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**Department of Energy Quadrennial Energy Review
State, Local and Tribal Issues:
Vulnerabilities and Desirable Characteristics of the Future Energy System
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INTRODUCTION

Members of the panel, thank you for the opportunity to participate in the Quadrennial Energy Review Stakeholder Meeting with regards to State, Local and Tribal Issues. My name is Steve Catanach, I am Operations Manager for the Fort Collins Utility Light and Power. I am here today to speak to the current vulnerabilities and future needs of the energy sector from a municipal perspective. Fort Collins operates a full-service municipal utility that includes electric, water supply, wastewater treatment and storm water protection.

The electric utility, Utilities Light and Power, serves the entire City of Fort Collins along with a small number of customers outside the City limits. Fort Collins has a population of approximately 151,000 and covers approximately 55 square miles. Light and Power serves approximately 68,000 customer accounts making it the 42 largest municipal utility out of more than 2000 municipal utilities in the country. Fort Collins Utility is also the second largest municipally-owned utility in the State of Colorado – behind Colorado Springs Utility.

Fort Collins operates as a City Council – City Manager form of government. This structure ensures that the direction and goals established for the Utility reflect the values, desires and needs of the community. As a result of this reflection of the communities' values, Fort Collins has established ambitious goals related to both energy and climate change. The City is committed to a building a sustainable future for the community, and is among the first cities to adopt a triple-bottom-line (TBL) orientation by aligning departments of Economic Health, Environmental Services and Social Sustainability (support for affordable housing and human social services) under one umbrella.

Fort Collins Utilities derives electric power as a partner in the Platte River Power Authority (PRPA). PRPA is a wholesale electricity provider which acquires, constructs and operates

generation capacity for the cities of Fort Collins, Longmont, Loveland and Estes Park. The four cities each have a share of the governance of PRPA by seating both an elected official and the utility director on the Board of Directors. Policies and decisions governing PRPA operations are made using a shared governance model which allows PRPA to respond to community needs, build on community strengths and advance community values.

Faced with major natural disasters such as wildfire (the High Park Fire) in 2012 and flooding in 2013, we recognize climate change is not coming; it's here. We are actively addressing how to build resilience into daily operations and incorporating climate data and modeling future impacts that drive aggressive carbon reduction strategies. The City's current Energy Policy which was adopted in 2009 defined a goal to achieve annual energy efficiency and conservation program saving of at least 1.5% of annual energy use (based on a three year average history).

Additionally, because electric use is responsible for approximately 50% of the Green House Gas (GHG) emissions of the city, the policy also directs the utility to support the City's goal of reducing GHG by 20% below 2005 levels by 2020 and 80% by 2050. Incidentally, the City is currently analyzing the cost and benefits related to reducing GHG by 80% below 2005 levels by 2030 and 100% by 2050 through emissions reductions in all energy sectors including electricity, heating and cooling, transportation and waste. The findings will be reported to City Council by the end of this year.

As a result of the ambitious goals established by the community through our City Council, Fort Collins Utilities has pursued several innovative projects that are intended to help achieve the goals. These projects have also helped the Utility to develop expectations of how the electric system will change in the future. The inevitability of change provides both opportunities and risks and exposes both the vulnerabilities of our current system but also its strengths. Business, physical and cyber-security all have vulnerabilities, but provide opportunities as we look toward the future.

BUSINESS VULNERABILITIES AND OPPORTUNITIES

The traditional model of the electric utility being the sole provider of electrical service is changing. Distributed generation, primarily through photovoltaic (PV) panels, is quickly approaching a competitive cost of buying electric power from your local utility. New financing models are available to customers which allow them to easily lease, purchase or buy outright the energy from the installation while someone else owns and maintains the array. A choice is truly developing for customers. Electric utilities and even those utilities that provide heating fuels cannot ignore the changing desire of the customer nor can we fight to maintain our existing business models. While it is essential to develop appropriate cost recovery mechanisms that

recognize the value the electrical system provides by insuring that the customer's lights are on, even when the sun is not shining, it is equally important to recognize the value provided by these distributed resources. In partnership with the local utility, the solar provider and the customer new models that insure a much higher level of resilience and recognize the value that each partner provides will become critical. New business models, new regulatory models and new infrastructure models will all be critical to insure that customers / citizens can count on the fact that the lights are on. The federal government plays a role in these new models by maintaining a reliable and predictable subsidy for renewable energy adoption and in supporting innovation in both the private and university settings that fill gaps in the existing grid.

PHYSICAL VULNERABILITIES AND OPPORTUNITIES

The long held model of centralized large power generation transmitting power over long distances to communities has, to date, served the country well. Highly reliable power delivery coupled with the economies of scale has insured that energy is available to homes, businesses and industry. This has provided a foundation for the growth and development of our nation and has become a foundational necessity for the vast majority. For the most part, in order to achieve the high reliability of the system, redundancy has been built to insure delivery. We also work closely with businesses and residents on conservation during high-volume times. One of the City's most successful programs is ClimateWise, which works to assist and recognize businesses that develop energy efficiency into their operations. Transmission systems are typically designed in a networked system that provides multiple paths to the same point. There are certainly points of concern where the network is vulnerable, but those weaknesses are identifiable and can be cured. Unfortunately, the cure is not easy. Construction of new transmission infrastructure is lengthy and difficult. Typically, community acceptance, permitting and siting are more significant issues than the physical construction. The primary challenge in gaining public acceptance of new transmission lines is that they have a visual impact. The cure is to underground the lines; this also can make for a more reliable and resilient electric system in areas with seasonal winter storms, tornadoes and hurricanes. Typically the cost of undergrounding a high voltage transmission line can be a factor of 10 compared to overhead construction. However, as we look to the future impacts of climate and the desire to plan and build resiliency into our communities the value compared to cost of undergrounding not just our transmission but also our distribution systems has higher value.

In 1962, the City Council mandated that all new electrical distribution system construction should be underground. In the mid-1980s Council directed the utility to underground the remaining overhead system in the City. As a result the City's system is more than 98% underground. The City's reliability numbers are in the top 10% of utilities nationally and in

many cases are greater than a factor of 10 better than the national average. It may not be appropriate or necessary to underground our entire system, but this reliability has been critical, particularly after watching neighboring communities with above-ground systems suffer months-long power outages in the wake of the 2013 flooding.

New materials and technologies will have to be developed to decrease the cost of undergrounding transmission system but building our local systems underground is easily achievable. When the City Utility was directed to underground the distribution system, new construction materials and practices for undergrounding lines had to be developed in order to achieve this goal. Today the cost of installing an underground distribution system is very close to that of an overhead system and when you take reliability into account the value of an underground system far outweighs the cost differential.

Reliability creates an opportunity for hardening economic resilience. Fort Collins is home to several high-tech businesses whose research and development or manufacturing is sited here specifically because of the reliability of electricity. These high-paying jobs have added to our economic stability and bring well-educated residents to the area. On the water production side, Fort Collins is known as the “Napa of Beer” because of our burgeoning craft beer industry which thrives as a direct result of the quality of the water provided by the Utility.

CYBER VULNERABILITIES AND OPPORTUNITIES

Data and measurement drives local governments these days and it drives the Fort Collins Utility. We have implemented advanced metering infrastructure (AMI) throughout the service area in order to better serve customers. With this technology some benefits are timelier customer service solutions, the Utility can use information to maintain high system reliability, and they make utility operations even more cost-effective. This installation project provides data and customer support that drives better solutions for customers and can reduce waste, making Fort Collins a more aware and resilient community.

Smart Grids, Smart Cities, the Internet of everything all represent the integration of information technologies (IT) into the operational technologies (OT) typically employed to operate our electrical systems, our traffic systems, our water systems and multiple other services we’re provided. With this integration comes the risk of compromised data, control and personal information. As the systems become more advanced and more connected the opportunity for interference becomes more prevalent. As we look to the desired future state of our energy system it is critical that we plan and execute changes to our business models, our physical infrastructure and our digital infrastructure to insure the our communities continue to receive highly reliable energy delivery, at a cost that reflects its value and insures that it is secure.