

DOE Best Practices for Energy Efficiency Energy Storage and Renewables

Please standby for real-time captions.

Hello, it is 2:00. Let's go ahead and get started. My name is Roosevelt Grant. Welcome to the webinar. We have quite a few folks participating, so the webinar will be limited to listen only mode. Today's webinar will be recorded. The recorded webinar, the slides and a transcript will be posted on the HUD exchange at a later date.

In terms of webinar instructions, please submit any questions you may have for the content or for technical issues through the Q&A box. We will monitor that and make sure we try to address as many questions as possible at the end of this webinar presentation. If you have technical questions, please submit those, again, to the Q&A box and our host will monitor those. Before I continue I would like to acknowledge Jo-Shani Clemmons, who is our host today. She has been instrumental in providing us with assistance. Thank you, Jo-Shani. With that, I would like to present our title, mitigating natural hazard risks in the energy sector, opportunities for HUD CDBG-MIT grantees to learn best practices for energy efficiency, energy storage and renewables. With that I would like to turn it over for a few comments.

Hi, everyone. Thanks for joining us today and thank you, Roosevelt. Again, my name is Jan Carpenter, the assistant director of policy for the disaster recovery and special issues division here at HQ in D.C. Thanks for joining us. We are glad we could all meet virtually to take up the first webinar in our CDBG-MIT webinar series. We are happy to have colleagues from FEMA. Those of you who don't know, Roosevelt Grant, who started the webinar today, he has been heading up the series. He is working on a detail with HUD in the disaster recovery and special issues division, so it has been great having him and his knowledge from FEMA and I think you will see how great these webinars are going to be in this series. It is a great focus on coordinating with other federal partners, so we are happy to have D.O.E. with us today and we will be working with other folks from FEMA on the rest of the series and other divisions. So I think you guys will get an interesting perspective throughout this webinar series. A little different than you would get from the HUD side. I think it is always good for you to hear from federal partners, especially, you know, with our CDBG-MIT funds and the unique aspect of those funds. So thanks for joining and I will throw it back over to Roosevelt.

Thank you, Jen. We will do quick introductions of the presenters. First I would like to introduce Krystal Laymon, with the U.S. Department of Energy. She serves in the office of energy efficiency and renewable energy. Which focuses on clean energy strategies for states, localities and she formerly worked at the U.S. EPA in the climate change division and the United Nations office of disaster risk reduction. So thank you, Krystal, for joining us today. We have Jana Ganion, who is with the Blue Lake Rancheria tribe in Northern California. She is the government affairs director and a nationally recognized leader in the field of energy efficiency and renewable energy. She helps to establish and implement the Blue Lake Rancheria tribe's energy strategy, including

reducing the carbon footprint, reducing the cost of energy and increasing resiliency. I would also like to introduce Mikayla Catani, with the U.S. Department of Housing and Urban Development. She is a specialist in policy under disaster recovery and special issues division. Thanks a lot. And my name is Roosevelt Grant, with the Department of Homeland Security and FEMA, on a temporary assignment to support the policy unit with disaster recovery.

We have a lot of ground to cover today in this webinar. First we will provide you with a background looking at CDBG-MIT purpose and goals. We will take a look at the Community Lifelines, particularly energy. We will look at other projects and CDBG-MIT eligible activities. We will look at examples of energy efficiency and renewable energy for disaster mitigation projects. We will take a look at energy efficiency and renewable energy best practices. We will take a look at the value of including energy efficiency and renewable energy in action plans. We will provide you with a summary and resources for your benefit going forward and lastly we will look at questions and answers. So with that, I would like to turn it over to Mikayla Catani.

Thanks, Roosevelt. So first we are going to get into the purpose of your CDBG-MIT grant. So, for us, mitigation is a unique set of funding for you all, in the sense that this funding really focuses on carrying out strategic and high-impact activities, to mitigate against disasters and reduce future losses. So this is where our grant differs from your typical disaster recovery fund that qualifies you in getting this mitigation grant. So first of all, all of your activities must meet the definition of mitigation. Mitigation is defined where activities are used to increase resiliency to disasters and reduce or eliminate the long-term risks of loss of life, injury, damage to and loss of property and suffering and hardships by lessening the impact of future disasters. Then you have your needs assessment, where you are identifying current and future risks in your most impacted and distressed areas. Your activities must be CDBG eligible or eligible through a waiver and alternative requirements. CDBG-MIT grants typically have the same eligible activities as CDBG-DR, as far as infrastructure, public services and economic revitalization. There are some differences, especially with the emphasis to increase resiliency and reduce risk. A big one is lowered to 50%, low- and moderate-income persons, rather than your typical 70% LMI benefit. Lastly, all activities must meet a national objective, which for the most part is the same as CDBG-DR. We did eliminate some of the national objective options. If you would like to use this national objective, you can always make that waiver request. Additionally, we have added two extra criteria for mitigation. The first one being that urgent need for mitigation. This is a little different than your normal urgent need because it is used in this forward-looking mindset. So if you plan on using this national objective, you need to address the current and future risks that you have identified, which were kind of already doing, anyways. Then secondly, how this activity will result in a measurable and verifiable reduction in the loss of life. Then we have also added covered projects, where Roosevelt is going to dive a little deeper into this piece, shortly. Again, for all of your activities to meet the national objective, you must show you have considered and planned for long-term operation and maintenance of your project. Then you must also show that

all of your activities are consistent and working together to mitigate risks. This is making sure that none of your projects will have an adverse effect in other areas. We are naming these by the requirement, but you are likely already taking this into account in your regular CDBG-DR program.

Next, this slide is showing a few of HUD's goals with the mitigation funding and really the policy objectives behind this funding. We are really wanting you guys to rely on data informed investments, especially where there have been repetitive losses, as well as building capacity to analyze and address disaster risk and update those hazard mitigation plans. There is also the piece where we are putting an emphasis on supporting the adoption of policies that reflect local and regional priorities, to have long-lasting effects in risk reduction. Then of course, maximizing the impact of these funds by encouraging leveraging and partnerships.

So, mitigation needs assessment. These are different than your typical disaster recovery needs assessment because you're looking at your current and future risk and then determining how and what you can do to reduce them, rather than filling a gap in your unmet need. So, these are risk-based assessments, where risks can be assessed both quantitatively and qualitatively through a variety of methods, but generally you are going to be looking at your hazards and comparing it to your community assets. So typically you will want to look at those historical patterns, as well as some of those scenario-based analysis. You can use these exercises to determine what your most significant risks are, as well as other significant vulnerabilities in your system and then use this information to determine what the mitigation strategies looks like. Another consideration when you're looking at those vulnerabilities are those indispensable services that can be affected during a disaster. When you figure out what your activities are that can help reduce those risks, it can really push the acceleration of the recovery following a disaster. So this can really be thought of as looking at those functions that are critical businesses. Essential government functions and other critical services to human health, safety and economic security. You can kind of look at FEMA's seven critical service areas or their lifelines. So with that, I will turn it over to Roosevelt, where he will go over FEMA's lifelines and transition us into energy and why this is so important.

Thanks. So, last October, FEMA published the National Response Framework and that framework updated information from FEMA on the importance of community lifelines, so the next few slides will address that in more detail. So, that national response framework was an opportunity for FEMA to provide recommendations to rapidly stabilize the lifelines after a disaster. At the highest level, lifelines can be described as the safest functions that allows you to function, to operate. These basic functions allow continuous operation of critical government and business functions and as Mikayla mentioned, they are essential for human health and safety and promoting economic stability. I know that Jana and Krystal will note some of this in their presentations later, but Community Lifelines and energy often intersect. There are seven lifelines. We have safety and security, food, water, sheltering. Health and medical. We have energy, which we will talk about in the next slide. We have communications.

Transportation. And then hazardous materials. One of the things I want to point out is that underneath each of these there are critical components for that particular lifeline. So, going from right to left, under transportation we have highway and roadway systems, mass transit, and aviation. For communication we have, for example, infrastructure, 911. For health and medical we have the healthcare supply chain. For food, water, and sheltering we have the distribution supply chain there. And agriculture. Safety and security looks at government services, fire service as well as law enforcement. I would encourage you to take a look at that October document FEMA published and it will have a lot more detail for your benefit with respect to Community Lifelines.

So, drilling down a little bit more here on energy lifelines. We have these three blue boxes. The power grid, temporary power and fuel. For the power grid there is power generation, transmission and distribution, impacted under that. Critical facilities fall under temporary power. The ability to have power is very critical to maintain operations. And having the right fuel resources to meet your needs for power generation is extremely important. As you look at these boxes and think through your risk assessment for your community, certainly you want to take a look at where are your vulnerable spots for your power grid. How can you develop mitigation activities to address that, or for power again, ensuring you have continuation of critical services, both before, during and after a disaster. It is entirely important. Clearly, making sure you have fuel resources to meet your needs is also important. We will get into a little more detail with that when Krystal and Jana take over the webinar. So again, more information, in-depth information about the Community Lifelines and in particular energy, I would encourage you to take a look at that October 2019 document on the National Response Framework, that will have more information on that.

I had an opportunity to spend some time in Puerto Rico after Hurricane Maria hit the island. One of the things that really struck me is how interconnected and how these Community Lifelines intersect, especially with energy. This slide illustrates that conductivity. So, thinking about power generation, transmitting that power. In the context of Puerto Rico, they had some long-standing problems with vulnerability for their energy lifelines. So, after Hurricane Maria hit, those vulnerabilities would certainly manifest in terms of communications. Government services was significantly impacted. The ability to move goods, the supply chain. Certainly, the long-term impacts from Maria were exacerbated by the failure of the lifelines to build a support the food, water, shelter lifelines, and clearly there is documented evidence of some of the impact of energy on health and medical. So, we are working with the island, FEMA, and other federal partners, both public and private, to bring a whole community approach to a solution to some of the challenges. But I wanted to bring attention to this slide. As you are thinking through some of the information that Mikayla talks about in terms of leveraging mitigation plans and incorporating that information into your mitigation needs assessment.

I focused a little bit on covered projects and then some eligible MIT activities.

So the definition for covered projects is an infrastructure project having a total project cost of \$100 million or more, with at least \$50 million of CDBG through either MIT, DR, or NDR funds. The U.S. Virgin Islands and Puerto Rico have a lower dollar threshold for covered projects. I wanted to give you a timeframe. From August 30, 2019, the Federal Register notice, there is a lot of great information in that notice, but I will just give you a very quick overview. Infrastructure projects are defined further as being an activity or group of related activities that are designed to provide and support services in various sectors, such as water, energy, and transportation. Other considerations for covered projects. Grantees must submit the covered project in an action plan or a substantial amendment to the action plan. Covered projects must meet the definition of a mitigation activity. They must be eligible under CDBG. They must, as Mikayla has noted, covered projects must address current and future risks. Again, identified in a mitigation needs assessment. The action plan must also describe how the covered project will meet the national objective. Examples include looking at the long-term efficacy and sustainability aspect and doing that will entail looking at the life of the project, addressing operations and maintenance. The project will need to have some form of cost-benefit analysis and the project needs to be documented as being consistent with other mitigation activities that are most impacted in an area. So again, for more context, more information on covered projects, I recommend you take a look at the August 30, 2019 Federal Register notice and then there was a webinar to look at CDBG-MIT requirements and also covered projects related to that August, 2019, Federal Register notice. There are some eligibility allowances for covered projects. Particularly energy products. Here we have examples of green building standards, such as energy Star, LEED, and the national building standard. Other considerations include distributed energy resources. Micro grids, solar and storage, and Krystal and Jana will cover those in more detail. One other thing, we will have a webinar next month that will look more into resilient buildings and leveraging energy efficiency and renewable energy for that. Krystal will get into that in her presentation, but in terms of being able to leverage energy efficiency and renewable energies, these technologies benefit shelters, schools, hospitals, police stations and other critical infrastructure as defined by grantees in their action plan. So with that, let's go ahead and move forward and I will turn it over to Krystal. Thank you.

I'm going to do a quick sound check, so Jo-Shani can give me the green light. Can you hear me okay? Perfect. Okay. My name is Krystal Laymon, a policy advisor at the office of energy efficiency and renewable energy at the U.S. Department of Energy. Thank you to my colleagues for inviting me to speak today. During this presentation I will be showcasing various examples of energy efficiency and renewable energy projects that have been funded by the U.S. Department of Energy to mitigate national disasters. I will also highlight the value of energy efficiency and renewable energy and share examples of how CDBG-MIT grantees are already using energy efficiency and renewable energy in the required CDBG-MIT action plans.

Roosevelt briefly mentioned this. This is one part of a D.O.E. webinar series. Those interested should consider participating in the future energy webinars.

Before I dive in, I wanted to give a high-level overview of the U.S. Department of Energy and where my office sits. There are many different offices within the Department of Energy and the information I will be presenting comes from the office of renewable energy, highlighted on the screen.

The office of energy efficiency and renewable energy includes various technology topics, with the vision of supporting a strong and prosperous America powered by clean, affordable and secure energy. In particular, the weatherization and intergovernmental office supports a program called the state energy program, also known as SEP. SEP is a program that provides funding and technical assistance to 56 states, territories and the District of Columbia to enhance energy security, advanced state led energy initiatives and maximize the benefits of increasing energy efficiency. D.O.E. primarily works with the states designated energy office and has seen state led efforts to increase resiliency. I will talk through examples of two resiliency projects. One in Puerto Rico and one in Florida. Both funded by SEP. To receive SEP funding, the program requires state energy offices submit an annual plan to DOE that reflects energy emergency activities the state is planning to undertake for the fiscal year. States can use SEP formula grants formulated to develop and execute plans related to energy.

My first example will cover how Puerto Rico responded after a major disaster and decided to utilize energy efficiency and renewable energy to respond and mitigate against disasters. Hurricane Maria, a category four hurricane, made landfall in Puerto Rico in 2017. These storms brought powerful wind, storm surges and major flooding. The Puerto Rico electric power authority, the utility and Puerto Rico, reported over 1 million of its electricity customers were without power immediately after Hurricane Maria. In the aftermath of Hurricane Maria, Puerto Rico began developing a residential energy resiliency solar program, for its residents and communities. The objective of the program was not only to reduce energy consumption in the affected homes, but to establish resiliency for the families whose homes were affected by the hurricane. In 2018, a total of \$239,000 of SEP funds were invested into this program. Each of the PV systems installed in the homes cost about \$12,000. As part of the installation, components included PV modules, module racks, charge controllers, inverters, and of course, battery storage. Puerto Rico created selection criteria for the program to determine which homes can participate in the project. To participate in the project, homes had to be previously weatherized by the weatherization program. Located out of flooding zones. Located in areas of extreme vulnerability in the energy grid. Been without power for more than 60 days and agreed to voluntarily send monthly electricity bills to be evaluated. This project contributed to energy resiliency within Puerto Rico by creating security in the home when families need to shelter in place during the disaster response. In addition, the project will help mitigate future disasters by maintaining reliable power.

With 2.7 kilowatts for each home, the project provided 54 kilowatts overall for the 20 homes selected for the program. A reduction of an average of 10 to 15 kilowatt hours per month has been recorded on the project, per home. As part of the qualitative assessment, Puerto Rico has asked participants about the benefits they have seen since having the system installed. Most participants answer that they feel safer having electricity in the event that a natural event may occur. In two cases, where elderly people lived in the home, they commented that the project was a relief. This provided reliable power to the homes, especially when families needed to shelter in place during a disaster. This project was recently highlighted through a joint webinar which illustrated that FEMA benefit cost analysis made it eligible for FEMA's upcoming bills building resilient infrastructure in communities, which will be focused on mitigation. You can find this webinar on the FEMA and DOE websites, respectively. Many renewable energy projects are eligible because it meets requirements, is a cost-effective technology to mitigate against disasters.

This next project came from Florida's interest in becoming more resilient in a natural disaster and strengthening the committee community by installing solar panels at schools. When a disaster strikes, people may need to leave their homes or seek a resource that is open to the community. Keeping these facilities online with power is essential. The project, called SunSmart e-shelters, cost approximately \$9 million to complete the education and provide solar kits. Florida successfully outfitted 117 schools with solar systems throughout the state. The total capacity installed was about one megawatt, which produced an average of 12 megawatt hours annually. The project installed module systems that can operate either grid connected or in a standalone mode and use battery storage. The key difference in the system is the inverter set up, which draws direct-current power from the battery system, instead of from the solar array.

In addition, when the school is not used as a shelter, the project became a teaching tool for teachers and students alike to learn about renewable energy technology, as you can see from this photo.

The project was put to work during four different hurricanes. For example, in 2017, once it became clear that Hurricane Irma was headed to Florida, the state moved into action. 40 SunSmart school e-shelters were activated. Even when 32 of the schools lost power, they utilized the battery backup generator and stayed online. The solar system provided more than 10 hours of power until the grid was fully restored. It is a successful story of how renewable energy, plus storage can be used to mitigate a disaster. These systems provide power during emergencies, as well as offset day-to-day electricity costs. The primary goal of this project was to provide adequate shelter for Floridians in the event of a disaster. However, complementary benefits are seen, too. The SunSmart program has an energy cost savings for the school and has successfully taught students and teachers about renewable energy technology.

With that, those are my two examples, I will pass it to Jana Ganion from Blue Lake Rancheria tribe.

Thank you, Krystal. This is a quick microphone check. Everybody can hear me okay? Can everyone hear me okay?

Yes.

Okay, thank you. Sorry about that. So I am delighted to be joining this discussion. It is super exciting, and I hope that you are all as well and as healthy as possible as we deal with this COVID-19 pandemic. It hit tribal nations hard and we are all working to manage the impact, which of course are on top of long-term infrastructure deficiencies in tribal lands, from decades and decades ago. So my presentation today will hopefully be a bit of a break from all that and hopefully be of use to those considering micro grids as part of their energy resilience strategy. I will talk about strategic energy planning context that the tribe has used and developed, because it is key to the investment and other decision-making by the tribal Council. That then allows us to do these projects. Then we will look at the details of the micro grid systems themselves and how they are all working, operationally and financially. And a little bit of a case study of performance in a recent disaster. So, just to get started on a sense of place. The Blue Lake Rancheria tribe is located in far northwestern California. It is rural and geographically pretty isolated. The tribe was first recognized in 1908. Terminated for a period of time in the 60s, 70s and 80s and restored in 1983. Since restoration, it has been rebuilding and today has a portfolio of economic enterprises and is one of the top 10 largest employers in the region. Specific to energy, I think one key thing to note is the tribes formed the utility Authority in 2013 that manages energy, water, telecom, fuel, and other utilities for the community.

I am not going to go into detail here, but I want to highlight that partnerships and networking are core to the tribes resilience strategy. Though it is a small tribal nation, Blue Lake Rancheria is engaged in designing climate smart resilient policies and programs with other tribal nations and with the local, state, federal and international stakeholders.

I am going to talk for a few slides about our investment rationale. I will start with global and downscale from there. The tribes investment in infrastructure projects has the climate crisis at its core. There are data points locally on temperature increases and what impact we are seeing globally that are already causing extreme issues on the ground and the climate crisis and global warming temperature increases are accelerating.

The core consideration that the tribal government thinks about is that, you know, we have to coordinate and work together to de-carbonize the planet. We need to reduce greenhouse gas emissions and that is really one of the core tenants of our resilient strategy.

And why is that? Well, because global climate impacts and amplifies our local conditions. So we are already seeing amplification of dangerous and destructive issues on the ground, for example we are seeing wildfires where there has never been. We are in the midst of an ongoing drought that has lasted for a decade, even in the temperate, coastal regions of

Northern California. We are now experiencing regional power shutoffs that could last up to 10 days or even longer and these are necessary to prevent wildfire because of the dry conditions. And we are five miles inland from the Pacific coast in a temperate area, so again, historically we have never seen conditions like these.

Many of our typical issues are becoming more and more frequent. So, landslides are increasingly common. We are seeing supply disruptions and other supply-chain disruptions, multiple times per year. This includes, importantly, diesel shipments, which impact not only our transportation sector, but also backup generators. When you think about emergency power, the tribe can't rely solely on diesel for these needs.

Then Humboldt County has the fastest net sea level rise on the Pacific coast, because of climate change and geologic conditions. And this will affect our powerplant in 10 years and with it, a nuclear waste repository co-located on-site. So, when Roosevelt was talking about all of those overlapping issues that he saw in Puerto Rico, and probably all of you on this call have some combination of those in your own local area, as well. Lastly I will say we are in earthquake country. We can have very large earthquakes, so relying on infrastructure such as natural gas pipelines is not practical. Our region is served by one, 10-inch natural gas pipeline, that would very likely be ruptured, possibly indefinitely, in any zone earthquake event.

So why am I talking about this? Because it is important to get the context, so decision-making is really well-informed, of course. The Blue Lake Rancheria is building climate smart infrastructure as fast as possible. The benefits are proven and include more resilience in the face of unexpected disasters. They result in better community health. There are economy enabling benefits. These infrastructure investments reduce cost, increase skill sets within the tribal staff, create new jobs for tribal members and regionally, and generally contribute to the economic activity in the region. Micro grids are part of our lifeline strategy. We focus on five of those. Energy, water, transportation, communication, and food. With the idea that if we do all of those well, community health and wellness, including economic wellness, will be enhanced. And of course, the lifeline sectors overlap in many ways, as Roosevelt was saying, as well. However, we started with energy because it supports all the others. The tribe has developed specific plans and long-term strategies for this and those include, but are not limited to, a climate plan, a community economic development strategy and various hazard mitigations plans and other emergency plans. Our planning effort very concertededly involves government departments, tribal members and community, economic enterprises and an array of external stakeholders.

All of this is encompassed in our overarching goal, which is to achieve zero net greenhouse gas emissions by 2030. We do this by making our infrastructure more robust and reducing greenhouse gases at the same time. So we pair mitigation, which is reducing greenhouse gases, and adaptation, which is dealing with the impacts we are already experiencing. We pair those things always in our decision-making. It takes discipline at first, but once you get used to it, it is easy.

So, specifics about the microgrid. We have two solar and battery storage micro grids in operation, and we have two more in development. We are also looking at expanding the micro grids we do have, in terms of adding more solar and battery storage.

I will talk about the community scale first because it has been in operation the longest. This powers the government offices and economic enterprises, including a casino, hotel, several restaurants and other buildings, including an event center that is certified to operate as a Red Cross shelter in times of need. I want to make sure that I stress how we have worked to develop public/private partnerships for these projects. We work very closely with local universities, Humboldt State, and the energy research center there that provides engineering and other project assistance for these complicated micro grids.

Having an expert lead engineer for the project is crucial. If any of the listeners out there want more information on that, please email me and I will be happy to have individual conversations. The California Energy commission is a major funder and we have worked with over six national labs including Idaho national Lab and others on these projects. We also work with a broad array of federal, state and local emergency agencies. FEMA. The office of emergency services. Red Cross. Many others. We do this to coordinate and align resilience efforts with emergency planning, as well as normal operation planning. Our regional utility is Pacific Gas & Electric, PG&E, and they have been excellent to work with. The micro grid will be connected to the regional grid. I recommend establishing relationships with your utility partner or partners early and often. I cannot stress that enough. If you are going to be connected to their grid, there is a lot of safety information and benefit that can be realized by that kind of a strategic partnership. So, the micro grid is tied to the larger, regional grid, but it can disconnect from and reconnect to that grid when needed.

When it is disconnected, it is called being in island mode and when it is disconnected it uses 420 kilowatts of solar, photovoltaic, and two megawatt hours of battery storage, with legacy diesel generators that are used, only as needed, to generate the power we need in that community grid for as long as we need to. So we can go months at a time disconnected from the larger grid. It is a great feeling and it is a testament to how far these technologies have developed. The system is controlled by a centralized management system that allows us to control the event. To shed loads we don't need to conserve energy if we know the outage is going to be a long duration, et cetera. We save about \$20,000 per year on energy costs and reduce greenhouse gases by about 200 tons per year, as well. The other micro grid we have, to give another example of a different scale, the other one we have in operation is a facility micro grid. It is also powered by solar, PV, and battery storage. This micro grid is also a partnership between the extraordinary energy leaders we have at the local, state and federal level and within the tribal community and is meant to build up a resilience package for these kinds of small, commercial buildings, which do provide critical services for the community. Advanced building controls for this project are going to be working in concert with power generation and storage to improve the energy efficiency of the building and reduce cost to the tribe, allowing

as well for that capability for the larger grid and robust emergency power.

So, how is it working? Well, last October we had our first extended preventative power outage that was meant to prevent wildfires from starting from the electrical grid. This outage on October 9, 2019, impacted 30 counties and millions of people across northern California and lasted for multiple days. With the micro grid allowing for continuity of operations, the tribe was able to stay operational, keep businesses and services open and provide critical services to the community. Estimates are that we served over 10% of the region with our campus, providing supplies, and other services, like refrigeration to keep food and medicine cold. Electric vehicle charging. Most critically, we were able to provide housing in our hotel for people who needed powered medical devices. The Department of Health credited the tribe with saving for lives during this event and all of this was because we were able to keep the power on. And of course our office of emergency services had planned well, but that is a different discussion.

So, micro grids as solutions, they do create a lot of benefits, as we discussed. They are still bleeding edge technology, in that each will be somewhat customized for its site and power loads and operational needs. So, the complexity of the micro grid will need to be matched to internal capacity to build, commission and operate it. So we found, for example, that our I.T. teams were as involved as our electrical and facilities teams, because of the software and control systems and digital communications and other components that were necessary to bring the system online. It does save us money on electrical bills, however, operating a utility electrical system is a big endeavor. Some of the things that helped make that a success strategically is that the tribal government took a patient payback approach for the investment. It looks at a 10 to 20-year payback and the tribal government was prepared to fund contingencies for these projects. We value the microgrid in several ways. Obviously, continuity of operations is crucial, reaching our target. In normal operations. We want to reduce costs. It helps hedge against future energy cost increases. It clears the air and improves tribal member health. In emergency operations, it allows us to exert more control over our response and recovery, which is maybe one of the most important aspects.

So, this slide I guess, we don't have time today to go into project flowcharts, but this give some consideration for how to approach microgrids. I will stress the importance of an expert integration engineer or engineering team, again. Microgrids, as I said, are not out-of-the-box yet. So in feasibility, design and construction and for the lifetime of the system and operation and maintenance, the internal capacities will matter. As well as reasonable and affordable access to contractors and other service providers that will help maintain the system. Government and project structures such as the utility Authority, project management, other kind of business structures will be important to explore. Lastly, I will say that in our case, much of this has been addictive. It worked well, so we are immediately expanding them. One recommendation is to include phased expansion plans. Maybe adding more

solar, adding more battery storage. Include that right up front, so you are ready to go into phase 2.

Final thoughts are that by centering climate concerns and building as fast as we can, the tribe has seemed to arrive at the road right moment with infrastructure. In reality, the success here is a result of planning and moving as fast as possible to deploy climate smart solutions. By doing this, the tribe is creating a just, equitable transition to a climate smart community and that really is working in all of the ways we discussed. Socially and economically. All at the same time. I have also included in the slides that I sent, and maybe we can get those slides out to the participants today, but there is some microgrid development resources, links and further reading resources that, if they are not available in this particular PowerPoint, I can provide to anyone who is interested. Thank you so much.

Thank you, Jana. I will be speaking a little bit more on the value of energy efficiency and renewable energy in action plans. Jana provided great information on the value of microgrids, calling them addictive. The examples I gave from Puerto Rico and Florida showcase the value of energy efficiency and renewable energy. Next, I will walk through how valuable these technologies are. For those interested, they can be incorporated into the CDBG-MIT action plans. The energy sector not only powers our homes, but can help our critical facilities, such as hospitals, police, fire stations or shelters. More energy efficient building demands must power from the grid and can help the backup generator during an outage, which also allows for energy resources to be utilized elsewhere. Energy efficiency increases the viability of buildings and allows habitable conditions in the event of a heating or cooling system loss. Efficient buildings, especially those that incorporate higher energy building code standards will stay warmer in the winter and cooler in the summer. They allow individuals to shelter in place during an event, potentially reducing morbidity and fatality. It is particularly important for residential buildings and is also relevant for public buildings that might serve as community relief centers during an adverse event. It enhances resilience to outages because buildings need less power to run during an outage. The strategy is simple. When a critical public facility needs less energy to function, it also needs less backup generation on-site cooperate if the grid goes down. Energy efficiency improvements save money, especially by lowering energy bills year-round and it carries other benefits, including improved moisture, air quality, and can even decrease energy burden. My colleagues at the U.S. Department of Energy will host a webinar dedicated to this topic and provide more information on buildings and energy efficiency on June 18. Next I will discuss renewable energy. It is important to note that energy efficiency measures are very powerful in terms of complementing on-site energy generation, such as solar and storage. They can significantly reduce the necessary size and cost of installing backup power systems. It can also increase the reliability of existing backup power in servicing critical loads.

Renewable energy technologies can mitigate against natural disasters and also contribute to resiliency. Solar technology, paired with storage, allows the power system to be resilient against natural disasters. It provides backup power and can support critical services during outages. These services were listed by Roosevelt during the community lifeline's slide. Solar plus storage also allows for micro grid islands. Jana spoke nicely about it. It enables operations to provide power and reduce stress across the energy system. Using solar power to charge on-site energy storage offers facilities and homes the ability to continue to have power if the electricity grid goes down. There are other benefits of renewable energy, including low cost of solar electricity and decreasing energy burden, reducing health and environmental impact, and also deliver supplementary benefits, too. In addition, community solar can serve households, businesses, nonprofits and municipal sites. Integrating renewable technology into buildings and community centers serves as a measure to mitigate against power outages while also serving as an emergency in times of need.

The examples I gave on Puerto Rico and Florida are real-world examples of energy efficiency and renewable energy projects that we have seen that can increase resiliency and mitigate against a disaster. Before you have a project you need a plan, which is why we require CDBG-MIT action plans. There are two examples of plans that incorporate renewable energy and energy efficiency.

I believe it helps seeing examples of how peers are engaging in this space, in particular how peers are incorporating renewable energy into their action plans. Development of action plans is a Laird process, including public hearings and review and here are just two examples. The 2019 building energy efficiency standards require newly constructed homes to include solar. The city of Columbia, South Carolina, will promote high-quality energy efficiency construction for all activities funded with CDBG-MIT. These are just two examples that provide a nice snapshot on action plans and the energy lifeline. I want to make a note that it is important and those interested can visit the DOE website. DOE hosts a web-based tool called low income energy affordability data tool, also known as LEED, which helps identify low income areas in the nation down to the county level. With that, I will hand it back to Roosevelt to wrap up with a summary and takeaways of the presentation.

Okay, I would like to thank Mikayla, Krystal and Jana for your webinar presentation today and I would like to remind everyone that the webinar is being recorded and we will post the webinar recording, today's slides and a transcript onto the HUD exchange.

Just quickly trying to recap some of the wonderful things that were discussed, on slide 11 there was a discussion that looks at the mitigation plan and how that connects to the needs assessment. The mitigation plan covers hazard mitigation. Assesses those risks and allows you to develop a mitigation strategy. As you are building your action plan and looking at the mitigation needs assessment, you can leverage some of that analysis, in terms of vulnerabilities, and also developing a mitigation strategy. Then acquiring the funds to address those vulnerabilities. We talked about the mitigation needs assessment being

current and assessing risk and how that is a key component. We talked about community lifeline's and the basic functions necessary to allow a community to function. Then we talked about how these Community Lifelines intersect, particularly energy. Both Jana and Krystal noted that connection. Energy lifelines include power generation, the grid, backup power and fuel. A grantee looking at developing a mitigation needs assessment needs to assess the potential for vulnerabilities, especially after a major event. So, with that being said, Mikayla also talked about the four goals connected to CDBG-MIT. From here I would like to talk about the value of connecting energy efficiency and renewable energy in your action plans. For goal one, data informed investments to protect against loss of property. Both Krystal and Jana spoke to that. Krystal mentioned the Florida emergency shelters and also talked about the Puerto Rico resiliency energy projects. Jana mentioned the low carbon resilience package, which also certainly underscores the importance of solar and storage. The capacity to analyze disaster risk, that is what I can speak to in terms of the value of the mitigation plan, incorporating that into your mitigation needs assessment for your action plan. Jana spoke about the tribal resilience planning that they have done. And I think she also talked about the low carbon resilience project I mentioned as well. For goal three, looking at local and regional priorities that will have lasting effects on both risk reduction and promoting Community Lifelines. Again, the discussion that Jana had on micro grids provide some information on that. And also assessment about the use of solar. Lastly, goal four, which is encouraging public/private partnerships. Again, using some information from Jana, using a whole community approach to smartly leverage funding and looking at promoting the public/private partnerships. So we call that out in particular, in blue. Being able to pull that information in. Also, Jana spoke about the importance of connecting with facilities to ensure information sharing to build that strategic partnership. So, with that, I would like to quickly go through these resources.

[Captioners transitioning]

The team focus on last year in terms of being able to look at [Indiscernible] and some of those particular requirements. In particular Frank and Jen had webinar in September that focused on [Indiscernible] requirement that also covered [Indiscernible] there are number of FEMA resources here that we recommend that you can enter including days that focus on mitigation planning and looking into leveraging that vulnerability assessment to your mitigation need assessment of your action plan. We talked about the community lifeline that is contained in our national response framework. Here are several DOD energy efficiency and renewable energy resources. We have a fact sheet we have information for state and local leaders [Indiscernible] renewable energy. We have information on resilience and building buildings we have case studies. Again I want to thank Crystal, Jana, and Michaela for all of their information. We will be posting the slides a recording of the webinar in his transcript at a later date [Indiscernible] available to you. Here's some information you see in the blue and there is also an email to the hot policy you can ask questions at [Indiscernible] again DRSIPolicyunit.gov with that I would like to turn it over to Michaela for any possible question.

Hey everyone. We do not currently have any questions in our Crescent boxes so just reminder if you guys have a question type it in the chat box and we will do our best to get all of your questions answered so I will give a few minutes to see if we get questions coming in. Okay one of the questions that has been asked is, are there and energy benchmark for energy efficiency? Krystal do you want to take that one?

Yes. That's a good point you always need to do some sort of baseline when you are doing a project, so energy efficiency benchmarking is a way to do that. I believe that -- this is something that HUD can help correct me who may be able to [Indiscernible] funds to do that but we do it at the Department of Energy through different mechanisms in order to showcase the results of doing energy efficiency as I believe my DOE colleagues I will also cover energy efficiency much more in-depth but I encourage you to be on webinar as well.

Okay great thank you Krystal. It looks like we have another question for DOE that is asking for some information on battery storage options and standard.

That's a great question. I think Jana might be best to answer that because she was on the ground doing [Indiscernible] I will send it over to her.

I'm sorry will you repeat the question for me?

Yes. The question is, are there some battery storage options and what are typical standards for battery storage?

The standards question I think -- I'm not sure what the technical contact is for standards, but they type of battery technology that are available are -- we chose lithium ion batteries. We worked with Tesla and there are reasons for that within a micro grade -- grid. the batteries function for energy storage and dispatch really well. They have a good control system and interconnection with our Michael grid while it wasn't seamless we had some engineering and development work that we did with Tesla. They are a very robust with their up and running. They also had -- I guess for the purposes of comparing and contrasting they had 10-year warranty and a fairly and it's a fairly robust warranty in terms of annual maintenance and that kind of thing that was included. The other battery technologies there's all kinds of battery technology there's [Indiscernible] different technologies are being developed right now and I mainly know about lithium ion I don't know about the other ones although we did can visit our engineering team --.canvas those at the start of the project. Now a caveat to that is these things are changing so rapidly that year-to-year it to keep yourself updated. I'm not sure this is incredibly helpful but battery storage is one of those really dynamic technologies right now and we are going to have a lot more commercial size availability next year then we do today but already there's already other technologies that are coming to commercial viability and I can provide some documentation to those who were better interested if they want to email me.

Our next question is probably for you Krystal and that is, is there a solar panel rating site?

Thanks for that. The solar industry depending on who you talk to will be recommended different for panels for your geographical location here once great about solar is that depending on your [Indiscernible] you can find really good providers -- by providers the industry and developers that any you are looking for and that itself will help you understand what kind of panels you would need. I will say this that solar panel becomes far superior in the last five years the Department of Energy we actually on our roof and headquarters in Washington DC we have the solar panels there we actually show from several years ago the different -- different of solar panels and how superior they are by a year time frame. Right now solar electricity is fairly cheap is the installation and obviously the [Indiscernible] cost which can often be a portion of it. I will say this, solar panels have been certified to withstand very high amounts of wind sometimes up to 140 miles per hour is certain hurricane categories [Indiscernible].

Thanks Krystal. It looks like we have answered most questions and our chat box we will give it a few minutes. Jana do you want to briefly discuss the wind and [Indiscernible] with micro-grid.

I'm sorry did you say wind power?

Yes. Pairing micro-grid with wind.

Oh sure. When will be just like solar so that it is a [Indiscernible] resource depending on the type of wind resource available on any given site. It could in fact be more the baseload power source and that of course the wind can blow day or night -- [Indiscernible - low volume] Over when you -- more control over the dispatch of that power you can level it out compared to when it's generated. In our Michael grid obviously we captured as much solar power as possible and then we use it in normal operations to our economic advantage which also eases pressure on the grid. We would use solar power in the evening through our batteries when in California we see the tail end of the dock curve where the sun is going down the power load is coming up and those two things do not match until you put storage in their so you can dispatch it when you need it. The same be sure with wind you would just capture the wind energy to a great degree in the batteries or any other storage mechanism as you would have that you would use it when you need it in your system.

I will add that wind -- just like solar panels wind infrastructure is dramatically reducing and price. Solar and wind energy generation for new systems are the most cost effective or close to the most cost-effective energy generation that we can invest in.

Thanks Jana. Krystal could you explain a little bit more about what informs the availability of the state energy program? Annually that states can apply for.

Absolutely. Similar to how the CDBG HUD funds were provided to the state and the dates decided which office would then be responsible for this

fun the same of the energy program. When we provide funds to the state there provide that they decide where to put the money in terms of the office. Often times it's called the office energy, but it depends on how situated depending on the date or the territory/Commonwealth. What I would recommend if you are interested in communicating with your office you are currently in office host the FTP funds reach out to me and I can connect you with our point of contact is just different mechanisms of providing funding from the federal agent. Is similar FEMA to his federal emergency management organization or agency where their funds goes to the hazard mitigation office.

Thanks Krystal. Would you also want to answer a question that we have received it says does DOE have any best practices, and examples of cogeneration or try generation projects?

Absolutely. I'm assuming that means combined to empower and feel free to put in the chat if you and yes we do. I did not get into that too much because I was focused on energy efficient and renewable energy. Combining power provokes -- when you have one generation, but it also is utilized as a second form of generation as well. We have seen a lot of great best practices and I will this to the resource line that we have here. Is a two-year program called -- we did a two-year program called -- it was in focused on resiliency and power where we were two different stakeholders to understand that they were doing and not days. A great example is from Montgomery County in Maryland and they are focusing on low and moderate income the -- communities. They are one of the pioneers of combined heat and power they are also trying to build out a micro-grid as well there are a lot of different examples a lot of different information on our website on that resource on the resource page.

Thanks Krystal. That looks like we have addressed most of the questions, Roosevelt do you want to go ahead and close up off?

Again I would like to thank Krystal who is the Department of Energy and energy efficiency and renewable energy. Thank you for your slides we also appreciate [Indiscernible] who certainly represents the blue Lake rancheria and try and a recognized leader in energy efficiency and renewable energy. Thank you Mikayla as well this is the first webinar [Indiscernible] we do plan to have future DOE related webinars as Krystal mentioned the next one coming up is on June 18 that will focus on energy efficient the and renewable energy as it relates to building. We do plan to have a third webinar that will focus on electricity. From there we will continue to have CDBG -- CDBG-MIT webinars and we will continue to post that, and we would like you to stay tuned for that. With that being said I would like to thank everyone for participating, thank you for the great question and we will see you soon.

[Event concluded]