DUKE OHIO EXHIBIT_____

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Duke Energy Ohio, Inc., for Approval of McMann Battery Storage Project.	)))	Case No. 19-2223-EL-UNC

DIRECT TESTIMONY OF

WILLIAM LOWDER

ON BEHALF OF

DUKE ENERGY OHIO, INC.

December 20, 2019

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A My name is William Lowder. My business address is 400 S. Tryon St., Charlotte, North Carolina, 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Business Services (DEBS) as the Director for Distributed Energy Enablement and Storage Projects. DEBS provides various administrative and other services to Duke Energy Ohio, Inc., (Duke Energy Ohio or Company) and other affiliated companies of Duke Energy Corporation (Duke Energy).

Q. PLEASE SUMMARIZE YOUR EDUCATION AND PROFESSIONAL QUALIFICATIONS.

A. I have been employed by DEBS in various positions since February of 2011 and in a previous period of my career from 1983 to 1998. I have an Electrical Engineering degree from North Carolina State University, and I hold my Professional Engineering License in the state of North Carolina. I began my career as a Distribution Engineer at Duke Energy, holding roles in planning, designing, operating, and maintaining the utility grid. I have spent the last 24 years of my career delivering strategic technologies to improve utility business operations, plus introducing Smart Grid technologies. I started in my present position as Director for Distributed Energy Enablement and Storage Projects in 2015 to support the strategic development planning and, ultimately, the

deployment execution of utility-owned solar, battery storage, and microgrid facilities.

I have gained extensive knowledge regarding battery energy storage since the beginning of my Energy Storage Strategic Planning role in 2015, from local field studies with various energy storage consulting specialists, from industry information garnered from research, from interactions with utility subject-matter experts, and from attendance at conferences. Based on that knowledge, I now carry leadership responsibilities over battery system delivery.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A. No.

Q. PLEASE SUMMARIZE YOUR DUTIES AS DIRECTOR FOR DISTRIBUTED ENERGY ENABLEMENT AND STORAGE PROJECTS.

A. I am responsible for the efficient execution of new distributed energy projects in Duke Energy's regulated service territories, leading a team of project managers. These projects include distribution grid connected solar, battery storage, and microgrid (storage plus solar) projects. I am responsible for the internal business transformation requirements; communications, change management, and business processes designs, all of which come along with the introduction of these new distributed energy resources into our utility business groups. Finally, I am responsible for the distribution connected distributed energy assets, providing full-time operating and maintenance execution oversight to protect these assets' useful life for the benefit of our customers.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony in this proceeding is to support the Company's cost estimate, contracting strategy, and construction schedule for the proposed approximately 3.95MW/8.9MWh battery energy storage facility (McMann Battery Storage Project) located on land just east of Duke Energy Ohio's existing McMann Substation. Duke Energy Ohio has a one-year right to purchase this property for the McMann Battery Storage Project.

II. COST ESTIMATE

Q. HOW DOES DUKE ENERGY OHIO INTEND TO CONSTRUCT THE PROPOSED McMANN BATTERY STORAGE PROJECT?

A. The McMann Battery Storage Project scope comprises developing, designing, procuring, constructing, and ultimately operating a battery system of 3.95MW/8.9MWh capacity. Duke Energy Ohio's preference is to contract with a supplier with experience in battery facility design and construction to ensure seamless delivery of the facility. After a competitive procurement process, Duke Energy Ohio intends to contract with a reputable engineering, procurement, and construction (EPC) firm. The EPC will procure all major equipment and materials for the project, including the batteries. Duke Energy Ohio's Customer Delivery distribution team will design and install protection and control equipment to the 12.47kV distribution system serving the Union Township, Ohio, area for safe and reliable grid interconnection. Duke Energy Ohio will oversee project execution, providing project management, construction oversight, environmental health and safety (EH&S) oversight, and document controls.

Duke Energy Ohio will issue a request for final proposals from suppliers with the objective of placing the facility in service in September of 2021. Duke Energy has gained experience and built relationships with several industry leading battery suppliers while evaluating their products and understanding their capabilities through multiple research and development projects and through similar battery facility projects deployed in other Duke Energy territories. Duke Energy will leverage this experience to develop and construct the McMann Battery Storage Project, as well as similar projects in the future.

Q. PLEASE PROVIDE A SUMMARY OF THE COST ESTIMATE FOR THE MCMANN BATTERY STORAGE PROJECT AND DESCRIBE THE MAIN COMPONENTS OF THE COST ESTIMATE.

A. The estimate for McMann Battery Storage Project development is approximately $11,690,000. A summary of that cost estimate is provided below:

Cost Category	Cost in $MM
Non-Duke Contracted Cost Subtotal	**$7.47**
EPC or Contractor - Includes battery system, battery containers, PCSs, engineering, site work, electrical and civil scope, project management, commissioning and testing.	
Duke Energy Cost Subtotal	**$1.95**
Includes development costs, grid interconnect engineering & construction, land purchase, permitting, telecommunications scope, site controller, project management, training, and project overhead.	
Other Project Costs Subtotal	**$2.28**
Includes contingency for risk & estimate uncertainty, project AFUDC.	
Total McMann Project Cost	**$11.69**

The summary provides facilities cost broken down by Non-Duke Contracted Costs of $7,470,000, Duke Energy Costs of $1,950,000, and Other Projects Costs such as contingencies and AFUDC of $2,280,000. The Company's cost estimates

for the McMann Battery Storage Project have five main components: (1) equipment, comprising batteries, inverters, and the balance of plant components; (2) engineering and construction; (3) distribution interconnection; (4) site control and communications infrastructure; (5) project management and construction oversight.

Duke Energy Ohio will use negotiated agreements with the EPC to procure all major battery facility equipment and materials. Major equipment and material will include items such as: battery cells and the containers, inverters, HVAC, safety equipment, control house, concrete pads, fencing, metering cabling, connectors, plus all other miscellaneous required materials.

Duke Energy Ohio will enter into an EPC contract with a reputable company, to design the project, procure selected equipment, construct the battery site and footings, install the batteries, and interconnect the facility. Duke Energy Ohio will provide active oversight of the EPC contractor's safety, environmental, engineering, construction, and commissioning activities.

Duke Energy Ohio has included an estimated cost associated for distribution grid interconnection based upon a preliminary interconnection review. Full and exhaustive interconnection studies will be completed after formal project approval, due to the cost and time requirements. Additional grid interconnection requirements could be discovered during the full study, impacting overall project cost and schedule. The project estimate carries contingency funding for these and other project elements at this early stage of development. To the extent there are additional schedule impacts associated with potential grid

upgrades, those will have to be evaluated to determine any impact to the commercial operation date and cost estimate of the facilities.

The Company has included costs for the facility's control and communications infrastructure to ensure real time data and grid optimization are both available. This facility will be able to be isolated and interrupted, in the event of a grid fault event, to protect both the facility from grid faults and the distribution grid from any faults associated with the facility. This level of monitoring and system control allows Duke Energy Ohio to optimize these facilities specific to the grid at the point of interconnection and to ensure they are producing and storing energy optimally.

In addition to these major components, Duke Energy Ohio has also included within its estimate a reasonable amount for contingencies, as well as employee labor costs.

Q. PLEASE EXPLAIN THE PROCESS DUKE ENERGY OHIO PLANS TO UNDERTAKE TO SELECT ITS CONTRACTOR FOR THIS PROJECT.

A. Since 2015, Duke Energy Ohio has solicited multiple battery facility proposals through Request for Information (RFI) and Request for Proposal (RFP) processes in order to identify and evaluate the commercial and technical capabilities of providers within the distributed energy industry. Indicative pricing and sample project schedules, including construction milestones, were provided by the suppliers, and Duke Energy Ohio evaluated each proposal and interviewed each provider in order to confirm details of the submissions. This process enabled Duke Energy Ohio to gather sufficient market intelligence to create a Class 4

estimate at this time. As the microgrid and battery markets continue to evolve, the Duke Energy Ohio team continues to gather cost and performance estimates through additional RFI/RFPs, vendor meetings, attending industry events, and leveraging market research (*e.g.*, Navigant's 10-year Battery Price Forecast). As project development efforts continue to progress, a formal RFP will be issued for the McMann Battery Storage Project to selected providers who are best suited to successfully execute this particular project.

Q. PLEASE DESCRIBE HOW THE COMPANY DETERMINED THE AMOUNT OF CONTINGENCY TO INCLUDE IN THE PROJECT ESTIMATE.

A. Within Duke Energy Ohio, projects follow a standard methodology for establishing contingency amounts. This methodology accounts for uncertainties inherent in cost estimates as well as any known project risks.

Relative to estimate uncertainty, contingency values are applied to cost categories by Duke Energy Ohio cost estimators, considering historical variability of items such as wage rates and contract pricing. This process was followed for McMann Battery Storage Project.

The other component of contingency is established via a standard process for identifying and quantifying project risks. Risk items are identified by project team members and quantified based on the project location, contracting strategy, technology, and other project-specific items. A project risk register is produced to tabulate and calculate the appropriate contingency required. Duke Energy Ohio

project management will be responsible for managing this risk register throughout the life of the McMann Battery Storage Project.

Q. DO YOU BELIEVE THIS COST ESTIMATE IS REASONABLE?

A. Yes, I do. The Company's Class 4 estimate for this project is based upon realistic assumptions given the early stage of project development, the current market uncertainties, and Duke Energy's knowledge acquired from similar projects. Most notably, assumptions have been made around the interconnection costs and site conditions, given that the interconnection study is in progress and the site geotechnical study has not been completed for the project. We have included contingency funds associated with these and other assumptions, which I believe are reasonable.

Another notable assumption made for the sizing and benefits of this facility was the assumed locational load growth rate of three percent for the life span of the system.

Q. FOLLOWING CONSTRUCTION, WILL DUKE ENERGY OHIO OWN, OPERATE, AND MAINTAIN THE MCMANN BATTERY STORAGE PROJECT?

A. Yes. Duke Energy Ohio will own, operate and maintain the McMann Battery Storage Project to ensure proper operations and maintenance for the benefit of its customers. My organization will be responsible for the management of these operations and maintenance activities.

Q. WHAT KIND OF OPERATION AND MAINTENANCE (O&M) EXPENSE IS DUKE ENERGY OHIO ANTICIPATING ONCE THE MCMANN BATTERY STORAGE PROJECT IS IN SERVICE?

A. Maintenance activities required for the facilities include: remote performance monitoring; resolving any outage or system performance concerns; replacement of equipment as needed due to breakage or performance loss; routine maintenance of the inverters, power transformers, and HVAC; repair of electrical connections; routine vegetative management, including mowing and vegetation control; and energy storage system controller updates to maximize benefits and adjust to system changes.

III. CONSTRUCTION SCHEDULE

Q. HOW DID YOU DETERMINE THE McMANN BATTERY STORAGE PROJECT'S SCHEDULE AND WHAT IS YOUR CONFIDENCE IN THAT SCHEDULE?

A. Assuming a project kickoff date of September 12, 2020, we expect the project will reach Substantial Completion by September 1, 2021. The project's schedule was derived from Duke Energy's experience with its first four regulated, grid-connected battery and microgrid projects executed over 2019 in other Duke Energy operating jurisdictions. We have learned the general industry lead times for equipment and materials, plus gained an understanding of the general EPC preparation, construction, and commissioning required time frames. With this information, we are able to predict the project's execution schedule fairly well,

though we do have dependency to reach kickoff, such as EPC contract signatures and grid interconnection approval, just to name a few examples.

Q. HOW DO YOU PROPOSE TO KEEP THE COMMISSION INFORMED OF THE CONSTRUCTION STATUS OF THE McMANN BATTERY STORAGE PROJECT?

A. Within 6 months after the start of commercial operations, the Company will provide a report with the Commission detailing the facility's construction progress, along with the final actual project costs. Within one year after the start of commercial operations, Duke Energy Ohio will file a report with the Commission detailing operational knowledge gained from the facility's use, plus provide any detailed information available on the operational benefits of the project. Benefits for Peak Load Shaving will not occur until 2024 based on Duke Energy Ohio's three percent load growth prediction for this service area. This report will be updated annually for a total of five years.

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY AT THIS TIME?

A. Yes.