Non-Technical Voiceover Script

- Slide 1: Introduction
    - Hello, I'm Angela Yang, and I'm working as a U.S. Department of Energy, Energy Innovator Fellow in partnership with the Massachusetts Department of Public Utilities. In this video I'll be describing Electric Sector Modernization investments in Massachusetts, and the extent to which they have occurred in communities with environmental justice populations. Please note that this is an abbreviated version of this project and there is a link to a comprehensive version of this information at the bottom of this website.
- Slide 2: Department of Public Utilities (DPU)
    - To begin, I'd like to give a brief introduction to the Massachusetts Department of Public Utilities and why this agency supports grid modernization. The Department of Public Utilities resides within the Executive Office of Energy & Environmental Affairs and oversees investor-owned electric power, natural gas, and water utilities as well as transportation network companies in Massachusetts. DPU's overarching mission is to ensure that consumers' rights are protected, and that utility companies are providing the most reliable service at the lowest possible cost. The DPU seeks to promote safety, security, reliability of service, affordability, equity, and greenhouse gas emission reductions. DPU is an adjudicatory agency, where adjudications are the formal determination of parties' rights through a quasi-judicial process where all parties to the proceeding are entitled to due process safeguards. When considering contested issues, DPU reviews evidence, conducts hearings, and considers the input of all parties to the proceeding in accordance with the requirements of the Massachusetts Administrative Procedure Act and the Department's procedural regulations.
- Slide 3: Background
    - The objective of this project is to analyze the extent to which grid modernization investments authorized by the Massachusetts Department of Public Utilities ("Department") and made by the state's electric distribution companies ("EDCs") occurred in environmental justice populations. Subsequently, the Department has created a map to identify grid modernization progress across the three EDCs territories. The geographic coverage of the map includes all municipalities within the Commonwealth of Massachusetts, utilizing 2022 environmental justice data. The grid modernization deployment data spans from 2018 to 2022 and only applies to municipalities within the EDCs' service territories; therefore, grid modernization activity from Municipal Light Plants is not included. This website

provides only a high-level summary of a limited scope of DPU decisions. Please refer to the Orders cited for specific details on the Department's findings and directives.

- Slide 4: Grid Modernization Background
    - To give some background on grid modernization itself, let's start off with what it is. Grid modernization means making necessary upgrades to electric distribution grid infrastructure to meet current and future electricity demand. Grid modernization directly addresses aging electric infrastructure by lessening the strain on our power grids. These upgrades involve an interconnected system of controls, sensors, and innovative technology that allows more efficient, flexible operation of the grid. By investing in grid modernization technology now, we can meet our long-term goals of meeting future energy demands and clean energy goals.
    - Grid modernization been underway in Massachusetts for more than a decade. In 2014, the DPU established policies to encourage EDCs to adopt grid modernization technologies and practices to enhance electric service reliability, reduce electricity costs, and empower customers to play an active role regarding their electricity. In 2018, DPU approved the first grid modernization plans with the objective to optimize system performance and system demand as well as to interconnect distributed energy resources. In 2022, DPU approved the second grid modernization plans. These plans included performance metrics to measure progress in achieving grid modernization objectives.
- Slide 5: Grid Modernization and You
    - Among the various types of grid modernization technology currently available, here are the four major types included in the EDCs' grid modernization plans: monitoring and control, advanced distribution management system, volt-var optimization, and distribution automation.
    - Monitoring and control is more commonly known as SCADA which stands for supervisory control and data acquisition. SCADA involves a network of hardware and software components that can monitor and control utility devices. SCADA enables remote alarm monitoring and control of field devices for enhanced visibility outside the substation. Using this technology helps avoid equipment damage, reduce outage time, and save on labor costs.
    - Advanced distribution management system, or ADMS, is a decision support system with SCADA functionality and more advanced features for control room and field operators to manage the distribution system. ADMS enables utilities with demand management, energy loss prevention, operational efficiency, and support for regulatory compliance.

    - Volt-VAR optimization, or VVO, is a powerful process for managing voltage levels and reactive power by leveraging an advanced function that determines the optimal set of control actions for operators. By using VVO, operators can reduce end-use energy consumption, peak demand, and system losses thus lowering costs and promoting energy efficiency.
    - Distribution automation improves the operational efficiency of the distribution system by providing operators with an integrated solution of field apparatus, devices, communications and software applications. Often known as FLISR, which stands for fault location, isolation, and service restoration, distribution automation minimizes outages, reduces costs, optimizes distributed energy resources, and extends asset lifespan.
    - When an EDC deploys grid modernization technology in its service territory, field deployment technicians can be seen (and heard) in residential and commercial areas when installing hardware technology to utility poles. Software technology installations for grid modernization are conducted remotely. After the initial installation, utility technicians may revisit the installed grid technology in the field for regular maintenance. Software technology updates for grid modernization are pushed through remotely.
    - These installations of critical grid infrastructure result in consumer benefits such as lower energy costs, reduced greenhouse gas emissions, reduced outages, and increased clean energy options.
- Slide 6: Environmental Justice in Massachusetts
    - This map shows the distribution of environmental justice or EJ populations in Massachusetts which are communities that satisfy one or more of the following criteria: Annual median household income is 65% or less of the statewide annual median household income, Minorities make up 40% or more of the population, 25% or more of households identify as speaking English less than "very well", Minorities make up 25% or more of the population and the municipality’s annual median household income does not exceed 150% of statewide annual median household income. The updated 2022 EJ map is embedded further down this website for your reference.
- Map Navigation Tutorial
    - As mentioned before, the second grid modernization plans were approved in 2022. In response to intervenor’s concerns regarding consideration of environmental justice populations in grid modernization plans, the EDCs met in 2023 to develop additional standards and methodologies to offer greater transparency and accountability for the selection of grid modernization investments in environmental justice populations.

    - Here we have the embedded grid modernization and environmental justice map that you can access further down this website This view has the advanced distribution management system (ADMS) data layer activated but each layer is available alongside this view. If you click on a municipality, a pop-up box will show how many ADMS investments were made in that city or town between 2018 and 2012 as well as EJ and other geographic details. The colored shapes indicate the extent of ADMS investment: fewer investments are shaded blue and purple and more investments are shaded are in red and yellow. As you can see, ADMS investments are not spread evenly across the state and the same is true for other grid mod investments.
- Slide 8: EJ vs. Non-EJ Municipalities
    - By analyzing the map data, we can start to see geographic trends in grid modernization deployment especially in relation to environmental justice populations. Here we are looking at deployment in municipalities that have EJ populations vs. municipalities that have no EJ populations. The first pie chart with the green background shows that 53% of Massachusetts municipalities contain EJ populations. The other five pie charts show that from 2018 – 2022 the vast majority, that is 80-90%, of grid modernization deployment occurs in municipalities with EJ populations.
- Slide 9: VVO Substations & Energy Savings
    - To quantify the consumer benefits of grid modernization technology, we used a 2023 case study of net energy reduction due to VVO where VVO was enabled for Massachusetts substations of Eversource, National Grid, and Unitil. VVO-enabled substations subsequently documented the following energy savings and greenhouse gas reductions as a result. A total of 12 substations were evaluated and a majority were located in municipalities containing environmental justice populations. The total observed in energy savings was 4,039 MWh and 1,167 tons of carbon dioxide or CO2 in greenhouse gas emissions reduction.
- Slide 10: Key Takeaways
    - As a result of this project, the Massachusetts Department of Public Utilities has developed a methodology for analyzing grid modernization progress and the extent to which grid modernization investments have occurred in areas with environmental justice populations.
    - A we saw in the pie charts, 80 – 90% of all types of grid modernization technology was deployed in municipalities containing EJ populations. Additionally, we found that among municipalities with EJ populations, grid modernization technology is more likely to be deployed in municipalities with higher EJ population densities.

    - From the 2023 VVO case study, we see that VVO-enabled substations experienced energy savings and greenhouse gas reductions with a majority of those substations located in municipalities with environmental justice populations.
    - In terms of next steps, we look forward to incorporating the insights from this project into future proceedings such as Electric Sector Modernization Plans and identifying metrics for other investment types to perform a similar analysis.
- Slide 11: Conclusion
    - Thank you for listening and please address any questions or feedback to the DPU Electric Power Division contact information.