**MINUTES**
**of the**
**SECOND MEETING**
**of the**
**SCIENCE, TECHNOLOGY AND TELECOMMUNICATIONS COMMITTEE**

**July 8-9, 2019**
**Mesalands Community College**
**Tucumcari**

The second meeting of the Science, Technology and Telecommunications Committee (STTC) was called to order by Representative Debra M. Sariñana, chair, on July 8, 2019 at 10:07 a.m. at Mesalands Community College (MCC) in Tucumcari.

**Present**
Rep. Debra M. Sariñana, Chair
Sen. Michael Padilla, Vice Chair
Rep. Christine Chandler (7/8)
Rep. Kelly K. Fajardo (7/8)
Sen. William P. Soules
Rep. Linda M. Trujillo

**Absent**
Sen. William F. Burt
Rep. Daymon Ely
Rep. Jason C. Harper
Sen. Mark Moores
Sen. Bill B. O'Neill
Rep. Melanie A. Stansbury

**Advisory Members**
Sen. Craig W. Brandt
Sen. Carlos R. Cisneros
Sen. Nancy Rodriguez
Sen. Bill Tallman

Rep. Abbas Akhil
Sen. Jacob R. Candelaria
Sen. Ron Griggs
Sen. Richard C. Martinez
Sen. Mary Kay Papen
Sen. William H. Payne
Rep. Joseph L. Sanchez
Sen. Peter Wirth

**Guest Legislators**
Rep. Jack Chatfield (7/8)
Sen. Pat Woods (7/8)

(Attendance dates are noted for members not present for the entire meeting.)

**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 and are posted on the legislature's website.

**Monday, July 8**

**Welcome and Introductions**

Representative Sariñana welcomed the committee and invited members of the committee and staff to introduce themselves.

**MCC Welcome and Overview of the North American Wind Research and Training Center (NAWRTC)**

Dr. John Groesbeck, president, MCC, Jim Morgan, director, NAWRTC, MCC, and Andy Swapp, instructor, Wind Energy Technology, MCC, welcomed the committee to MCC and highlighted some of the degree and certificate programs offered at the college. Mr. Swapp emphasized the benefits of the Wind Energy Technology Program, which provides students with unique, hands-on experience working on the fully operational wind turbine located on the campus. The program currently provides training to 300 to 500 technicians per year. Dr. Groesbeck told the committee that he considers the college to be a logical choice for a new center of excellence in New Mexico's higher education institutions — the "Center of Excellence in Wind Energy". Mr. Swapp shared that the college collaborates with utility companies and landowners to expand the training program and the wind energy industry in general.

Dr. Groesbeck went on to list some of the other programs available to students at MCC, such as bronze casting and silversmithing, animal science, agribusiness and natural sciences, among other academic and career technical courses. He mentioned the MCC Dinosaur Museum, which displays fossils found in the area by students, local residents and paleontologists from all over the world who participate in "invited digs". The museum also displays bronze castings of fossils made by students at the college. He noted the college's nationally recognized rodeo team. He discussed MCC's efforts to reduce recidivism by providing training and educational programs to prisoners, mostly through online courses or video conferencing, in everything from automotive technology to wind energy. Dr. Groesbeck emphasized the importance of collaboration with nearby high schools to provide students with opportunities for dual credit.

Tucumcari recently suffered an economic downturn when the trucking industry declined, again leaving ranching and farming as the main economic drivers for the area, Dr. Groesbeck said. He shared that the state provided funding to MCC for job creation and workforce training through the University Research Park and Economic Development Act. This act allowed the college to form the Mesalands Community College Foundation, Inc., a nonprofit entity with the objective of establishing and operating a research park in Tucumcari to attract private investors to help support college programs and services. He mentioned the Tucumcari Business Hub, which serves as a business incubator, noting the potential to expand MCC's Digital Business and Entrepreneurship Certificate Program and continue to create new programs, such as a certificate program for coding. He noted that the college is in the process of hiring staff for the Integrated Renewable Energy Technology Program, which trains students in integrated solar and wind

energy systems that link to battery arrays using microgrid controller systems. Dr. Groesbeck said that MCC would also like to expand research to include small hydraulic generating systems and pumped energy storage to create a portfolio of renewable, variable power production systems that will begin to rival current baseload power sources. He listed some of the college's stackable industrial technology credentials, such as electrical, mechanical, welding and composites. He discussed some of the work being done by MCC's student-run online media and communications company, in collaboration with counties, on marketing, tourism and videography. Mr. Swapp highlighted another collaborative effort in higher education, that MCC and Northern New Mexico College (NNMC) have linked NNMC's Electromechanical Engineering Technology Program with cross-training in wind technology at MCC.

Dr. Groesbeck described MCC as a place where learning meets doing, which should be the role of all community colleges. He discussed advancements in technology, the search for partners to engage in the process and the overall goal of creating economically viable programs that are good for the community, region, nation, world and environment.

Responding to questions from the committee, Dr. Groesbeck and Mr. Swapp stated that:

- the college annually certifies or graduates between 300 and 500 technicians through the Wind Energy Technology Program;
- all graduates and certificate holders easily obtain jobs, and a typical starting salary for a technician with a degree is approximately $45,000 per year;
- many start-up companies and wind farms, such as Diamond Energy, Xcel Energy and Pattern Energy, are eagerly seeking technicians that have hands-on training and industry-related education;
- with the goal of scaling up their programs, MCC is partnering with Clovis Community College to offer more broad courses in wind energy and is also developing a mobile training unit with hands-on and online class components;
- wind farms typically employ one technician for every 20 wind turbines;
- Xcel Energy is building a wind farm south of Portales;
- although MCC strives to attract New Mexico students to the Wind Energy Technology Program, the program attracts students from all over the world, and graduates from the program look for jobs everywhere;
- MCC is willing to expand outreach to colleges and universities across the state, such as New Mexico State University (NMSU), to increase awareness among New Mexico students about opportunities in the wind energy industry;
- community colleges must strive to keep up with the pace of technology and shifting student demand, since not everyone wants or needs a four-year degree; MCC also provides associate's degrees, certificates, re-education and career technical courses, with many classes offered online;
- the current funding formula for higher education institutions is based on credit hours and degree type and does not consider the full spectrum of education offered at community colleges like MCC, such as short courses, associate's degrees and technical certificates, but the funding formula constitutes only six percent of the college's funding;

- MCC does not currently participate in the New Mexico Established Program to Stimulate Competitive Research, known as EPSCoR, but the college would love to be invited;
- construction of turbines requires knowledge in digital, mechanical and electrical techniques, as well as the ability to work on and in structures more than 250 feet high; there is not currently a program at MCC that focuses on wind farm construction, and the majority of construction in the state is done by crews from California and Texas;
- MCC is working on restarting its building trades program, with components in project management, code compliance and scheduling, but currently only NNMC offers a Project Management Program;
- MCC is working on various partnerships to create a full-package wind energy training program, potentially with free housing and a guaranteed job offer after completion. Abandoned motels could be renovated as residence housing units;
- future capital outlay and general obligation bond requests will include money for more on-campus residency needs, rehabilitation of certain buildings, a student support services building and expansion of online degree courses;
- MCC was recently awarded a limited grant through an emergency fund to assist at-risk students with tuition, but additional state funding for community college students that do not qualify for tuition scholarships would be very beneficial;
- construction of hydroelectric canals is being considered in the Arch Hurley Irrigation District, which includes the Conchas Dam;
- MCC would be willing to explore a public-private partnership to recruit a wind turbine manufacturing company, and Roswell already has empty hangars with utilities and everything needed;
- the continued growth of the wind energy industry is limited by transmission capability, which is currently at capacity;
- the energy grid must be reconfigured in the future to allow wind to be a baseload power replacement, as less energy will be derived from coal;
- energy storage is still a major obstacle for the renewable energy market, and power stored is immediately used for transmission purposes; and
- northern New Mexico would benefit from the expansion of transmission lines to facilitate the sale of energy out of state.

**Department of Information Technology (DoIT) Project Dashboard Update and Plans**

Vincent Martinez, secretary, DoIT, explained the agency's Project Dashboard and updated the committee on the current "top 10" projects. Secretary Martinez shared that the bulk of projects in the top 10 list are currently in progress and that the total cost of these projects is approximately $390 million. The DoIT Project Dashboard provides a list of agencies, brief project descriptions and total cost, as well as issue, schedule, budget and overall status for each project. He highlighted the estimated number of projects and total cost over the past five years, in comparison to the number of closed projects and actual total costs. For fiscal year (FY) 2019, there were 96 projects estimated at a cost of over $600 million, and so far, 34 projects have closed at a cost of about $54 million. Secretary Martinez also provided a breakdown of the

number of projects and money appropriated for all agencies for FY 2019, totaling 45 projects and over $306 million.

In reference to the Computer Systems Enhancement Fund, Secretary Martinez compared the amounts requested and appropriated for the past few years and for next year, FY 2020, in which over $75 million was requested and about $50 million has been appropriated. He noted that these requests can be made through the online portal, where there are templates for requests. He described the oversight role of the DoIT in reviewing all requests for proposals and contracts. Secretary Martinez concluded with an update on current activity and plans for the department, including strategic planning by senior management; conducting visioning sessions and stakeholder analysis of the ideal future of the DoIT; hiring chief information officers and information technology (IT) leads and filling other department vacancies; developing education plans; improving communication between agencies, the legislature and the governor; rebranding the DoIT; and effecting business optimization and modernization.

Responding to questions from the committee, Secretary Martinez stated that:

- the top 10 list is designated based on project cost, but projects within each agency are prioritized rather subjectively, based on need;
- project cost includes consulting, development, implementation, hardware and software;
- the DoIT has oversight authority over larger projects;
- the DoIT has 213 employees when fully staffed but has a vacancy rate of 35 percent;
- the State Personnel Office project for a one-stop shop for document management and recruitment is now complete;
- there are currently 19 different cloud policies throughout various state agencies, but the DoIT has yet to develop a statewide policy and may end up serving as a "cloud broker" and managing clouds for other state agencies;
- the state could save some money if the independent verification and validation (IV&V) process for each project was brought in-house, whereas currently IV&V expenditures for larger projects range from 10 to 15 percent of costs;
- the legality of the Regulation and Licensing Department's (RLD's) project to implement digital signatures must first be evaluated and then the DoIT will begin the certification and planning phase of the project. Each agency will have the ability to opt out of digital signatures;
- the Human Services Department is working on its child support system and should collaborate with the RLD and others to ensure that licenses are not issued to people who are delinquent on child support payments;
- the DoIT is also in the process of developing enterprise policies for software as a service, infrastructure as a service and platform as a service, because currently its only enterprise policy deals with access by mobile devices;
- the Statewide Human Resource, Accounting and Management Reporting system, known as SHARE, requires hardware updates every four to five years and software updates as new versions are released;

- modules for the SHARE system have been purchased but not implemented, and the DoIT is looking to make the system more stable overall;
- vacancies at the DoIT are difficult to fill with people outside of state government because IT is a competitive field, and the same applicants tend to apply for every IT position;
- the DoIT should focus on increasing outreach and collaboration with universities and colleges to expand the pool of applicants;
- the DoIT recently filled 24 vacant positions;
- the Tourism Department is working on a "reasons to work in New Mexico" campaign;
- state and local entities continue to ensure interoperability of public safety components with the P25 standards, and the DoIT will continue to work with Bernalillo County on its public safety project over the next 18 months;
- the DoIT will develop a 10-15 year plan for communications, requiring about $150 million in capital expenditures;
- the DoIT is working with the secretary of state (SOS) on election security, as the SOS was appropriated $7 million for system security improvements, and other elected offices, such as the state treasurer and the attorney general, may also work with the DoIT on security issues; and
- the Human Services Department's Medicaid Management Information System Replacement Project was estimated to cost $150 million, is currently at $175 million and is expected to reach $200 million before completion.

There were requests by committee members for:

- a more detailed report on the status of the Children, Youth and Families Department's Enterprise Provider Information and Constituent Services system, known as EPICS; and
- the DoIT to start reporting original requests and final project costs with an explanation for any changes in cost and to make this available online to improve transparency.

**Minutes**

Upon a motion made and seconded and without objection, the minutes of the May 2019 meeting were approved.

**SunZia Southwest Transmission Project (SSTP) and Pattern Energy Group Inc.: Transmission and Renewable Energy**

John Ryan, executive director, SSTP, and Loralee Hunt, manager of project development, SSTP, provided the committee with a project summary and overview of SunZia. The SSTP is a joint partnership between New Mexico, Arizona and the federal government that involves two 500kV AC lines, spanning 520 miles, that will provide high-quality renewable energy generated by New Mexico wind farms to Arizona and California utilities. Mr. Ryan highlighted the strong wind potential in Torrance, Lincoln and Guadalupe counties. He shared that Pattern Energy is the anchor tenant on the current project, the first 500kV line, which is expected to begin

commercial operation in 2020 or 2021 and will enable delivery of 1,500 megawatts of renewable energy to western utilities. Ms. Hunt added that the SSTP also plans to connect with solar companies in the future.

Mr. Ryan noted that some of the proposed substation locations along this line, as depicted on the map provided in the handout, such as Deming and Lordsburg, will be linked to the Pinal Central Substation in southern Arizona. He also noted the difficulty in building out transmission lines, which typically takes about 10 to 15 years and includes the National Environmental Policy Act of 1969 process, which can take up to eight years to evaluate a single route. The panel provided a list of cooperating agencies that includes the United States Army Corps of Engineers, the State Land Office, the Arizona State Land Department and the federal Bureau of Indian Affairs.

Ms. Hunt provided an outline of the economic benefits of the SSTP to New Mexico, including benefits from construction and during operation. She noted that although legislation regarding industrial revenue bonds did not pass this session, SunZia is actively working with New Mexico Counties to return wind energy revenue directly to impacted counties. Since 2006, SunZia has spent $100 million on the project, completed federal permitting and acquired Bureau of Land Management right-of-way access. Ms. Hunt said that SunZia expects the first transmission line to cost about $850 million, and it is currently working to obtain right-of-way access on state and private lands in New Mexico and Arizona and a location permit in New Mexico.

Responses to questions and comments from committee members included:

- the industrial revenue bond legislation would give more authority over projects to impacted counties and would encourage construction of transmission lines in rural areas;
- Public Service Company of New Mexico (PNM) has a transmission capacity of about 3,000 megawatts, and the 500kV AC line, providing 1,500 megawatts of electric generation, would be sufficient to power the city of Albuquerque;
- the data on the economic benefits to New Mexico in the handout was provided by the Arrowhead Center at NMSU;
- SunZia adjusts project plans to avoid or minimize impacts on neighborhoods and areas such as the White Sands Missile Range and U.S. Air Force bases;
- although the Energy Transition Act sets a renewable portfolio standard that dictates a certain amount of renewable energy to be utilized within New Mexico, the majority of generated power will be transmitted out of state, but there is the possibility of localized use of more of this energy if PNM or El Paso Electric enters into a power purchase agreement with a renewable generating company;
- typically, New Mexico-based limited liability companies registered with the SOS act as subsidiaries of larger energy companies, such as Pattern Energy, and will enter into a power purchase agreement directly with a utility company;

- if the energy generated in New Mexico is only being sold out of state, New Mexico does not receive any gross receipts tax revenue because it is assessed where the electricity is being sold;
- thousands of jobs will be created during the construction phase of the SSTP, and 64 positions will be required for operations, so there will be a lot of initial job creation but not much growth potential;
- SunZia is seeking to enable the economic scaling up of wind-generated energy companies, such as Pattern Energy;
- SunZia is not a New Mexico corporation, but it does generate revenue for the state through personal income taxes;
- wind energy will compete with coal but probably not with natural gas;
- New Mexico has the potential of generating enough energy from wind to exceed the energy demand of the whole state; and
- there is potential for generation of 10,000 to 12,000 megawatts in the central New Mexico wind region.

**Leveraging Broadband in Eastern New Mexico**

Vince Tyson, chief operating officer, Plateau, Eastern New Mexico Region, discussed the history, mission and current projects of the cooperative. Formed in 1949 by local farmers, ranchers and residents, under the original name Eastern New Mexico Rural Telephone Cooperative, the telecommunications company provided service to 9,000 members, mostly in eastern New Mexico, Mr. Tyson said. In the 1980s, after federal court rulings dismantled larger telephone network providers, the cooperative was able to start its subsidiary operation, Plateau Telecommunications, and expanded to cover most of New Mexico and a portion of west Texas, filling in rural service area gaps that were neglected by larger companies.

Mr. Tyson explained that as a competitive local exchange carrier, this expansion to rural areas is still a central mission of the company, which invests about $5 million annually on further expansion in fiber-optic cabling, modern networking equipment and strategically located retail stores. The company-owned and -shared fiber-optic network now exceeds 5,200 miles. Plateau evaluates rural areas for potential expansion through a pre-qualification process and then develops the interest of consumers in those areas before expanding.

Mr. Tyson discussed the cooperative business model of Plateau, in which shareholders are the members, so the company does not seek to make a profit but rather seeks to provide broadband to the region at the lowest cost possible, while still maintaining good management and economic practices.

Mr. Tyson highlighted some of Plateau's current projects and future plans. He discussed the success of the Tucumcari Fiber to the Premises (FTTP) project in upgrading to 100 percent fiber throughout the Tucumcari market by using the cable television system purchased from Comcast. This purchase allowed Plateau to use existing infrastructure to provide gigabit internet service over fiber-optic lines and reduce the cost per home by overlapping fiber to existing coaxial cable. Plateau is currently providing customers up to one gigabit per second service for

$70 per month and provides service to 76 percent of broadband customers in the area with its FTTP technology.

Mr. Tyson discussed the "donut hole problem", in which rural communities are left unserved or underserved in areas outside urban overbuild areas and Plateau's service range because the return on investment is typically too low. The next generation of technology, commonly referred to as 5G, is beneficial for urban areas, but the distances are too great to serve rural areas. Mr. Tyson mentioned that Plateau applied to the United States Department of Agriculture ReConnect Loan and Grant Program as well as the Public Regulation Commission's 2019 Broadband Program Support from the State Rural Universal Service Fund, with the goal of addressing the donut hole problem in more rural communities.

In response to questions from the committee, Mr. Tyson shared that when schools in rural areas build out their broadband capability, it creates demand from surrounding businesses. He also responded that local entities might have difficulty in understanding or taking advantage of legislation passed in 2019 to expand access to broadband.

**Recess and Tour**

The committee recessed at 3:30 p.m. for a tour of the Grady Wind Farm in Curry County, led by Adam Renz, business development manager, Pattern Development, and Crystal Coffman, business development director, Pattern Development.

**Tuesday, July 9**

**Reconvene**

Representative Sariñana reconvened the meeting at 9:08 a.m.

**Electric Vehicles (EVs) and Oil Demand**

James Peach, Ph.D., professor emeritus, Economics, Applied Statistics and International Business Department, NMSU, discussed the proliferation of EVs on the market and the potential effect this will have on oil demand and prices.

Dr. Peach began with a brief history of the electric refrigerator, cellular phones and internet access to highlight how the pace of technological innovation diffusion has increased. The diffusion of EVs is also likely to progress rapidly, he said, which could impact oil and gas demand in the near future. He then provided the committee with data on the number of cars and light trucks in use, the average number of all vehicles sold each year, the average life of such vehicles and the number of EV sales in the U.S. and worldwide. He noted that as of June 2019, approximately 0.4 percent of light vehicles in use in the U.S. were EVs, and he said that EV sales in the U.S. increased by over 80 percent between 2017 and 2018. Although there was a 20-percent increase in EV sales in the first six months of 2019 compared to the same period in 2018, Dr. Peach said that the federal tax credit will soon be reduced by one-half, which will likely slow purchases of EVs.

Dr. Peach went on to mention some of the constraints on the growth of EV sales, such as maximum driving distance between charges, high cost, production issues, battery cost and performance, charging times and limited choice in EV models. Despite these constraints, though, the market is adapting, and Tesla and almost all other auto and truck manufacturers and numerous start-up companies are unveiling new models of EVs, at more competitive prices, with longer driving ranges. Dr. Peach acknowledged that EVs are likely to contribute to the peaking of oil demand, the point at which our historically ever-increasing oil consumption will start to decrease. He cited multiple studies that sought to predict the point at which peak oil demand will occur and whether the cumulative effects of EVs will change that point. One study cited found that EVs may have reduced U.S. gasoline consumption by 0.1 percent in 2017, but Dr. Peach noted that until EV sales exceed sales of internal combustion engine vehicles, a decrease in gasoline demand is unlikely. He added that there are many uses for oil other than motor gasoline, so even if a 20 percent to 40 percent growth rate in EV sales occurs, oil demand will definitely not be impacted by EVs in the next five to 10 years.

Dr. Peach then went on to discuss policy implications of the increase of EVs in use. Noting the need to compensate for the loss of gasoline tax revenue, he suggested either implementing a tax or user fee on EVs, which has been adopted by 17 states so far, or increasing the per gallon gasoline tax, which 16 states have already done this year. He acknowledged that regardless of EVs, New Mexico needs to diversify and create revenue stability with less reliance on the volatile oil and gas industry. He suggested that New Mexico facilitate EV use by: equipping state parks, museums and rest areas with EV charging stations, which could generate revenue through fees or simply be used as another tourism advertising attraction; collaborating with federal agencies to ensure national parks and monuments have charging stations; requiring private-sector tourist destinations and hotels to install charging stations; and purchasing EVs as part of state and local government fleets and installing charging stations at state buildings.

In response to questions from committee members regarding the State Road Fund, Dr. Peach stated that if the state increased the gasoline tax, which is well below the national average, each one-cent increase would generate roughly $14 million per year that could be used to maintain state roads and highways. He noted that the advent of autonomous vehicles will put more people on the road that otherwise would not drive and that these vehicles will predominantly operate on electricity but will damage roads as much as gasoline-powered vehicles.

Responding to further questions, Dr. Peach shared that there is a mix of publicly and privately funded charging stations across the country and that New Mexico is far behind other states in the number of charging stations. He said that Connecticut is one state that is including charging stations as part of state road planning. He also said that installation of a charging system in a private home costs roughly $1,000, whereas in a public space it would cost around $1,500 to $2,000.

As the variety of EV models increases and battery technology improves, EV sales will continue to increase, but Dr. Peach cautioned the committee to not be overly optimistic, as lithium batteries contain 15 percent cobalt, which has a highly volatile market. He shared that

the electric truck designed by Rivian claims to be capable of pulling up to 5,000 pounds. He said that some rental car companies are starting to carry plug-in hybrids.

**Using Technology in Agriculture Research to Discover New Scientific Knowledge**

Leonard Lauriault, superintendent and forage crop management scientist, Agricultural Science Center (ASC) at Tucumcari, NMSU, discussed the projects and research being conducted at the ASC at Tucumcari facility. Noting that there are many higher education institutions in the state with a variety of missions, Mr. Lauriault shared that NMSU focuses on agricultural research and education, with range, crop and livestock research stations throughout the state. He emphasized that the Tucumcari site has been in continuous operation since 1912 and has the most diverse research programs of all of NMSU's research facilities. Mr. Lauriault said that the ASC at Tucumcari conducts locally driven, globally relevant research to improve food security, enhance agricultural profitability, stimulate economic development, protect natural resources and improve the overall quality of life for New Mexicans.

Mr. Lauriault shared that in 2018, faculty at the ASC at Tucumcari produced 20 research publications, made presentations to statewide stakeholder groups and regional, national and international scientific audiences and co-advised five graduate students. He discussed the various programs at the ASC Tucumcari and their economic value to the state, such as feed efficiency testing that is estimated to have increased the value of New Mexico's beef cattle industry by over $800,000 annually; alfalfa variety testing that could increase revenues by $38 million for the industry; and strip tillage for corn that is estimated to result in an additional $12.9 million in revenue versus conventional tillage. These ongoing programs have been developed to meet NMSU's College of Agricultural, Consumer and Environmental Sciences Pillars for Economic and Community Development. In order to meet these pillars, Mr. Lauriault said that the goal of the ASC at Tucumcari is to secure recurring legislative funding to:

- evaluate the potential of using treated municipal wastewater for agricultural irrigation;
- address rangeland sustainability in eastern New Mexico; and
- discover new crop options for small farms with limited resources, particularly water.

Mr. Lauriault also discussed the need for capital outlay funding to replace, upgrade or construct facilities to meet the demands of ongoing and new programs and to address several program enhancements for the Tucumcari area, such as semiarid cropping systems; soil-plant-water quality-environment relations; range improvement, restoration and riparian issues; and small landholders horticulture. Funding will be needed for new Ph.D.-level faculty researchers, support staff and operations, and Mr. Lauriault provided estimated amounts of recurring and nonrecurring funds that would be required for these programs.

Mr. Lauriault provided the committee with a list of the ASC at Tucumcari's many current and recent partners and connections, including the City of Tucumcari, Quay County, Tucumcari Feed Efficiency Test, LLC and the Water Trust Board, as well as numerous universities around the world. He then went into further detail on the Tucumcari Beef Cattle Feed Efficiency Testing Program, providing a summary, objective, background and outcomes as well as

describing the ongoing expansion of the program to include water intake scanning of cattle to provide a genetic marker for breeding cattle that require less feed and water. He said that this program designates ASC at Tucumcari as the only facility in the country capable of evaluating both feed and water consumption.

Responding to questions from a committee member regarding the reuse of wastewater for agricultural irrigation, Mr. Lauriault stated that:

- the Department of Environment would have to issue a ground water discharge permit, but this process is proving difficult because regulations are stringent and the recycled wastewater cannot come in contact with any edible part of a plant, limiting the use of sprinkler systems and the irrigation of root vegetables;
- the U.S. has the safest food in the world because of strict standards and regulations;
- the Southside Water Reclamation Plant in Albuquerque would need upgrades to make the recycled water potable again;
- water is becoming increasingly scarce, giving rise to the need to find alternative sources; and
- advances in modern health care mean that there are many new issues involving chemical contamination in wastewater.

In response to further questions from committee members, Mr. Lauriault said that upper management at NMSU needs to put more focus on off-campus research facilities. He said that the ASC at Tucumcari needs legislative support because it is a statewide research facility that affects all parts of the state. He also said that it encounters some difficulty in implementing its research and getting farmers to adopt new techniques and practices because farmers have farmed in certain ways for generations. It generally takes two years for new techniques to be accepted in a new community, Mr. Lauriault said.

**Creating Technical Enterprises to Revitalize Agricultural Communities**

Robert G. Hockaday, engineer and president, Tucumcari Bio-Energy Company, provided the committee with an overview of the company and discussed some of its current projects. The mission of Tucumcari Bio-Energy is to enable agricultural communities to thrive and be sustainable by producing products in Tucumcari that can be exported to agricultural communities to solve problems of energy, food quality, diversity, waste, pollution and water scarcity. Acknowledging the struggles in the agriculture industry, the ever-worsening shortage of water and the expectation that high-altitude, arid climates will continue to get hotter and drier, Mr. Hockaday said that it is imperative that agricultural communities begin to adapt.

Tucumcari Bio-Energy strives to invent solutions for more productive and efficient agriculture in the midwest and southwest, and the company currently proposes to use cow manure as a source of methane and carbon dioxide for biogas production and greenhouse and aquaponics growing operations. Mr. Hockaday shared the company's plans to refurbish and reconfigure the abandoned ethanol refinery in Tucumcari to create a high-efficiency biowaste processing facility for manure, whey and garbage. He listed some of the advantages of this plan, which include reducing greenhouse gases from the decomposition of manure; reducing ground

water and aquifer contamination; providing a carbon-neutral fuel source that could serve as an alternative baseload source for solar and wind energy; providing an alternative source of income for farmers who can sell manure; and encouraging the development of low-water-use greenhouse and aquaponics systems.

Noting the challenge of persuading people to embrace new technologies, Mr. Hockaday suggested that with the right mix of capital investment, education and public outreach, these innovations could bring about positive change in Tucumcari. He also noted some of the advantages of being located in Tucumcari, despite the small workforce, such as plenty of open space, wind and sun, natural gas and carbon dioxide pipelines and a large supply of cow manure. Mr. Hockaday went on to discuss other innovative solutions being produced by his other company, Energy Related Devices, Inc. He highlighted two products: the first, a spatial mosquito repellant that has been in research and development for the past 12 years, comes in the form of a floor mat, wristband or clip-on for clothing and does not utilize DEET or require application to the skin; and the second, a photovoltaic mount system that is mobile and modular, can withstand hurricane force winds, improves solar panel efficiency by five percent and doubles the lifetime of the panels. The mount system utilizes recycled rubber tires for the base and is predicted to cost one-half to one-third of a conventionally charged utility backup system.

Responding to questions from the committee, Mr. Hockaday stated that these products from Energy Related Devices are currently being brought to market, but the company has had difficulty entering the market for the spatial mosquito repellant. He noted that the inundation of the market with Chinese solar panels has made solar energy a lot more competitive with fossil fuels, but that in the future he would like to see more production locally. In regard to assistance from the state, Mr. Hockaday stated that his firms have applied for the federal new markets tax credit and have invested $1.8 million in the community. He also mentioned that his companies are eligible for grant money through the New Mexico Small Business Assistance Program and have received $100,000 from Sandia National Laboratories.

**Adjournment**

There being no further business before the committee, the second meeting of the STTC for the 2019 interim adjourned at 11:46 a.m.