Coalition of the Departments of Transportation and Turnpike Commissions of Ohio, Michigan, and Pennsylvania. And one of the projects associated with that is

to be able to allow for truck platooning among the major interstate corridors of those three states which promotes not just efficiency in the freight system, but also safety delivery, having the vehicles communicate with one another to maintain and safe and healthy distance while being able to move at a speed faster than the humans would be able to provide in and of themselves.

Mr. Latta. Well, thank you very much, and my time has expired. And the chair recognizes the gentleman from New Mexico for 5 minutes.

Mr. Lujan. Thank you, Mr. Chairman. Two questions for the panel: what should the federal government do to assist in development to smart communities? And what have been some of the challenges -- maybe three questions. What have been some of the challenges that you have identified with the federal government? For example, Mr. Chisek, in your testimony you talked about the challenges of being able to access different funds because of, you know, telecom energy versus something else, and the ability to be able to combine those funds to be able to deploy a project.

And then I would say the final question is what thoughts do you have with access to existing infrastructure; has that been a critical component to being able to deploy your assets or resources from a Smart City perspective, and specifically pole location on light poles or electrical power lines, existing buildings or infrastructure that are owned by the city, as we

talked about even the deployment of 5G now which will present more opportunities with smart cities as well?

Ms. Gallagher?

Ms. Gallagher. Thank you for the questions. As far as roles for federal or state government, from our point of view it would be helping define those regulations, those policies, those standards as we move forward into this uncharted territory, but yet allowing enough flexibility for locals to use those to be able to solve the problems they are seeing in their communities.

Second question was risk challenges with the federal government. I think probably the same thing on just trying to move as quickly as the changes and the technology in the private side is moving and to try to get that legislation, that funding in place to try to keep up with those. It is a challenge at all levels of government.

And then thirdly, as far as infrastructure, and you know we are having some of those dialogues right now in Ohio with some of the utility providers, as far as who has what rights and priorities on and poles and infrastructure and so forth. So that is going to continue to be a challenge as we move forward because there is such a need for that infrastructure and those are conversations that we are going to continue to have, but I think are very, very important.

Mr. Lujan. Anything to add, Mr. Chisek?

Mr. Chisek. Thank you. So I will address the middle question first which was some of the challenges with the federal government. I think different agencies have different wants and needs and so the city definitely would, like I said when things are more aligned between the different agencies so we can address it directly rather than in different ways. We also understand that on some of the procurement side of things that the rules and regulations are different for different agencies we are interacting with, so again moving that to that common alignment and trying to problem solve and be more innovative on how we move these things forward.

I think as far as challenges and co-location, we are working with a consortium of private companies and our electric utility on deploying smart sensor technology on our light poles. You know, it does get complicated, but we have good partnerships with these private industries so we are able to work things out. Our private electric utility owns the poles. We own the little arm that comes off of the poles, so we have for a long time have had the ability to work through these issues with them. We are doing the same thing with them on electric vehicle charging stations located in our right of way but owned and maintained by our private electric utility.

Mr. Lujan. And as we go to Ms. Berman, for the other witnesses I may not be able to get to I will submit that in writing

as well and to get your thoughts in that particular area. Ms. Berman?

Ms. Berman. I will try to be very brief. Two supportive roles I think the federal government could play, one would be around coordination between the cities. We are all working on very similar problems. You saw one example just a minute ago where we are doing something really similar. The other would be there is a very strong focus on pilots, which is excellent. The challenges do change when you go from a successful pilot to scaling for an entire city and oftentimes the federal support whether it be a grant or a challenge falls off from pilot to full scale, and so it would be very helpful to see the focus on helping projects go from that pilot to scaling the solution.

Mr. Lujan. Do you think there would be, and that is based from a scaling perspective, maybe collaborative efforts even with our national labs?

Ms. Berman. Yes. And that is the goal of the Array of Things, actually, is we are scaling a solution citywide there and it is going to multiple cities. So yes, the role of partnering with the national labs is very helpful, absolutely.

Mr. Lujan. Thank you. And with that Mr. Chairman, I yield back.

Mr. Latta. Thank you. The gentleman yields back. The chair now recognizes the vice chairman of the subcommittee, the

gentleman from Mississippi, for 5 minutes.

Mr. Harper. Thank you, Mr. Chairman, and thanks again to each of you for being here. And you know the technologies and the things that we are seeing already are just, you know, we couldn't even have really pictured this 20 years ago or even 10 years ago, and who knows what we are going to see as this is developed over the next number of years. So I really appreciate your testimony and your insight into what is going as we want to make sure that government is not in the way of innovation. You know, it seems sometimes regulations get a little bit behind that curve that we want to make sure we give folks the ability to be innovative and to come up with these things that are there.

You know, I certainly have an interest in the fact that I have an adult son with special needs who cannot drive. He works. He graduated from a special program called the ACCESS Program at Mississippi State University, one of the first two students to graduate from there almost 3 years ago. He has done a lot of stuff. But as we look at self-driving cars and things like that that could really help those in the disability community, you see some potential that we haven't seen before so we are excited about that.

And Dr. Clark, if I could ask you some questions. Of course our hearing is called, you know, Smart Communities. Do you see opportunities for smaller and rural communities to leverage these

technologies that other cities on the panel have discussed, and also how are traditionally underserved communities, including those that are disabled, able to benefit from these technologies?

Ms. Clark. Thank you very much for the question because I do feel like this is something we need to focus on is how to make that work. Yes, I mean the short answer is yes, I see those opportunities. I have some concerns about how those opportunities are going to appear. I think we need to plan for them.

One of the things that has been happening in the policy diffusion or the technology diffusion for smart cities rather than smart communities in recent years is that for larger cities vendors have been coming to larger cities and they have been saying we will give you this in kind so we can work out this technology in your city. You don't have to pay us for it, we are going to work it out here. Well, the smaller communities are not going to get that opportunity. They are going to get a price tag on the technology.

And I think this is one of the real challenges is that what is going to end up happening is a very uneven distribution of who has the high-tech technologies built into their infrastructure system and who doesn't. And so I think it absolutely is important for smaller and rural communities to be seen as an important part of this story, not as an add-on later, and also recognizing the

fact that they don't have the tax base to pay the same prices.

One of the most interesting, and I will try to make this brief, but one of the most interesting conversations I had recently was I was making a presentation with my colleague from the City of Atlanta to the mayors of the region and you know we have 23 different counties in the Atlanta region, it is a huge region. And the mayors came up to us afterwards and they said, so how do we become part of the smart communities partnership, how do we get access to this technology?

And I thought, I am overwhelmed. I don't know. I don't have a program to direct you to, I don't have a funding source to direct you to, all I can tell you is that we know we need to do this, but I can't give them an answer to when.

Mr. Harper. Talk to me then for a minute about those that have disabilities, whether they are physical or, you know, we deal a lot with those with intellectual disabilities, so how do we incorporate that for them?

Ms. Clark. Well, and I think this has a lot to do with the question of standards and thinking about digital inclusion instead of digital divide, right. And so one of the ideas is thinking about, and we have a number of researchers at my own institution who are working on trying to develop the technologies at the beginning so that they are actually someone who had limited eyesight or limited hearing actually could use the technology,

because we don't build it for just people who can see in the first instance, instead of again, as I said, coming to that question later and saying oh, how do we retrofit this to be?

We have the technologies to actually build these for quite a broad set of capabilities and opportunities, but we need to design that on the front end and that takes some consideration and planning.

Mr. Harper. Sure. Well, thank you. And I would encourage each of you in your roles to look at how we can do that and make sure that there is not a catch-up; that it is a bring-along as we go. And so with that I yield back.

Mr. Latta. Well, thank you very much. The gentleman yields back. The chair now recognizes the gentlelady from California for 5 minutes.

Ms. Matsui. Thank you very much, Mr. Chairman, and I want to thank the witnesses. It has been wonderful hearing about what has been happening as far as smart cities and all the innovations that you have utilized. Now very exciting work is happening throughout all the communities across our country to harness the power of technology. In my home district of Sacramento we are also moving forward to embrace these opportunities. We are positioning ourselves as a test bed for, for instance, autonomous vehicles, and encouraging the development of electric vehicle infrastructure.

The City of Sacramento hosts an open data platform which promotes transparency and invites civic innovators to create solutions at the local level. Sacramento was selected as one of the 16 cities to join a partnership with Transportation for America and Sidewalk Labs to pilot new programs and develop best practices for Smart City policies and projects. All this innovation will rely upon connectivity. This will place new demands not only on our roads and highways, but also on spectrum and infrastructure that powers wireless communications. The most important thing we can do is encourage smart communities is to accelerate the deployment of 5G networks. Verizon recently announced a pilot project to offer 5G in Sacramento and ten other cities. I am glad that Sacramento residents will soon see some of the benefits of super high wireless networks and every American community deserves access to these world class networks.

I am also looking at things like energy efficiency and air quality and I think some of you have brought this up. Cities already consume 75 percent of all energy used worldwide and urbanization is on the rise. These cities of the future as well as all smart communities will need to find innovative and sustainable ways to reduce their energy consumption. Energy efficient technology made possible by smart communities from smart grids to connected light bulbs have the potential to significantly benefit the environment and public health.

Well, all of you who represent cities, what features of your smart systems have that enable your cities to use energy more efficiently and sustainably? Ms. Gallagher, start with you.

Ms. Gallagher. Thank you, Congresswoman. So as part of the Smart City Challenge award that we received, $10 million of that came from the Vulcan foundation, and their entire goal is to reduce carbon emissions. So we are partnering with them on basically five different fronts. One is a smart grid which we are very fortunate in Columbus, Ohio, to have the American Electric Power Company headquartered there, so they are doing about a half billion dollar program for everything from smart meters up to helping us electrify homes for electric vehicles.

We also, another component of that is fleet, changing our fleet over to electric vehicles. It is consumer adoption of electric vehicles. We are partnering with Columbus Power on many, many ranges for smart grid and we are also looking at just the charging infrastructure in general. So just very quickly those are just some of the highlights that we are hitting for the carbon emissions.

Ms. Matsui. Okay, thank you. Mr. Chisek?

Mr. Chisek. Thank you. Through the Smart City Challenge, Portland was actually fairly far ahead on the electric side of things. We have been working for quite some time on smart meters. What we want to do is take it to the next level now and move more

into, say, port operations and how can we gain efficiency there both with energy usage but also electrification of some of their infrastructure as well.

Ms. Matsui. Okay, thank you. Ms. Berman?

Ms. Berman. So two things in Chicago, the first is our smart lighting project which will do an LED retrofit for 420,000 streetlights which will be getting underway later this year, and then we have an active smart buildings program which for buildings that the city owns introduces building control systems for all the city owned buildings, and on the policy side encourages the adoption of similar systems for privately owned buildings across the city to shrink the energy consumption for our building stock.

Ms. Matsui. Thank you. And Mr. Pazuchanics? Paz?

Mr. Pazuchanics. Sure. Two projects, we, similar to the City of Chicago and a number of other cities, are also embarking on a streetlight conversion project for about 40,000 lights, so a bit smaller but that project we expect to realize significant energy savings.

The second piece is through system efficiency. As a result of the adaptive signal network that we are building we are seeing reductions in air quality emissions because the vehicles are spending less idle time in those corridors. Given our topography and the fact that you know everything in Pittsburgh sort of has to run through a valley in between mountains the particulate

matter tends to concentrate, and so to the degree that we are able to move vehicles more efficiently and move mass transit more efficiently, we are seeing significant improvements in air quality in those corridors.

Ms. Matsui. Okay. Thank you very much. It looks like I have run out of time. Thank you. I yield back.

Mr. Latta. Thank you very much. And now the gentleman from Indiana is recognized for 5 minutes.

Mr. Bucshon. Well, first of all, thank you for being here. Thank you, Mr. Chairman. I don't know. I was in Shanghai a few years ago and all of a sudden at about a certain time of night all the lights went off in the entire city. Has anybody ever experienced that? I am not promoting that but I guess that is how they do energy efficiency. I mean, literally it looks like Vegas and then it is dark. It was the weirdest thing I ever seen in my life.

I want to focus on kind of some practical things and I do want to talk about rural broadband, because my district is primarily rural. And I really consider rural broadband like the electricity or the telephone of our age and especially in rural communities, so what things can we do to get broadband to rural communities? I mean, other than money. I mean, obviously that is important, but there is probably other things too.

Mr. Gruendling. Thank you for the question. Yes, I agree.

I think rural connectivity is, you know, certainly a critical conversation we all need to have and certainly is a focus and you know it ties right in with economic development. I mean, some of the challenges we have as a local family-owned telecommunications carrier is really just some of the uncertainty in the recovery mechanisms you know going forward in terms of, you know, we are building the fiber optic network of the future but it takes time and it takes money, and in Vermont we have a limited construction season, right. We have a few months that we can actually put infrastructure in the ground and that is a challenge as well. But, you know, over the past couple of years at FCC, you know, we have seen reductions in our Universal Service funding, our access revenues, all at a time where we need to be stepping up our infrastructure investment in the fiber optic network of the future. You know, we are --

Mr. Bucshon. Are there specific regulations that make it difficult and more costly to do these things?

Mr. Gruendling. Permitting.

Mr. Bucshon. Okay, so permitting is, I am assuming it is slow?

Mr. Gruendling. Absolutely.

Mr. Bucshon. Yes. And that is primarily, who is that primarily from, what agencies?

Mr. Gruendling. It is a mix of local, state, and federal

issues.

Mr. Bucshon. Okay.

Mr. Gruendling. You know, including rights of way issues and certainly easements you know which can be challenging when dealing with local --

Mr. Bucshon. Oh yes, I know.

Mr. Gruendling. -- landowners. Especially, I mean, with fiber optics too, you know, we are putting more and more electronics out in the field with splitter cabinets and what not which require easements and you know it takes time.

Mr. Bucshon. So it is a complicated problem, because I mean I have schools, you know, I mean, if kids can't get fast internet, you know, I mean, how can you have kids out in the rural communities learning when they -- I literally have some people that almost essentially have dial-up. I mean they don't have access to the internet, so that is a big problem in our country.

So what I would like to do is if there is any barriers at the federal level, you know, we need to try to work on those to improve that. And I do think at some point, you know, I have talked to the big carriers also about this and at some point, you know, or I am hopeful that the private sector can solve most of these problems, but there may very well be, like I said it is like the telephone or electricity in my view.

I want to focus on some other practical things. I was

interested in what you said about your streetlights because -- I went to med school in Chicago by the way, University of Illinois. My son lives in River North, so I love Chicago. And one of the most frustrating things of any city, but Chicago is one of those is when you are driving, you know, it is 10 o'clock at night and you see a ray of red lights and there is nobody coming from the other direction, right. And you are just sitting there idling and then you pass the one and it turns red on you again. What is happening in all of your cities where you can, you know, either pressure sensors or visual sensors or other ways to interact?

The other one is late at night you are traveling through a city, and I am just using Chicago because I lived in Chicago, and you are driving along and you have a green light and all of a sudden out of the corner of your eye you see someone fly through the red light and you are like whoa, because they just assume there is nobody coming. So that type of interaction I am interested in too, in technology, infrastructure, vehicle communication.

And I will let you comment first and then take some comments from others about what they might be doing.

Mr. Pazuchanics. Sure. So the adaptive signal network that we have tested about 60 intersections right now in the city and we have seen between 15 and 20 percent reductions in the wait times, the number of stops that vehicles are going through those corridors. You know obviously a lot of that benefit is realized

at points that are not a.m. or p.m. peak, sort of the off-peak where the signal timing doesn't necessarily make sense.

The city actually received an ATCMTD award from FHWA last year to expand that pilot to another about 150 intersections throughout the city. So I think we are really starting to see the potential for vehicle to infrastructure communication with those signals as well, not just --

Mr. Bucshon. Is that computer modeling or how is that?

Mr. Pazuchanics. It is a combination of sort of computer modeling and then visualization of the intersection itself, so sort of blocking out vehicles as sort of blocks within the system and then the intersections themselves are talking to the next intersection down the line providing the information. And as I mentioned, you know, we are hopeful that we can then provide information about the load of a bus, how far behind schedule the bus is, factor all of that into whether the bus gets a green light or a red light.

Mr. Bucshon. I am out of time so the other cities can't comment, but what I would like to say is there is a lot of things. It is not just inconvenience, right, and somebody pointed out idling time in cities and other areas that is leading to more emissions and other things that goes into that is a really important issue. So thank you, I yield back.

Mr. Latta. Thank you. The gentleman yields back. The

chair now recognizes the gentlelady from New York for 5 minutes.

Ms. Clarke. Thank you, Mr. Chairman, and I thank our panelists for their testimony here this morning. I want to switch gears just a bit and really focus in on cybersecurity, because of course we are in a time when you know just with some general expertise you could shut down a grid, right. So I would like to have a sense of have any of your smart community systems already been subject to hacking or malicious attacks either attempted or successful?

And I will start with particularly those of you who are operating in cities, so Ms. Gallagher and Mr. Chisek?

Ms. Gallagher. Thank you. We have not yet, but of course I think some of the other cities are a little further along than we are, so I will probably pass to them.

Ms. Clarke. Mr. Chisek? Ms. Berman?

Mr. Chisek. Thank you. We have not as well, but we have been thinking for quite some time about cybersecurity and those issues are very important to us.

Ms. Berman. So I would like to give you a more general answer because I am responsible for cybersecurity for all of the city systems, not just the connected ones we have talked about today but all of our systems. And cybersecurity is a concern across the country, certainly, and there is not enough funding for everything that cities should be doing in our current budgets or

the small amount of grant money that we may be able to pull from the sources that we have today to do everything that we should be doing.

The systems that we have talked about today in Chicago have not been hacked as yet. You never want to say that out loud. To say have they been attacked you actually can't answer that in any definitive way. None of the systems that you have that are monitoring that because to say have they been attacked that means you don't know if they have been successful, right.

So to be very clear you actually don't know if they have been attacked yet, right. You can say that they haven't been hacked because that means they have been successful. You don't know if they have been attacked because everything is under attack all the time. So the City of Chicago and all of our systems are under attack all the time millions of times a day and that is a fact, and that is a fact in all cities across the U.S. every day.

So it should be a focus of the federal government to help cities be safer from a cybersecurity perspective. And so I appreciate the question because it is a deep concern of mine and of my peers that are focused on these issues and we take it very seriously, but the support of the federal government would be greatly appreciated in that area.

Ms. Clarke. Mr. Pazuchanics?

Mr. Pazuchanics. Sure. The City of Pittsburgh has not

experienced an attack at this point, but I will say that a big part of our success thus far has been partnership with the University of Pittsburgh, Chancellor Gallagher, himself an expert in cybersecurity, and a very strong program in cybersecurity that helps provide sort of a feedback loop for us and enables us to, you know, test out our systems, make sure that there is resiliency in those systems, so that city-university partnership is very critical.

Ms. Clarke. And I am glad that you mentioned that because part of what I would want to suggest because of the rollout of what you are all doing is that where you can get some partnerships going, particularly with the utilities you know that should be a bond that you build. Because you are absolutely correct, Ms. Berman, you are currently under attack right now as we sit here. All you need is for one to penetrate though for there to be catastrophic consequences. So I want to encourage to that extent some sort of partnering and I will certainly be your advocate here at the federal level to see what we can do, because as we move into 5G, as we become more expansive in our interconnectedness, you know, the more vulnerable we are going to become.

Just quickly, as the administrators of your community smart systems, have you taken the cyber threats into account when planning for the future and, if so, how have you begun to prepare

for them?

Ms. Gallagher. We absolutely have. We actually as part of the Smart City Challenge we have put together a working group that is solely focused on this. We have a chief information officer that is leading that. We are very fortunate that we have the Ohio State University on our team. Another key leader for us is Nationwide Insurance because of course it is very important to them so they have lent us quite a few of their employees to help us in this effort. So you are absolutely right, it is all about partnerships and leaning on that private side and the university side who has already been down this road. So we take it absolutely seriously.

Mr. Chisek. Thank you. The City of Portland also has been moving forward on this issue. We are creating a chief data officer position just simply because we are going to have sensor equipment spread throughout the city that is vulnerable that is bringing a whole host of data back to our open data platform.

So thinking through that ahead of time has been critical. I think our partnerships with private industry have also helped us quite a bit, because just like we are under attack they are under attack and the more we can do things together, I think the more and better results we get.

Ms. Clarke. Ms. Berman, did you want to add anything?

Ms. Berman. Just quickly that like the other cities we plan

for both security and privacy at the beginning of every project and there is someone assigned, a chief information security officer, who has that responsibility on every project.

Ms. Clarke. Mr. Pazuchanics?

Mr. Pazuchanics. Yes, agreed that it is significantly factored into the legal agreements and the structure of our regional data center with that intent and expected purpose in mind. Thank you.

Ms. Clarke. Thank you. I appreciate your indulgence, Mr. Chairman. I yield back.

Mr. Latta. Thank you very much. The gentlelady yields back, and the chair now recognizes for 5 minutes the gentleman from Pennsylvania.

Mr. Costello. Thank you, Mr. Chairman. Mr. Pazuchanics, I had the opportunity to visit CMU within the past year and learn about the autonomous vehicle testing and learned a great deal about how the technology and other types of technology have really contributed to what it means to have a smart community and how it really can create a lot more in the way of efficiency and improvement within not just a public works department but code enforcement and law enforcement, right on down the line.

And I applaud you and everyone in Pittsburgh. It is Congressman Doyle and the other members of Congress from the Pittsburgh area, but in particular those in the city

administration who really deserve to be commended. And I would like to ask a couple of questions related to that.

The data utility system that you have, Deloitte report speaking about the impact of wireless connectivity to our communities estimates that adopting a smart grid would create $1.8 trillion in added revenue to the economy, saving the average consumer hundreds of dollars of year in energy costs. What are the biggest barriers that currently exist to deploying a smart energy grid and related to that how does the data utility help advance energy services to provide better resources for the City of Pittsburgh?

Mr. Pazuchanics. Sure. I think one of the biggest challenges to a coordinated smart grid and a smart utility management system is the lack of coordination or cooperation among various entities sort of providing very similar services -- natural gas companies, the electric company, the water systems -- to the degree that we are able to share resources and solve multiple problems at the same time using similar infrastructure we are going to all be better off and see an economy of scale. So I think that coordination is key across those agencies.

I think, you know, in Pittsburgh we are very fortunate to have Duquesne Light which is a very sophisticated and innovative electric utility that takes that seriously and is moving toward IPv6 infrastructure. But I do think that there is still, you

know, a challenge with playing catch-up with some of the other utilities and we could see savings if they were all working together.

Mr. Costello. And is that going to require affirmative steps on the procurement end moving forward?

Mr. Pazuchanics. Yes. I think that a major hangup with a number of Smart City initiatives tends to be, or the way that our procurement system is structured now it tends to be sort of more purchase or product oriented rather than solution oriented. And to the degree that we are able to restructure to allow for some of these innovations in procurement to occur we are going to be better off.

Mr. Costello. I would like to ask you about, and I will open this up to the rest of the panelists. Let's talk about health care and a smart community. Smart communities demonstrate real potential for a much needed transformation of health care from reactive and hospital centered to preventive, proactive, evidence based person centered focused on well-being.

How does a smart community, particularly in the municipal administration realm, go about improving a community's health care through its various applications?

Mr. Pazuchanics. I think one of the key components of that is providing provision of first and last mile service to critical healthcare assets. You know, one of the major challenges in

Pittsburgh given our topography is the fact that first mile or last mile can mean very different things depending on age, ability. The potential of Smart City deployments, particularly shared vehicles, autonomous vehicles, to enhance connection to the major hospitals and university systems that provide that health care, I think, is going to be very important and it is the way that health care and transportation are tied together.

Ms. Clark. I think the smart and connected health initiatives, research initiatives, actually are a big effort in figuring these questions out. And I also would just point to things like when we are talking about air quality monitoring one of the things we can monitor is for asthma. And so what that allows -- and real time. So what that allows families to do is to determine whether or not today is a good day to walk to school or whether today is a good day to drive. So it gives people agency about making decisions about how they navigate the built environment through these sensor systems that can improve their health.

Mr. Gruendling. I think telehealth is a great topic when we are talking about smart communities, and I think that access to specialists who might not reside in a rural area for instance, you know, without the need to travel to a big city hospital you know for certain checkups or check-ins. You know, I think with a lot of smart connected medical devices now you know they report

back automatically to a physician or a physicians' group and allow them to monitor a patient in a home type environment. And you know it is the connectivity that is allowing that to happen.

Ms. Berman. I would like to build on what Dr. Clark said about the asthma example, because smart cities technologies can allow a city to go beyond just monitoring and changing behavior based on air quality and asthma but actually doing something about it. So taking that information and putting policies and services in place to improve air quality, which also speaks to the equality of health in the city because oftentimes the worse air quality also is where your underserved communities are, so evening that playing field and helping families be healthier as well.

Mr. Chisek. I agree with everyone. But it could also help better deployment of resources and resources are scarce. So better deployment of these resources, be they health care, be they first responder, is one of the advantages of smart cities.

Ms. Gallagher. We have been out talking to especially I would say our lower income neighborhoods as we have been going through this process and just asking them what do they see as their biggest challenge with health care and what we have heard is transportation is a major barrier. When it will take you an hour and a half to get to your doctor's office by the time you change two or three buses, go to a hub, go to the next place, it is easier just not to go.

So we have got to get them additional solutions. Not only the first and last mile, I a hundred percent agree, but just make it easier so it becomes just another thing to do versus a hindrance and an obstacle you have to overcome.

Mr. Costello. Thank you. I yield back.

Mr. Harper. [Presiding.] The gentleman yields back. The chair now recognizes the gentleman from Florida, Mr. Bilirakis, for 5 minutes.

Mr. Bilirakis. Thank you, Mr. Chairman, I appreciate it and I thank the panel for their testimony. For the entire panel a recent report by Deloitte on the impact of wireless connectivity to our communities notes that 1-minute improvement in response time for emergency medical services could reduce fatalities by eight percent, which means efforts to better coordinate responses or automatic deployment could save lives.

Are you discussing with your emergency responders how they are utilizing this lifesaving technology? How are you planning to use connected cars to better serve the elderly and disabled populations? Whoever would like to go first, thank you.

Ms. Gallagher. We actually do have a lot of conversations with our emergency management. And just a quick example of one thing we are doing is working again, and I think it has been brought up, with the traffic signals and having the traffic signals talk to the vehicles and talk to each other. So whether it is you know

an emergency vehicle is coming, you keep the lights green, you stop the other vehicles so they can have quick passage you know that is one example.

Another one perhaps is them specifically talking to each other and you know figuring out who is the closest and that sort of thing per the cars, they are not having to go through dispatch, and just a variety of things. But we are having those conversations.

Mr. Bilirakis. Yes, please.

Mr. Chisek. It does go back to that deployment of resources issue. So typically we have been sending fire trucks and ambulances to medical calls; by using this technology to triage that and pull the medical calls out we can better deploy our fire resources. We are also deploying some smart cities kiosks that can also be used as gathering points for information for the public in the event of a disaster. We have all heard about the Cascadia Subduction's own earthquake that is supposedly going to hit the West Coast, so that is also one of our strategies around resiliency.

Mr. Bilirakis. Very good. Ms. Berman?

Ms. Berman. We took a slightly alternative approach to getting emergency resources to where they needed to be. We did an analytics analysis of all of our 911 calls and there are pockets of recurring 911 calls around train stations, et cetera, during

commutes, so now we pre-deploy ambulances and have them waiting, so that cuts your response time down quite a bit when the ambulance is already there. So we are doing things like that.

Mr. Bilirakis. Very good. Sir?

Mr. Gruendling. Thank you. We are definitely having these conversations at both the state and local levels with our first responders. Obviously we are a critical part of that enhanced 911 system in the State of Vermont, so you know those conversations and the technology pieces and components that make that up are certainly ongoing. And you know one of the big initiatives that our state and working with our schools we have been trying to really enhance the location-specific 911 in those schools, which is something you know that is still in process.

Mr. Bilirakis. Anyone else? Dr. Clark?

Ms. Clark. From the research perspective, one of the things we are seeing is that different partners have different data available. So for first responders if they can, particularly when we are talking about events, these natural events like a storm, if they can get information from the utilities about the conditions on the ground they can respond much, much quicker and more safely to an event and help people. And it is building those partnerships and that trust so there is actually data exchanged is one of the things we think there could be a lot of value added.

Mr. Bilirakis. Very good. Would you like to --

Mr. Pazuchanics. To answer your second question regarding mobility for the elderly and integration of these technologies into elderly populations, one of the key initiatives we have been doing in that regard is building a level of technical sophistication with our elderly population, getting some of these technologies deployed out to our senior centers throughout the city, and enabling residents to understand how the system works so that new technologies such as TMCs and autonomous vehicles are a little bit less unfamiliar to that population.

Mr. Bilirakis. Very good. Next question, I know I don't have a lot of time. I understand from a recent Deloitte report on the impact of wireless connectivity to our communities consumers are increasingly more attracted to wireless innovation with their health care with 70 percent saying that they would be interested in some form of connected health care service.

What are your cities doing to help educate older citizens to the positive benefits of this technology? Who would like to go? I know we only have a couple of seconds.

Mr. Chisek. So we are partnering with community organizations to help explain the technologies and the capabilities to some of our different populations in elderly, minority community as well. So we are using trusted voices in their community that they already have a relationship with to help communicate those things to those populations.

Mr. Bilirakis. Very good. Anyone else have any ideas?

Ms. Berman. We partner with Microsoft to provide a program called Cyber Seniors in our senior centers and libraries that teaches them basic computer skills if they need that and also how to use those skills to connect with their doctors, hospitals, and also non-medical resources as well so that they can get the resources they need online and learn those skills --

Mr. Bilirakis. How effective has that been?

Ms. Berman. We have had actually pretty good uptake. We trained more than a hundred thousand seniors in Chicago last year and we are seeing increased uptake moving into this year.

Mr. Bilirakis. Anyone else? Okay, I will yield back. Thank you, Mr. Chairman.

Mr. Harper. The gentleman yields back. Seeing that there are no further members wishing to ask questions, I would like to thank all of our witnesses again for being here. I am sure when this was scheduled you didn't know you would have a snowstorm to get through, so I hope the travel wasn't too difficult, but we appreciate the effort and your attendance today.

Before we conclude, I would like to include the following documents to be submitted for the record by unanimous consent: a statement from a CA Technologies, a statement from Honda North America, a statement from Panasonic, a statement from ITS America, a joint statement from CompTIA and Technology Councils of North

America, a joint statement from ITA, CompTIA, Smart Cities Council and TIA, and a Deloitte report from CTIA for the record as well as a letter from Epic. And, without objection, those are admitted.

[The information follows:]

**********COMMITTEE INSERT 13**********

Mr. Harper. And pursuant to committee rules, I remind members that they have 10 business days to submit additional questions for the record, and I ask that witnesses submit the response within 10 business days upon receipt of the questions. Without objection, the subcommittee is adjourned.

[Whereupon, at 11:57 a.m., the subcommittee was adjourned.]