

**United States House of Representatives  
Select Committee on the Climate Crisis**

**Hearing on February 15, 2022  
“Keeping the Lights on:  
Strategies for Grid Resilience and Reliability”**

**Responses to Questions for the Record**

**The Honorable Nancy Sutley  
Senior Assistant General Manager of External and Regulatory Affairs  
Chief Sustainability Officer  
Los Angeles Department of Water & Power**

**The Honorable Kathy Castor**

- 1. From your perspective at LADWP, could you please describe the costs of inaction on climate change? How would capital investments now to help transition to 100% clean energy by 2035 achieve greater benefits for your service territory as compared to the status quo?**

*The negative impacts of climate change include, but are not limited to, the ability of LADWP to maintain resource adequacy, rising temperatures increasing customer electricity demand, accelerated degradation of critical transmission/distribution equipment resulting in more frequent outages, and our ability to serve load during transmission outages which may become more frequent due to wildfires. The cost of inaction on climate change would be the continued adverse health effects on the citizens of Los Angeles from PM2.5 and NOx emissions due to a lack of investment in significantly decarbonizing the transportation sector. Climate change is also affecting water supply in Los Angeles – we are experiencing more frequent and longer drought cycles.*

*These impacts led to action by state and local government entities and the investment in the Los Angeles 100% Renewable Study (LA100) completed in March 2021, in partnership with the National Renewable Energy Laboratory (NREL). The LA100 Study analyzed and quantified the capital investments necessary for transitioning to 100% carbon free by 2035 to achieve greater benefits for LADWP’s service territory, relative to the status quo to meet the requirements of California Senate Bill 100 and avoid these costs of inaction<sup>1</sup>. As discussed in my testimony, the LA100 Study evaluated multiple pathways and costs to achieve a 100% renewable electricity supply. The study considered electrifying key end uses while maintaining a high degree of reliability, quantified the reductions in GHG emissions contributing to climate change and local*

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<sup>1</sup> <https://www.nrel.gov/analysis/los-angeles-100-percent-renewable-study.html>

*air quality and resulting health impacts. It also evaluated the economic and employment impacts to our community.*

*Through a zero-carbon electricity grid, LADWP will help spur decarbonization efforts across multiple end users, including the transportation and building sectors. Significant capital investments to enable LADWP’s vision of becoming a carbon free utility by 2035 will yield several benefits, including, but not limited to, reducing greenhouse gas emissions, improving local air quality, and providing clean electricity to fuel transportation and buildings.*

**2. The United States is blessed with affordable and abundant renewable energy resources, but they are often located far away from densely populated cities. Upgrading and expanding our electric grid could help ensure that every American can access clean energy. The Biden Administration has already launched an initiative to use existing rights-of-way to site transmission to make this easier. In your testimony, you mentioned the need for transmission investments.**

**a. How would Federal investments to upgrade and expand transmission help LADWP improve electric grid reliability and resilience as you transition to 100% clean energy?**

*Federal investment can assist in bringing renewable resources to load centers. Renewable energy resources, for the most part, are resource dependent and location specific. Federal investments would help meet the need to expand transmission system to access low-cost renewable energy resources. To transition to 100% renewable energy resources, LADWP will consider two critical elements as part of its strategic transmission plan:*

- Siting a variety of resources in diverse regions to ensure reliability during unfavorable weather conditions.*
- Funding for multiple transmission corridors to increase operational flexibility and to minimize the risks caused by system failure, wildfires, and other unforeseen events.*

*As such, using Federal investments would enable LADWP to meet those two elements by upgrading existing transmission corridors making the system more efficient and reliable. It will also create an opportunity for increased economic, environmental, and consumer benefits as we thrive toward 100% clean energy.*

**b. How would upgrading and expanding the electric grid help consumers save money on electric bills?**

*As a publicly owned utility, our focus is on delivering reliable, cost-efficient electricity while also transitioning the generation mix to decarbonized resources. Upgrading and expanding the electric grid on various levels—transmission, sub-transmission, and distribution—increases*

*access and delivery of low-cost renewables and energy storage resources outside of LADWP’s service territory, and provides access to customer-side, distributed energy resource options for customers to save money on their bills (e.g. local solar, demand response, and energy efficiency).*

*Bolstering the electric grid to support widespread adoption of transportation and building electrification also translates to overall customer cost savings by increasing electricity sales that can cover more of the fixed costs to support the delivery of electricity resulting in lower electricity rates.*

*To meet the growing need, LADWP must upgrade at least ten (10) major internal transmission lines with the LA Basin over the next 10 years, expand the in-service ratings of several existing lines, and coordinate with other utilities and private developers to obtain access to renewable and storage resources. To date, LADWP has worked with developers and successfully entered into power purchase agreements for some of the largest and most cost-effective renewable energy and energy storage projects in the country.*

**c. How would the Bipartisan Infrastructure Law and the initiative to use existing rights-of-way facilitate transmission development without compromising environmental protections?**

*The use of existing transmission infrastructure to pivot from fossil fuel generation to renewable energy integration will be vital in reaching the 100% clean energy goals. Implementation of the Bipartisan Infrastructure Law (P.L. 117-58, Bipartisan Infrastructure Law) aims to accelerate building and upgrading thousands of miles of transmission lines to improve reliability, reduce energy costs and facilitate the expansion of clean energy. LADWP has initiated that process with such programs as the Intermountain Power Project (IPP) through the upgrade of the associated High Voltage Direct Current (HVDC) Southern Transmission System (STS). This upgrade is required due to the IPP generation facility transitioning from large base-load coal units to green hydrogen / natural gas generating units, allowing greater integration with variable renewable energy in the Utah area and transmitted to the greater Los Angeles area.*

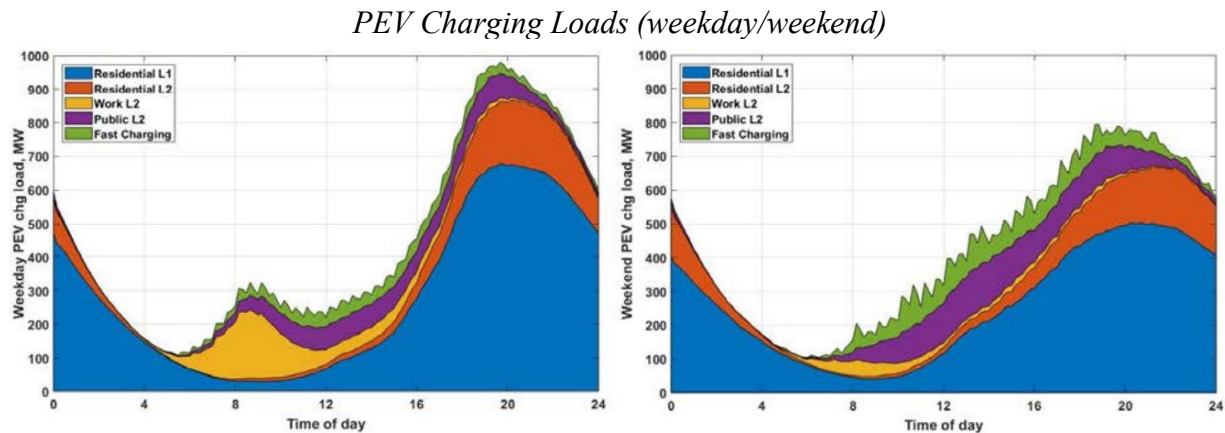
*The Bipartisan Infrastructure Law’s ability to make funds, grants, and investment assistance available to support these conversions, in addition to assisting in streamlining the permitting process, will move the resiliency and reliability of transmission systems at a much quicker pace. Additionally, with some of these resources, we hope that the Power Marketing Agencies will upgrade their transmission systems.*

**3. Energy efficiency is a critically important near-term strategy because it can help Americans save money on their household energy bills and on their transportation fuels as well as reduce carbon pollution. In your testimony, you highlighted the**

**Comprehensive Multifamily Retrofit program for deep energy savings for residents living in multifamily units. Could you please help us understand how energy efficiency *also* helps improve grid reliability and resilience to power interruptions and other disruptive events?**

*We agree, energy efficiency (EE) saves customers money on their electric bills and helps manage the peaks and base load generation.*

*LADWP anticipates that the electrification of the transportation sector will grow demand and EE is a cost-effective way to balance the system. With careful planning & targeted EE efforts, these anticipated effects may be mitigated. The visual below demonstrates how EE may counter the effects of Building Electrification (BE) load growth in the residential sector and interactions of various layers of Distributed Energy Resources (DER) to the distribution system. Specifically, these graphs demonstrate that additive properties of EE & DR in load constrained areas yield beneficial results. The avoidance of overloading the system capacity and avoidance of grid interruptions provides for a more reliable and resilient grid.*



*Source: CEC & NREL*

*Furthermore, EE efforts, in the way of incentives, outreach, education and community partnerships, raise awareness and accelerate consumer adoption of new technologies that enable connected demand responsive/flexible load appliances and devices within the household. For example, the introduction of economic incentives for Smart Thermostats resulted in increased adoption rates. Demand Response (DR) programs provide the ability to reduce demand during system wide high peak periods.*

*EE is a fundamental part of LADWP’s DER strategy and will continue to be innovated/optimized over time to maximize its benefits to customers and the utility in its efforts to increase reliability of its grid services.*

**4. In your testimony, you referenced a grid resilience project at the Green Meadows Recreation Center in South Los Angeles that provided solar panels, energy storage, and EV charging in a disadvantaged community. In your view, how would the EV charging investments in the Bipartisan Infrastructure Law help achieve LADWP goals?**

*The programs funded or created in the Bipartisan Infrastructure Law will help LADWP meet decarbonization goals, strengthen equity initiatives and reduce transportation-related emissions. More details on these goals are:*

- *Federal investments—including investments in clean energy and energy efficiency, clean transit, and pollution reduction—help LADWP reduce carbon and other tailpipe emissions, improving air quality for the entire region.*
- *The Bipartisan Infrastructure Law will help accelerate the adoption of and confidence in electric vehicles, including for those who cannot reliably charge at home.*

*Additional resources, through the Bipartisan Infrastructure Law, help support the development of convenient, accessible, reliable, and equitable EV charging.*

- *The Bipartisan Infrastructure Law helps achieve LADWP goals by further reaching the needs of historically marginalized and underserved communities within our service territory.*
- *Federal funding can help bring opportunities for innovative financial and technological solutions to increase access to home charging in multi-family residences and community-based charging solutions in underserved areas, including disadvantaged communities. Federal funding helps achieve quantifiable improvements in EV adoption, charging access, reliability, and consumer confidence in EVs.*

**5. In your testimony, you discussed Federal financing tools for clean energy and resilience investments. Could you please describe how the Federal government can encourage more private sector investment in electricity infrastructure that is clean, reliable, and resilient?**

*LADWP supports efforts to develop legislation to preserve tax-exempt financing (i.e., the exclusion of interest for state and municipal bonds from taxable income) and the restoration of the ability to issue tax-exempt advance refunding bonds. Advance refunding is an important tool for municipal utilities to lower borrowing costs associated with infrastructure development, which results in lower electric rates in the communities that we serve. On the customer asset side, providing funding or tax incentives for manufactures to develop vehicles, trucks, and potentially electrify existing trainlines to transport people and goods would help customers*

*adopt and adapt to having transportation assets, normally powered by gasoline, change to electricity.*

*One other area discussed in the past is expanding the utilization of large hydroelectric plants, such as Hoover Dam, to create a pump storage system that allows for additional clean dispatchable energy. While the engineering to create the system can be accomplished several ways, there is a lack of water that comes down the Colorado River into Lake Mead that presents a significant challenge. If the Federal government was able to capture the storm water east of the Colorado River that ends up going out to the ocean and direct it into the Colorado River, increasing clean energy from Hoover Dam could be feasible.*

**6. How would American companies benefit from the Section 48C incentive to manufacture climate solutions in this country?**

*Some critical power-related components are not manufactured in the U.S., forcing utilities, including LADWP, to rely on imported components when they are making investments in their power infrastructure. Limited availability and increased prices of these foreign-sourced components can cause delays to utility modernization projects resulting in increased costs to ratepayers. Incentivizing the domestic production of advanced electric grid, energy storage, fuel cell equipment, as well as renewable energy and energy efficient equipment helps secure a resilient power grid at lower costs to ratepayers. It can also address the need for high-skilled jobs here at home. These benefits extend beyond the electric grid to manufacturing of advanced light-, medium- and heavy-duty vehicles and components that will be powered by the electric grid. These incentives help reduce risks that would result from reliance on foreign components, while making American components more cost competitive.*

**7. Could you please describe the state of California’s efforts to improve grid resilience? How could Congress complement these efforts?**

*California’s utilities, grid operators, and communities face heightened risks from climate change, most prominently due to increasingly frequent and destructive wildfires, as well as threats like extreme heat events. These impacts jeopardize the state’s energy infrastructure, prompting a robust effort to improve the resiliency of the electrical grid. A range of technologies and programs have been promoted to increase clean energy integration, grid reliability and community resilience in the face of these climate change-related risks. These solutions include microgrids, distributed renewable generation, energy storage, building energy management systems, building performance and load flexibility and vehicle-grid integration.*

*California regulators such as the California Public Utilities Commission (CPUC), the California Energy Commission (CEC) and legislators have implemented programs to support resiliency technologies such as the deployment for microgrids and battery storage, a Self-Generation Incentive Program (SGIP), required wildfire mitigation plans, focus on lower-income communities that face particular barriers to energy resilience and Title 24 building energy efficiency standards requiring new residential construction to include rooftop or community solar installations.*

*LADWP has utilized these state programs to make the portions of the grid we manage and maintain more resilient. We propose Congress can complement California’s efforts with the following:*

- *Establish a reliability standard, within the Federal Power Act that addresses resiliency related to extreme weather events;*
- *Create a program through the Department of Energy (DOE) to advise and be a resource for states and local utilities on ways to improve the resiliency of their electrical grids; making funds, grants, and investment assistance available to support resiliency projects;*
- *Fund and prioritize emerging grid and community resilience technologies and pilot projects; and,*
- *Publish a Department of Energy report that provides recommendations on how to minimize planned electric power outages due to extreme weather conditions.*

**8. High-voltage direct current transmission lines could help connect transmission interconnections and transmission regions, which would allow more Americans to access clean energy. What Federal investments could ensure that these HDVC transmission lines are themselves resilient to the unavoidable impacts of climate change?**

*LADWP is the only utility in the Western grid that operates two High Voltage Direct Current (HVDC) links to import energy from remote locations to load centers. Those HVDC systems were built based on technologies from the early 1980s. Over the years, HVDC systems have significantly improved due to research and development of emerging technologies. New HVDC systems are robust, reliable, and better suited for transmitting renewable energy resources.*

*For those reasons, LADWP is highly interested in adding additional HVDC in its transmission system to access remote and low-cost renewable energy. To ensure that new HVDC systems are resilient to the unavoidable impacts of climate change, the following investments should be considered:*

- *Weatherization of HVDC systems to weather extremities such as induced-climate change extended-heat wave*
- *Redundant devices such as thyristors in the series string composing a HVDC valve, so that thyristor failures can be replaced in timely manner*
- *Double pole HVDC system which provides a high level of reliability simply because the failure of one pole does not affect the operation of the other pole*
- *Adequate overload rating on DC conductors to ensure that the pre-contingency power level can be maintained even with permanent outage of one pole*

- 9. Why is it important for the federal government to invest in recycling and reuse of critical minerals that are important inputs to batteries and other clean energy technologies? For instance, the Bipartisan Infrastructure Law invests \$7 billion in critical mineral supply chains, including a \$140 million program recently announced by the Department of Energy to develop a first-of-a-kind refinery to extract rare earth elements from coal ash waste. How could these efforts complement new mining and processing domestically and around the world?**

*We are encouraged by efforts such as California’s Lithium Valley Commission to produce, protect, recycle and reuse critical minerals.*

- 10. In your view, could you please describe how California can maintain grid reliability even as the state and the Western part of the country transition to a clean energy economy? What role would strategies like expanding transmission, investing in grid-scale energy storage, and expanding the use of distributed energy resources play?**

*Expanding transmission, investing in grid-scale energy storage, maintaining firm capacity near the load center, and expanding the use of distributed energy resources, in combination, all contribute to LADWP reaching its goal of a 100% clean energy future. All LA100 scenarios were evaluated to ensure that LADWP can balance demand for electricity with supply, even after failures of transmission and generation equipment or other extreme events occur. While wind and solar technologies provide a large fraction of the energy needs, all scenarios rely heavily on storage with less than 12 hours of duration, demand response, renewably derived fuel like green hydrogen, to provide sufficient operational flexibility and operating reserves as required by NERC/WECC operating standards. As LADWP expands its resource mix to 100% clean energy by expanding transmission and renewable energy further from the load center, it must also maintain firm capacity near its load center (~300 hours of duration) in the face of extreme events such as wildfires, or consecutive days with low renewable production.*

### **The Honorable Garret Graves**

- 1. In our hearing, you acknowledged that Los Angeles’ goal to become 100 percent carbon-free by 2035 will “require significant investment.” You also indicated that Los Angeles Department of Water and Power is currently conducting financial analysis of those plans. Further, the NREL report that you cite in your testimony states, “the estimated total cumulative costs of new investments needed to achieve the 100% target across the suite of scenarios explored range from \$57 billion to \$87 billion (in 2019 dollars) depending on the scenario and load projection.”<sup>2</sup> Even this astronomical cost projection is not all inclusive. NREL excluded some critical elements such as: future operating costs for the distribution grid; distribution**

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<sup>2</sup> <https://www.nrel.gov/docs/fy21osti/79444-ES.pdf>



**upgrade costs beyond equipment and labor, including land acquisition costs for substation expansion; new substations; or circuit reconfiguration. And costs associated with customer programs, for example, to support energy efficiency or encourage demand response.**

- **Can you say for certain that Los Angeles’ plans to restructure its power grid between now and 2035—a grid that currently relies on 27% of its power from natural gas<sup>3</sup>—won’t result in rate increases for your customers?**

*To determine the rate impacts, LADWP is currently determining rate options through the upcoming 2022 Strategic Long-Term Resource Plan (SLTRP). The LA100 Study indicated that 100 percent renewable pathways could be implemented cost effectively and largely in-line with inflation. This determination relies on aggressive transportation and building electrification growth, sufficient to support investment costs through increased retail sales, which we are well on the path to implement. LADWP’s mission is to provide our customers and the communities we serve with safe, reliable, and cost-effective water and power in a customer-focused and environmentally responsible manner and we must balance these multiple objectives while giving consideration to cost.*

- **If it will result in increased costs to consumers, has that been communicated to the citizens of Los Angeles?**

*Through the LA100 Study and through 2022 SLTRP Advisory Group process, LADWP has consistently communicated its plan development, which ultimately will provide the total power system investment cost and rate impacts in the near term, through 2045. Consistent with its planning practices, LADWP also intends to hold public outreach workshops in mid-2022 to further communicate the costs and benefits to customers as part of the SLTRP. LADWP has also launched the LA100 Equity Strategies Initiative, which is a stakeholder-driven effort to identify community driven, energy-just outcomes, particularly for those in disadvantaged communities, as LADWP transitions to 100% clean energy.*

*LADWP rate setting is a public process. LADWP must consult with LA’s neighborhood councils representing more than 100 communities within Los Angeles. The Board of Water and Power Commissioners considers any rate actions, which then go to Los Angeles City Council and ultimately to the Mayor of Los Angeles for final approval. Rate setting must meet the*

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<sup>3</sup> [https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-factandfigures;jsessionid=QMggvdfRX3jhfs1KrXgFdDmWKn3k822QWJkyhfg1njs1sLrvZIN!1901012332?\\_afWindowId=null&\\_afLoop=478600879122470&\\_afWindowMode=0&\\_adf.ctrl-state=1aplkups2b\\_59#%40%3F\\_afWindowId%3Dnull%26\\_afLoop%3D478600879122470%26\\_afWindowMode%3D0%26\\_adf.ctrl-state%3Dfm29dp575\\_4](https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-factandfigures;jsessionid=QMggvdfRX3jhfs1KrXgFdDmWKn3k822QWJkyhfg1njs1sLrvZIN!1901012332?_afWindowId=null&_afLoop=478600879122470&_afWindowMode=0&_adf.ctrl-state=1aplkups2b_59#%40%3F_afWindowId%3Dnull%26_afLoop%3D478600879122470%26_afWindowMode%3D0%26_adf.ctrl-state%3Dfm29dp575_4)

*requirements of Los Angeles City Charter, as well as criteria in the California Constitution regarding local government revenue.*

**2. In your written testimony, you stated, “Through the remainder of this decade, Los Angeles’ goals include providing an energy mix that is 80 percent renewable and 97 percent carbon-free resources by 2030 on the way to a 100 percent clean energy grid.” According to the Intermountain Power Agency’s website, net generating capacity will be 840 megawatts.<sup>4</sup> The website also states that, “the new natural gas generating units will be designed to utilize 30 percent hydrogen fuel at start-up, (in 2025) transitioning to 100 percent hydrogen fuel by 2045 as technology improves.”<sup>5</sup> Finally, the National Renewable Energy Laboratory (NREL) study you mention in your testimony states, “These aspects of the SB100 scenario allow for 10%–15% of power generation to be derived from natural gas. As a result, this scenario allows some of the existing natural gas plants to stay active in 2045.”<sup>6</sup> Today, Los Angeles Department of Water and Power depends upon 62% of its electricity needs from reliable sources, such as natural gas and coal.<sup>7</sup> Note that over 25% of your current production is met by coal powered generation coming from the Intermountain plant in Utah. It seems that you will need to continue to use fossil fuels well past the 2035 date you stated.**

- **Can you explain how Los Angeles will be 100 percent carbon free by 2035?**

*The City of Los Angeles has set ambitious goals to transform its energy supply. LADWP partnered with the National Renewable Energy Laboratory (NREL) on the LA100 Study, a first-of-its-kind objective, highly detailed, rigorous, and science-based study to analyze potential pathways the community can take to achieve a 100% clean energy future. While 3 of the 4 key scenarios identified shows LADWP reaching 100% clean energy by 2045, the Early & No Biofuels scenario outlined a pathway to reach the 100% carbon-free goal 10 years sooner by 2035. This scenario was evaluated under moderate and high load electrification, included no natural gas generation or biofuels, and allowed for use of existing nuclear resources and upgrades to transmission.*

*LADWP has amended the long-term power sales agreement to stop taking coal power from the Intermountain Power Project (IPP) no later than 2027, as required by California Senate Bill*

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<sup>4</sup> <https://www.ipautah.com/ipp-renewed/>

<sup>5</sup> *Ibid.*

<sup>6</sup> <https://www.nrel.gov/docs/fy21osti/79444-ES.pdf>

<sup>7</sup> [https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-factandfigures;jsessionid=QMggvdfRX3jhfs1KrXgFdDmWKn3k822QWJkyhfg1njs1sLrvZIN!1901012332?\\_afWindowId=null&\\_afLoop=478600879122470&\\_afWindowMode=0&\\_adf.ctrl-state=1aplkups2b\\_59#%40%3F\\_afWindowId%3Dnull%26\\_afLoop%3D478600879122470%26\\_afWindowMode%3D0%26\\_adf.ctrl-state%3Dfm29dp575\\_4](https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-factandfigures;jsessionid=QMggvdfRX3jhfs1KrXgFdDmWKn3k822QWJkyhfg1njs1sLrvZIN!1901012332?_afWindowId=null&_afLoop=478600879122470&_afWindowMode=0&_adf.ctrl-state=1aplkups2b_59#%40%3F_afWindowId%3Dnull%26_afLoop%3D478600879122470%26_afWindowMode%3D0%26_adf.ctrl-state%3Dfm29dp575_4)

*1368, and has plans to accelerate that date to no later than 2025. IPP will be converted from a 1,800 MW coal-fired power plant to an 840 MW combined cycle gas turbine capable of using a blend of natural gas and 30% green hydrogen upon commissioning in 2025. The combined cycle gas turbine will then be converted and will operate on 100% green hydrogen when the technology is available. In parallel, LADWP will be procuring the renewable resources and will facilitate the purchase of electrolyzers and fuel storage to support green hydrogen at IPP. The IPP Operating Agent is working closely with the turbine manufacturer and they have optimistic hydrogen glidepaths for significantly increasing the hydrogen capability in the 2030s timeframe. The technology maturity must move in lock step in order for LADWP to achieve its 100 percent carbon free goal by 2035.*

*LADWP will build upon the LA100 Study outcomes, and is assessing the implementation feasibility of achieving 100% carbon free by 2035. To that end, the 2022 SLTRP will be expanded to address implementation feasibility, assess technology innovation, and include an Integrated Human Resources Plan to help achieve its goal.*

### **The Honorable Veronica Escobar**

#### **1. How can local governments work with utilities to advance environmental justice and how can the Federal government support that?**

*LADWP works to coordinate, build partnerships, and collaborate with local, state, and federal government agencies to streamline and overcome opposition, legal challenges and hurdles that may prohibit LADWP’s ability to advance environmental justice through traditional mechanisms.*

*In addition, funding for power programs in the form of loans, grants, incentives, cooperatives, agreements, and/or credit allocations could vastly improve LADWP’s ability to target funding of its programs towards disadvantaged communities.*

*LADWP has also launched the LA100 Equity Strategies Initiative, which is a stakeholder-driven effort to identify community driven, energy-just outcomes, particularly for those in disadvantaged communities, as LADWP transitions to 100% clean energy. We expect the results of this study to be finalized by the end of 2023.*