MINUTES
of the
FIFTH MEETING
of the
SCIENCE, TECHNOLOGY AND TELECOMMUNICATIONS COMMITTEE

September 25-26, 2017
Barbara Hubbard Room
Pan American Center
New Mexico State University
Las Cruces

The fifth meeting of the Science, Technology and Telecommunications Committee (STTC) was called to order by Representative Candie G. Sweetser, chair, on September 25, 2017 at 9:12 a.m. at the Barbara Hubbard Room in the Pan American Center on the campus of New Mexico State University (NMSU) in Las Cruces.

Present
Rep. Candie G. Sweetser, Chair
Sen. Michael Padilla, Vice Chair (9/25)
Sen. William F. Burt
Rep. Kelly K. Fajardo (9/25)
Rep. Jason C. Harper
Sen. Bill B. O'Neill
Rep. Debra M. Sariñana (9/25)
Rep. James E. Smith (9/25)
Sen. William P. Soules (9/25)

Absent
Rep. Daymon Ely
Sen. Mark Moores
Rep. Linda M. Trujillo
Rep. Monica Youngblood

Advisory Members
Sen. Craig W. Brandt
Rep. Stephanie Garcia Richard (9/25)
Sen. Ron Griggs
Rep. Bill McCamley
Sen. Mary Kay Papen
Rep. Debbie A. Rodella
Sen. Nancy Rodriguez
Sen. Jacob R. Candelaria
Sen. Carlos R. Cisneros
Sen. Richard C. Martinez
Sen. William H. Payne
Rep. Nick L. Salazar
Sen. Bill Tallman
Rep. Carl Trujillo
Sen. Peter Wirth

Guest Legislator
Rep. Nathan P. Small (9/26)

(Attendance dates are noted for members who did not attend both meeting days.)

Staff
Mark Edwards, Legislative Council Service (LCS)
Ralph Vincent, LCS
Sara Wiedmaier, LCS

Guests
The guest list is in the meeting file.

Handouts
Handouts and other written testimony are in the meeting file.

Monday, September 25

Welcome to NMSU
Dr. Garrey Carruthers, president and chancellor, NMSU, welcomed the committee to the "University of Yuccas". Dr. Carruthers highlighted some positive aspects of the university. He noted that freshman enrollment increased by 11.3% this fall, resulting in the largest freshman class in 17 years. NMSU also had the highest fall-to-spring retention rate in years, Dr. Carruthers said. He also noted that over the past year, the university raised $2 million more than in any previous year. Dr. Carruthers then listed some of the university's national accolades: recognition as a top-tier university for the fifth time by *U.S. News & World Report*; a number-one ranking by the National Science Foundation (NSF) for science and engineering activities for minority-serving institutions; and a number-two ranking by the Brookings Institution in providing students opportunities for social mobility.

Dr. Carruthers said that NMSU's "Pathways Program" increased from about 280 students to 753 students this year, and the goal is to reach 1,000 students by next year. This program aids students who struggled in high school by providing extra help through learning centers on campus and creates a pathway for community college students to transfer to NMSU after one to two years.

In response to questions, Dr. Carruthers explained that the Pathways Program may affect enrollment numbers in the large 100- and 200-level classes on the main campus by accepting credits for introductory level courses from branch and community colleges such as Dona Ana Community College. However, he said that NMSU views the program as an integrated system in which the overall goal is to help more students graduate from college. Concerning the reduction in the lottery scholarship program and its effect on enrollment at state universities, Dr. Carruthers stated that the Council of University Presidents is currently working on a proposal to uncouple lottery revenue and state scholarships. He said that lottery revenue in the state has stabilized and that revenue can only supplement 60% of tuition and fees. He suggested moving to a scaled incentive scholarship to encourage students to continue beyond their freshman and sophomore years. Under this proposal, a student would receive increased assistance each year as the student moves toward graduation. Dr. Carruthers also noted that there is a national trend that shows a

decline in the number of students pursuing careers in education and social work, so NMSU has hired a new dean of education in order to develop a new attitude toward those fields of study.

Regarding the Arrowhead Center at NMSU and its entrepreneurial program, Dr. Carruthers stated that the national laboratories are integral partners in the program and that Sandia National Laboratory offers a patent application process for students. He also mentioned the center's Studio G, which provides students and recent graduates with office space, business consulting and a wide variety of additional resources for entrepreneurs to launch their own businesses.

Introductions

Representative Sweetser then invited the committee members and staff to introduce themselves.

Information Technology Projects Update and Developing Issues

Darryl Ackley, secretary, Department of Information Technology (DoIT), and Maria Sanchez, general counsel, DoIT, delivered an overview of the DoIT and a status update on current projects, funding and issues within the department. Secretary Ackley began by describing the evolution of the role of the DoIT from providing information technology (IT) infrastructure support for other departments to its current role as the state's IT service provider and technical center of excellence. He listed the DoIT's goals in its role as a center of excellence as:

- providing more transparency and oversight of all IT projects of more than $100,000 and projects that involve new systems with a lot of data;
- providing more oversight of projects by approving funding in stages, creating a value-added process;
- collaborating with other agencies to make services more effective;
- modernizing and streamlining service delivery; and
- focusing on enterprise architecture for investment.

Secretary Ackley then highlighted some of the benefits of the department's online portal, which, in coordination with the Legislative Finance Committee (LFC) and the Department of Finance and Administration (DFA), provides stakeholders with quarterly updates on projects. The portal maps out the time line for projects; shows funding "gates" or benchmarks; and gives a "Top Ten" list of projects based on total project cost and the department's overall portfolio, which currently consists of 56 open projects totaling over $360 million. He noted that from fiscal year (FY) 2018 to FY 2019, the DoIT saw an increase in IT project funding requests and in the total amount requested. Secretary Ackley then updated the committee on the progress of the Statewide Human Resource, Accounting and Reporting Enterprise (SHARE) system upgrade project. Upgrades to the SHARE system include: increased standardization, engagement and collaboration between agencies; increased platform stability, security and resilience; better workforce reporting; an effective governance board; sustainable, congruent training methods; and increased DoIT team skills and business intelligence.

Secretary Ackley pointed out that the DoIT carried over a deficit of $5.6 million from FY 2016 but closed FY 2017 with no deficit or surplus. The DoIT was able to reduce $1.2 million in annual spending through updates, cuts in unnecessary payroll and more aggressive negotiation with telecommunications providers. He also noted that if projected costs are below allocated funds, the DoIT must return the excess funding to the federal government. Some other accomplishments discussed included the implementation of cloud storage to be less dependent on underlying technology; consolidation of IT governance to a single organization; the ability to train new chief information officers (CIOs) of agencies with the creation of IT account liaisons; and overall improvement in oversight of IT projects throughout state agencies through implementation of the Project Management Center of Excellence.

Next, Secretary Ackley listed the effects expected from enactment of House Bill (HB) 113 from the 2017 regular session, including expansion of geospatial initiatives, telehealth initiatives and public safety broadband. Complementing HB 113 goals, Secretary Ackley said that the DoIT used a Federal Communications Commission (FCC) grant to implement "First Net", a program to change the public safety broadband network from analog signals to digital signals. He mentioned that the existing communication gaps for first responders are improving, but some communication is still analog. As Next Generation 911 and other data-driven systems become available, voice-based emergency calls will move to digitally based systems. He said that digitally based systems will allow large events, such as Zozobra in Santa Fe and the state fair in Albuquerque, to have a dedicated public safety network to further ensure communication.

Secretary Ackley then discussed a number of state IT initiatives. He said the Broadband for Education Initiative has a goal to provide one gigabyte per student by 2018, which is currently 99% complete. He said that the DoIT created a strategic plan that tied broadband initiatives from multiple agencies together, reducing the cost per megabyte from $15.00 to less than $6.00. He said that the DoIT is also implementing a consumption-based model that charges agencies telecommunication fees based on usage to further reduce costs.

Secretary Ackley said that the DoIT's future goals include:

- hiring a chief information security officer (CISO) — cybersecurity in the state is a major issue. Given the salary constraints and the market competition for CISOs, the DoIT has not been able to fill this position. It was noted that the median term for a state CISO is only 24 months, and some are as short as 18 months;
- becoming credit card compliant under Payment Card Industry (PCI) standards — the DoIT is working toward credit card security compliance to satisfy the requirements of the PCI standards, such as requiring all agencies to have increased levels of cybersecurity; and
- transitioning government agencies to a digital platform to improve transparency and analytics.

Responding to questions from committee members, Secretary Ackley said that the federal Intergovernmental Personnel Act of 1970 allows the national laboratories to provide a CISO for the DoIT, but this provision was only allowed for a couple of months because it was canceled by the federal government. He said that in order to attract a CISO to the position, the role of the CISO must be better defined. He also said that the department must look at expanding its internship program and should also look at collaborating with the National Guard of New Mexico on cybersecurity issues. He stated that he is currently working with other agency CIOs to implement the provisions of HB 113.

In response to inquiries about the SHARE system, Secretary Ackley stated that this platform allows more input from business owners and, therefore, better collaboration between business and technology operations. The system addresses issues of continued congruency under future administrations through a stabilized system, great staff and continuance of agency CIO training. Secretary Ackley noted that the department was able to eliminate its contingent liability.

In response to questions regarding IT project funding requests, Secretary Ackley outlined the process for new projects as follows.

1. An agency makes a request and provides information about the project, such as the goals, importance, risks, issues, alternatives and life cycles of IT, etc. A request must be submitted by September 1 of each year, along with the agency's annual budget request.

2. DoIT's Project Oversight and Compliance Group, DFA and LFC staff review the agency's business case, and the agency is provided a time to present the project to a committee, which is chaired by the CIO.

3. The DoIT, DFA and LFC consider the project proposal and make recommendations for possible funding.

4. Recommendations are provided to the House Appropriations and Finance Committee IT Subcommittee for consideration during the legislative session.

In response to questions by committee members, Secretary Ackley stated that his team is considering a public-private hybrid cloud service that will be based on agency classification. Regarding cybersecurity, Secretary Ackley said that the National Guard of New Mexico has a cybersecurity component. He said that Michigan might provide a good example of how to collaborate with a state's National Guard regarding cybersecurity issues. Secretary Ackley lastly noted that the DoIT provides broadband mapping on its website, but he admitted that it is difficult for the department to keep up with the changes.

Update on Installation of the ONGARD System

Secretary Ackley provided the committee with a brief history, overview and proposed trajectory of the Oil and Natural Gas Administration and Revenue Database (ONGARD), as well as an update on the ONGARD modernization and replacement project. He said that the ONGARD System Development Act created a joint powers agreement between the State Land Office (SLO), the Taxation and Revenue Department (TRD) and the Energy, Minerals and Natural Resources Department's (EMNRD's) Oil Conservation Division (OCD). ONGARD is a relational database system that supports collection and distribution of oil and gas revenues and is available on the DoIT site mainframe. The system is currently stable, but it is not modernized for business needs. ONGARD relies on antiquated technology such as the COBOL development language. He stated that the agencies have a strategic roadmap to modernize the system, but there is not enough funding to accomplish it. Funds intended for modernization in 2011 were instead allocated to system stabilization and upgrades, and the one-time funding allocated in 2015 proved to be ineffective. In 2015, the agencies involved began exploring an alternative option that uses three modular systems working in a federated approach.

John Monforte, acting secretary, TRD, George Rosenbaum, executive director, Royalty Management, Information and ONGARD Replacement, SLO, and Joe Montano, CIO, EMNRD, elaborated on the status of the ONGARD modernization and replacement project.

Secretary Monforte began by noting that the system has collected and distributed over $26 billion throughout its 23-year life. The taxes collected by the state that are related to the ONGARD system represent about 33% of the state's revenue. He described the current ONGARD platform as a single, monolithic system that can be split into three functions: permitting and reporting; severance tax collection and distribution; and royalty administration. He then outlined a workflow for a federated ONGARD system as follows:

1. a unit of land will enter the EMNRD OCD module for well initiation, well completion and initiation of volume reporting;
2. extractions will be reported to the TRD module for the volume-based severance tax collection and distribution; and
3. the land will be tracked by the SLO module for the volume-based royalty collection and distribution.

The panelists said that the TRD's severance tax module project has a budget of $6.8 million. The schedule, budget and scope of the project are all on target for completion by June 30, 2018. The SLO's royalty administration module project is estimated to cost $10 million, with a time line of 30 months to 36 months. To continue ONGARD service until these projects are finished, the SLO and the ONGARD service center are adapting the system to sustain it. DoIT staff will continue to work closely with the ONGARD system management team to address implementation issues.

Responding to questions, panelists explained that permits, staffing and conservation data are not within the scope of this project. However, that information is available on the OCD's website. It would be difficult to license the new ONGARD platform to other states because the method used in New Mexico to handle the tracking and taxing of the land royalties and extractions is customized to the state's tax system and distribution of land jurisdiction. Responding to a question about the collaboration between the individual entities of the system, the panel noted that each agency is a separate component that provides data to ONGARD for data sharing and collaboration.

Approval of Minutes

On a motion by Representative Smith and seconded by Representative Sariñana, the minutes from the July and August STTC meetings were approved.

Roadrunner Internship Program

The committee then recognized an audience member, Uriel Munoz, director of governmental affairs, Associated Students of NMSU, for his work with the Roadrunner internship program. The program provides NMSU freshmen, sophomores and transfer students the opportunity to get acquainted with the processes of student government and encourages students to participate in all levels of government.

Arrowhead Center: Business Acceleration/Incubation, Entrepreneurship and Technology Commercialization

Kathryn Hansen, director, Arrowhead Center, NMSU, provided the committee with a snapshot of the Arrowhead Center. She said that the purposes of the center are to promote entrepreneurship and innovation, to create economic opportunity, to provide students with client-based learning opportunities and to accelerate students' knowledge of economic development and the growing demands of the business world. She said that the Arrowhead Center has four focus areas:

1. business creation and growth;
2. education and training;
3. intellectual property (IP) commercialization; and
4. development of public-private partnerships.

Ms. Hansen said that NMSU is building a statewide innovation network that currently includes K-12 education entrepreneurship programs, business assistance, business incubation, workshops and economic studies. Ms. Hansen listed LAUNCH, Aggie I-Corps and Sprints as separate programs offered by the Arrowhead Center for business acceleration. She said that these programs are short-term programs that assist business start-ups in assessing the viability of their product based on customer feedback. These programs provide funding and team support and are seen as a pipeline to commercialization by generating market interest in IP developed at NMSU.

For longer-term business incubation, Ms. Hansen said that the center has three programs, Studio G, the Arrowhead Tech Incubator and Arrowhead Ventures, which provide new companies with funding, business mentoring and technical guidance. She said that funding sources for new companies include state and federal agencies, private investors and donors, the national laboratories in New Mexico and the Arrowhead Innovation Fund. Additionally, Ms. Hansen said that the Arrowhead Center provides companies with evaluations using an array of over 100 performance metrics to improve a company's chances of success.

Responding to questions from the committee, Ms. Hansen outlined the benefits and assistance provided through the Arrowhead Center for start-up companies. Depending on the location and needs of the company, the center provides workshops for incubation and acceleration, collaboration between start-ups, networking events, business mentorship, assistance with capital sourcing and customer acquisition and work-ready spaces. She also said that the center collaborates with the New Mexico District Office of the United States Small Business Administration in small business incubation research. She also noted that Innoventure, a core program within the Arrowhead Center, has been very successful at helping elementary, middle and high school students across the state with product design and marketing and at encouraging young entrepreneurs to think critically about the full pathway from invention to commercialization.

Next Generation Entrepreneurs: Critical Issues and Pathways to Business Creation

Students and alumni from NMSU described their individual businesses and the value of the Arrowhead Center.

Carlos Murguia, a master's student in industrial engineering and founder of Kool Armor LLC, described his innovative clothing material. He said that the material provides thermal insulation of at least 36 degrees. He credited the success of his company to the Arrowhead Center's LAUNCH program, which enabled him to receive an NSF grant and a Mexican invention voucher.

Alex Gorsuch, a master's student in industrial engineering and founder of AEGorsuch Designs LLC, described his field test kit that allows researchers to take the laboratory to the field, expediting and simplifying testing in a variety of pursuits, including agriculture, medicine and defense. As an example, he said that his field test kit could provide a substantial cost- and time-saving advantage in tackling the backlog of rape evidence kits around the country. He said that traditional testing costs $1,000 and requires at least one week per kit, whereas his product would provide immediate results at a cost of $0.28 per kit. He cited Aggie I-Corps as key to the success of his business. Aggie I-Corps, a component of the NSF I-Corps program, provides direct support for student-faculty-business mentor teams to move NSF-related technologies to market. Mr. Gorsuch currently employs one part-time employee and 15 interns.

Avinash Kuna, a master's student in computer science, and Alexis Cornidez, a civil engineering student, are the founders of Torch Bearer Limited. They described their software

development and digital marketing start-up as a one-stop shop for all web needs. Torch Bearer Limited provides multiple services, including mobile application development, website development, desktop application development, cloud applications and business model design. They also mentioned a campus organization that they recently started called the Preneur Club that allows students to discuss entrepreneurship. Mr. Cornidez said that they had contemplated establishing the company in a large, out-of-state market, but they had decided that, as a locally grown company, it was important to stay in Las Cruces and develop the local economy.

Patrick Hemp, an NMSU alumnus with a degree in business information systems and founder of Supernova Communications LLC, described his start-up wireless internet service provider. Supernova Communications currently provides service in neighborhoods near NMSU to test its business model. Mr. Hemp said that the company intends to spread service to neighborhoods across southern New Mexico. Mr. Hemp credited his initial success to the Arrowhead Center and the funding provided through Studio G. He expressed the desire to operate locally and create more technology jobs in the area as his service coverage expands. Currently, his company consists of himself and two unpaid interns. He also stated that a major benefit of being a part of the Arrowhead Center is networking with other entrepreneurs.

Rachael Ryan, a doctoral student in biology and founder of Backyard Farms LLC, described her start-up company, which cultures snails for the escargot market. She said that Backyard Farms currently maintains a herd of 400 snails. She said that the Arrowhead Center and a small business innovation research grant were crucial factors in expanding the company to an aquaponic system. She said that a challenge for Backyard Farms LLC is that aquaponic production is regulated and taxed as a manufacturing, rather than as an agricultural, enterprise.

Responding to questions from the committee, Ms. Ryan said that she has been in contact with the former New Mexico Shrimp Company to learn why that start-up venture failed. She believes her company will be more viable because snails are less sensitive to environmental factors than shrimp and because the Arrowhead Center provides support for targeted market research and consulting. She also noted that, while Backyard Farms LLC is taxed as a manufacturer, snail production is regulated by the New Mexico Department of Agriculture.

Committee members noted that workforce challenges sometimes lead start-up businesses to leave the state as they grow. Commenting on that issue, the panelists said that it is imperative not just to provide resources to small business start-ups but to advertise these resources and make them highly accessible to entrepreneurs. The panel also asked for help in attracting a labor force by providing incentives for graduates to stay in the state for work. They indicated that new college graduates are often attracted to the combination of social and career opportunities in larger markets, and they suggested using public-private partnerships to develop downtown Las Cruces as a social and technological hub. Also, most of the panelists stated that they would be willing to enter into partnerships with the state for financial assistance.

From "Eureka" to the Market — Commercialization of Inventions at NMSU

Faculty from NMSU discussed their research and commercialization initiatives before the committee. Dr. Rolston St. Hilaire, department head, Plant and Environmental Sciences, College of Agriculture, Consumer and Environmental Sciences, NMSU, described the process behind developing a new ornamental landscape tree to bring to market. He said that the process began with more than 15 years of research on indigenous maple species and the maples' environmental stressors and then screening seedlings from different locations to select the most drought- and salt-tolerant species. The result was the Mesa Glow, a bigtooth maple tree with a deep red color in the fall. Once Dr. St. Hilaire and his team had developed the tree, they partnered with an Oregon-based wholesale nursery for commercial production and licensing. Dr. St. Hilaire said that in the last two years, 700 trees have been produced and demand has, thus far, exceeded supply.

Dr. Jiannong (John) Xu, associate professor of genomics, Department of Biology, College of Arts and Sciences, NMSU, described his research and the commercialization of a method of "Biocontrol of Disease-Transmitting Mosquitos". He said the research goal had been to develop an all-natural biocontrol strategy to address two problems: insecticide-resistant mosquitoes; and general environmental concerns about chemical insecticides. Dr. Xu's system uses symbiotic bacteria to deliver anti-pathogen and anti-mosquito agents into vector mosquitoes. It is currently in the "patent pending" stage, and his team has entered into a collaborative research agreement with Pebble Labs to fund continuing research and licensing.

Dr. Satyajayant (Jay) Misra, associate professor of computer science, College of Arts and Sciences, NMSU, discussed the commercialization path for his "Protocol for Lightweight and Secure Communications in Constrained Devices". His research goal is to improve internet security by making encryption faster, more computationally efficient and scalable across constrained devices and by requiring less energy consumption. He listed the New Mexico Small Business Assistance Program, an NSF small business innovation research grant and the Arrowhead Center's LAUNCH program as critical resources for commercialization of his product.

Responding to questions from the committee, the panelists acknowledged that getting to market requires being business savvy and that partnerships with commercial institutions through the Arrowhead Center allow a broader reach for research applicability and provide a direct link to commercial industry. They also highlighted the importance of interdisciplinary teams for patent protection, marketing and the different stages of commercialization.

Responding to a question regarding the impact of increasing average annual temperatures on his product, Dr. St. Hilaire explained that while some tree species lose drought resiliency with higher temperatures, the Mesa Glow is resilient in a wide variety of western latitudes. He also mentioned that Mesa Glow was tested to ensure that it will not become invasive like the Russian olive trees, which have taken over much of New Mexico's natural bosques.

Recess

The committee recessed at 3:35 p.m.

Tuesday, September 26

Reconvene

Representative Sweetser reconvened the meeting at 9:07 a.m.

CenturyLink Cybersecurity and Connect America Fund Phase II

Katherine Martinez, director, legislative affairs, CenturyLink, presented the committee with an update on CenturyLink cybersecurity and the second phase of the federal Connect America Fund (CAF-II). Ms. Martinez highlighted some concerns surrounding cybersecurity and the importance of clearly defining an approach to cybersecurity through policy. She mentioned that hacking is an increasingly prominent risk, noting the recent political attacks, the surge in "hacktivists" and the risk to IP. She stated that hackers are costing consumers and companies about $400 billion annually. She described hacking as a highly lucrative field in which the criminals are rarely caught. She noted that the website informationisbeautiful.com is a useful tool to track breaches. She also noted that New Mexico was one of the last states to pass a data breach notification act but did pass House Bill 15 during the 2017 regular session. She suggested that the state consider allocating funds for cyber resilience. Cyber resilience is an evolving perspective that brings the areas of information security, business continuity and organizational resilience together, allowing an organization to continuously deliver services despite adverse cyber events. Ms. Martinez also recommended that the state hire a CISO to oversee cybersecurity concerns for the state.

Ms. Martinez emphasized the importance of looking at the whole "ecosystem" behind cyber attacks by looking at the third-party software and other partners for potential breaches and not just looking at the internet service provider (ISP). She also advised the committee to consider future partners to help deal with the aftermath of an attack, as rapid response is crucial. She acknowledged that a major focus for CenturyLink is to work with its customers to learn how to best protect against attack rather than just respond after an attack. Ms. Martinez cited the cybersecurity framework endorsed by National Institute of Standards and Technology as a successful model for other states. She also stated that her company went from handling 20% of the world's internet traffic to handling over 50% after merging with Level 3.

Next, Ms. Martinez provided an update on CenturyLink's broadband initiatives. From 2011 to 2016, CenturyLink upgraded broadband capabilities to 25 megabit download speeds for more than 265,000 subscribers in New Mexico, a number that compares on a population basis to other rural states. She addressed CenturyLink's concern that the $5 million of annual funding to the State Rural Universal Service Fund established by Senate Bill (SB) 308 from the 2017 legislative session is less than other states are investing. The targets for use of the fund are underserved areas where the broadband services offered do not meet the established minimum speed requirements. SB 308 does have reporting requirements that will allow for a review of the

efficacy of the fund, Ms. Martinez said. The Public Regulation Commission establishes rules for broadband service.

The CAF-II areas are mainly located in the far western and far eastern regions of New Mexico and are defined by the FCC, not CenturyLink, Ms. Martinez noted. Under the CAF-II, $11 million was allocated to service providers to expand broadband services in New Mexico. She noted that CenturyLink has upgraded 40% of its subscribers, including 10,500 living units and businesses, with download speeds of 10 megabits and uploads speeds of one megabit. She acknowledged that the last legislative session was very productive in advancing broadband access across the state through legislation that provides for keeping trenches open during road construction to allow for CenturyLink and other ISPs to lay wire, which cuts costs for the company and allows more resources for expanding coverage. For the upcoming legislative session, she suggested establishing a broadband tax deduction, noting that it is working in other states.

In response to questions from the committee, Ms. Martinez stated that CenturyLink is working to form partnerships with state universities like the New Mexico Institute of Mining and Technology and NMSU to improve statewide cybersecurity. She elaborated on the legislation that amended the Local Economic Development Act to allow ISPs to avoid conflicts with the Anti-Donation Clause of the Constitution of New Mexico when combining public road work and private infrastructure by simply requiring road construction crews to leave trenches open for conduit and fiber placing.

This "open trench" policy ultimately reduces the cost to the ISP of laying fiber by nearly one-half, and it allows the entities to work together for better broadband coverage. In response to a discussion about a broadband tax deduction, Ms. Martinez stated that a more realistic goal within the state's current tax structure is to have low tax rates and broad-based tax liability. When asked if the goals for download and upload speeds are adequate, Ms. Martinez stated that they are, based on the FCC standards for the CAF-II. The standards were incorporated in the bill language during the last regular legislative session and mainly target households rather than businesses. The new CAF-II requirements are increasing to 25 megabit download speeds and three megabit upload speeds. She said that Google fiber gigabit technology is unnecessary for the average user. She noted that ransomware concerns are encompassed in the current policy.

Moving New Mexico Toward 100% Clean, Renewable Energy

Tom Solomon, co-coordinator, 350 New Mexico, outlined the mission and concerns of the nonprofit organization, which is named after 350 parts per million (ppm), the threshold for a safe concentration of carbon dioxide in the atmosphere. He described 350.org as an international group devoted to slowing, stopping and reversing climate change to prevent catastrophic weather events. Mr. Solomon noted that the current renewable portfolio standard (RPS) for New Mexico has set a goal of reaching 20% renewable energy production by 2020, and Mr. Solomon stressed that the RPS should be extended. He stated that there will be no impact on oil jobs or oil revenue in the shift to clean electric power sources because oil is not used in New Mexico to generate

electricity. He also cited a poll by Pew Research Center that shows that 86% of adults surveyed support expanding the use of solar and wind energy.

Mr. Solomon stated that over the last 800,000 years, carbon dioxide has risen two ppm per year. He cited a study by Dr. Charles Keeling that predicts an increase in atmospheric carbon dioxide to 450 ppm by 2035, which would result in a two-degree Celsius warming. He said that each of the past three years has set a new record for global peak temperature and that 2017 is predicted to follow this trend. Recently, 195 countries signed the Paris Climate Accord and committed to reduce emissions to avoid the 450 ppm level. Mr. Solomon attributed a worldwide increase in wildfires, drought, massive hurricanes and famine to global climate change. He listed a number of negative predictions relating to the changing climate, including: a famine crisis reaching 60% of the world's population by 2060; the extinction of 90% of the world's coral reefs; and an increase in the sea level of three meters.

Mr. Solomon stated that the top priority of 350 New Mexico is renewable electricity. He said that the burning of coal and natural gas for electric energy production is the largest source of carbon dioxide emissions nationally, followed by carbon dioxide emissions from transportation. Since the early 2000s, the annual share of U.S. electricity production from coal has declined and is being replaced by natural gas and renewable energy. In New Mexico, 63% of electricity is generated by coal, 28% by natural gas and about 9% by renewable sources. He encouraged enacting legislation similar to SB 312 from the 2017 regular session to amend the Renewable Energy Act in order to extend the RPS requirements beyond 2020 and increase the requirement for renewable energy by 3% per year, reaching 50% by 2030 and approaching 100% by 2050. He noted that the Renewable Energy Act made New Mexico a national leader for renewable energy, but, now, 10 states have standards that are significantly higher than New Mexico's. He emphasized the opportunity for New Mexico to capitalize on its natural advantages in solar and wind energy to reclaim this leadership role. He said that the state's goal should be to increase its energy portfolio to 50% wind, 40% solar and 10% geothermal, based on recommendations from The Solutions Project at Stanford University.

In order to reach the proposed RPS requirements, New Mexico would have to install an average of 200 megawatts per year from 2021 to 2050. He stated that this proposal would cost $178 million per year, which amounts to 9% of the state's electricity revenue and would pay for itself in roughly 10 years. He also emphasized the significant cost reduction in both wind and solar power production over the past seven years, stating that costs have dropped 66% and 85%, respectively. He stated that New Mexico currently has 2,929 jobs in the solar industry, reflecting a 54% growth rate in 2016 alone. By extending the RPS, New Mexico will need to add at least 1,000 new solar jobs by 2021. Lastly, Mr. Solomon mentioned that New Mexico is one of only three states that lacks wind turbine manufacturing.

In response to questions, Mr. Solomon stated that there is little room for error or interpretation in the studies relating to increasing carbon dioxide levels. He said that 97% of climate scientists agree and 99.9% of climate papers support the theory that human-caused

climate warming is happening now. When asked about the impact on communities in New Mexico that depend on coal, Mr. Solomon noted that regardless of changing the RPS, coal plants are closing nationwide because coal is being out-competed by natural gas, and coal jobs have been declining for decades. He said that despite not having adequate storage capabilities to utilize stored solar energy for nighttime needs, wind is always blowing somewhere in the country and can offset that demand. He also noted that there are currently great advances happening in "grid-scale" battery research by Tesla, Inc.

Integrated Resources Planning — Transforming to a New Energy Balance for New Mexico

Sayuri Yamada, director of government affairs, Public Service Company of New Mexico (PNM), Carlos Lucero, government affairs, PNM, and Matthew Jaramillo, federal and state government affairs, PNM, discussed the plans for PNM as it celebrates its one-hundredth year of business. Ms. Yamada said that by 2022, PNM will close its remaining two coal plants operating in San Juan County. She said that the company is working with representatives from Farmington to ease the transition. She mentioned that the company has donated $750,000 to 62 nonprofit organizations, such as Luna County solar projects, Santa Fe STEM programs and the Adelante Development Center, to assist the labor force transition to other energy-related jobs. Ms. Yamada described the current time as the "energy tipping point" between traditional and sustainable energy sources. She acknowledged that this transition must be tackled at the local, state and private levels and that PNM is committed to protecting the environment for future generations.

In response to questions, the panel stated that PNM has put forth an Integrated Resource Plan for 2017 that outlines the transition from coal to renewable energy and natural gas. The investments in new infrastructure will translate to costs to the consumer, so PNM is seeking to balance affordability and sustainability. Although New Mexico is geographically ideal for nuclear energy generation, PNM does not see it as a necessary investment. The base load need is already being met by the Palo Verde Generating Plant in Arizona, and the baseload need in New Mexico has also declined due to declining population, technology advancements and the 2007 Efficiency Program Rebate. The panel members noted that there are several wind companies already in New Mexico, but these companies are generating energy to be exported to other states such as Arizona and California. They stated that PNM no longer buys excess energy from homeowners that invest in solar panels for their homes.

Adjournment

There being no further business before the committee, the committee adjourned at 12:10 p.m.