23

DE-OHIO EXHIBIT____

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Duke Energy Ohio for an Increase in Electric Distribution Rates	)	Case No. 08-709-EL-AIR
In the Matter of the Application of Duke Energy Ohio for Tariff Approval	)	Case No. 08-710-EL-ATA
In the Matter of the Application of Duke Energy Ohio for Approval To Change Accounting Methods	)	Case No. 08-711-EL-AAM

DIRECT TESTIMONY OF

CHRISTOPHER D. KIERGAN

ON BEHALF OF

DUKE ENERGY OHIO

_____ Management policies, practices, and organization

_____ Operating income

_____ Rate Base

_____ Allocations

_____ Rate of return

_____ Rates and tariffs

__X__ Other: SmartGrid

August 8, 2008

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Testimony addressing the cost effectiveness of Duke Energy Ohio's SmartGrid Initiative.

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CDK-1: Summary of Cost Benefit Study

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.

A. My name is Christopher D. Kiergan. I am an Executive Consultant with KEMA, Inc. Established in 1927, KEMA is an international energy solutions firm providing technical and management consulting, systems integration, and training services to more than 500 electric industry clients in 70 countries. KEMA, with its North American operations headquartered in Burlington, Massachusetts, allows many of its consultants to be home-based when not physically at clients' locations; as such my business address is 1257 W. Wellington Ave., Chicago, Illinois 60657.

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I graduated from the United States Naval Academy in 1983, with a Bachelor of Science in Mechanical Engineering. I served in the United States Navy as an officer and helicopter pilot (Search and Rescue, Antisubmarine Warfare, and Instructor). While in the Navy, I attended the Naval War College and earned a diploma in National Security and Strategic Studies. Upon completing ten years of active service, I attended the J.L. Kellogg Graduate School of Management at Northwestern University, graduating in 1995, with an MBA with majors in management and strategy, organizational behavior, and marketing. Upon graduation from business school, I entered the field of consulting with Booz Allen & Hamilton, performing operations and process reengineering consulting to

manufacturers. Since leaving Booz Allen & Hamilton in 1997, I have worked for several consulting firms (joining KEMA in 2003), focused exclusively on providing consulting services and delivering solutions to utility clients, primarily electric utilities. I have experience on both strategy and operations engagements, experience extending from corporate and business unit strategy to operational assessments and business process design. I have detailed experience ranging from large project financial modeling and business transformation initiatives to performance improvement projects of back-office processes, supply chains, maintenance processes, and construction processes. Additionally, I have extensive experience with electric utility deregulation restructuring, leading two multi-year projects for western electric utilities.

Q. DOES KEMA HAVE RELEVANT EXPERIENCE WITH SMART GRID TECHNOLOGIES AND ADVANCED METERING INFRASTRUCTURE?

A. Yes. KEMA's Intelligent Networks and Communications (INC) market issue team is a worldwide leader in planning, designing, and implementing advanced communications, Advanced Metering Infrastructure (AMI), Distribution and Substation Automation and infrastructure modernization systems. KEMA also provides project management experience to oversee the integration of these projects into utility operational systems. To date, KEMA's consultants have implemented numerous such projects and are presently supporting the implementation of some of the largest initiatives in North America, including programs for Duke Energy Corporation (Duke Energy), Con Edison, Southern California Edison, Public Service Electric & Gas, and Portland General Electric,

as well as other Smart Metering or Smart Grid projects in Australia, Europe, and Brazil. KEMA has also previously assisted other key utilities in their automation programs, including Hawaiian Electric Company, Ketchikan Public Utilities, Benton County PUD, and Louisville Gas & Electric Company (LG&E Energy Corp).

Within the INC market issue team, KEMA's Advanced Metering practice has established itself as a key partner for a number of the leading AMI programs in North America and in other global locales. The practice is comprised of both business strategists and technical specialists who together form a capability to understand all aspects of the business. With a rich combination of direct utility "hands on" experience, strong leadership and participation in industry consortia, and years of consulting project service, KEMA's consultants are well-versed in metering and communications technology, industry standards, regulatory/legislative trends, and the strategies and solutions of most of the leading suppliers. Using past and current AMI client engagements, KEMA has developed a library of knowledge regarding specific technology features, capabilities, and pricing, as well as insights into future product development efforts, for most of the major North American providers.

In the area of distribution systems, KEMA offers broad and deep set of subject matter expertise in electric distribution system planning, design, and operations. KEMA has assisted numerous utilities with the assessment, procurement, and implementation of advanced technologies as well as business and operational strategies in this area. These include advanced field

instrumentation, relay protection, equipment condition monitoring, feeder, distribution and substation automation, and information systems in support of planning, engineering, and operations.

Additionally, KEMA has extensive testing facilities in the Netherlands (Arnhem) and the United States, where it conducts testing of electrical equipment, from customer products to high voltage electrical equipment. In Europe, with regards to the electrical safety of products, KEMA is much like Underwriters Laboratory in the Unites States, providing the testing and certification of products, including the marking on customer packaging. In addition to testing electronic kWh and kVar meters on behalf of manufacturers worldwide, KEMA has recently set up a testing facility for Smart Grid technologies.

Q. PLEASE EXPLAIN KEMA'S SPECIFIC RESPONSIBILITIES RELATED TO THE DUKE ENERGY OHIO'S SMARTGRID INITIATIVE.

A. KEMA has been on-site with Duke Energy since December 2006, most recently helping to develop and refine the Company's business case and economic model for several jurisdictions, including Duke Energy Ohio (DE-Ohio or Company), and assisting with vendor selection, quality assurance and technology testing.

In 2007, KEMA was involved in developing and assessing the "use cases" put together by Duke Energy. The "use case" methodology was used to identify the services that Duke Energy would want to provide in the future and identify the benefits associated with the implementation of SmartGrid. This methodology pulled together both KEMA and Duke Energy Subject Matter Experts (SME) to create possible "uses" for SmartGrid, including, for example, [redacted]

[redacted]

KEMA has also been involved with the conceptual design and planning of the demonstration labs, as well as work on the deployment of meters and related equipment for the pilot programs in Ohio and the Carolinas.

Q. PLEASE BRIEFLY DESCRIBE YOUR DUTIES AND RESPONSIBILITIES AS AN EXECUTIVE CONSULTANT FOR KEMA.

A. Since joining KEMA, I have worked onsite with utility clients on three long-term projects, providing management consulting services in the form of overall project management, process analysis and design, financial modeling, organizational design, and strategic planning. I spent two years at Cinergy Corp., assisting with the reengineering of the AFIC (After the Fact Interchange Costing) process mandated by the Joint Generation Dispatch Agreement (JGDA) signed in April 2002. In 2005, I began a two-and-a-half year project with the Bonneville Power Administration on an enterprise process improvement project that included current state assessments and analysis (including financial analysis), future state design, and implementation of solutions in several areas including supply chain,

construction, and maintenance. Since the beginning of 2008, I have been with Duke Energy working on the SmartGrid cost/benefit model.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to support the cost benefit analysis of DE-Ohio's SmartGrid initiative. Specifically, I (1) describe the SmartGrid model; (2) explain how the model analyzes the program costs and benefits input into it; and (3) provide additional information on what specific costs and benefits were provided by DE-Ohio for input in the SmartGrid model. Finally, I sponsor Attachment CDK-1, which is a summary of the cost benefit analysis I performed for DE-Ohio's SmartGrid initiative, in terms of inputs, assumptions, and results.

II. THE SMARTGRID MODEL

Q. PLEASE GENERALLY DESCRIBE THE SMARTGRID MODEL.

A. The SmartGrid model is a Microsoft Excel-based economic cost/benefit analytical model, which generally captures the overall economics, supports financial analyses, and is used as a tool for management decisions for the SmartGrid project. [redacted]

Q. HOW WAS THE DE-OHIO SMARTGRID MODEL CREATED?

A. The Ohio SmartGrid model was created by DE-Ohio for an advanced metering infrastructure and smart grid pilot project in Ohio. However, over time, as

additional costs and benefits were identified, as moredetailed analyses were performed in the areas of information technology, data transfer fees, distribution automation, and operating and maintenance (O&M) expenses, and as SmartGrid technology and equipment considerations became more fully developed and costs became more firm, the model has been improved and is now a more detailed and more accurate depiction of the costs and benefits associated with the SmartGrid initiative in Ohio.

Q. PLEASE DESCRIBE THE INFORMATION INPUT INTO THE MODEL.

A. [redacted]

[redacted]

[redacted]

Q. WHAT ARE THE SOURCES OF THE DATA INPUT INTO THE MODEL?

A. KEMA obtained data from the applicable groups and employees within the Company through a detailed data request template. These groups included Power

Delivery, Power Delivery Accounting, System Protection Engineering, Asset Management, Substations and Operations Maintenance, System Operations, Metering, Meter Operations, Meters and Infrastructure, Integrated Resource Planning, Finance, Financial Forecasting, Accounting, Tax, IT, Customer Service, Billing, Energy Efficiency, Regulatory Strategy, and Rates. Follow-up discussions were held when necessary to clarify exactly what data was needed and the level of detail needed. Upon receiving this data, it was analyzed by me and others associated with the modeling process to verify the accuracy of the data in relation to predetermined, high-level estimates. For data that fell outside expectations, discussions and further analysis were conducted to confirm the accuracy of the data. Consensus was reached between me and the providers of data on all data entered into model. Additionally, in the areas associated with O&M costs, current budget amounts were checked with Power Delivery Accounting to ensure accurate and current data was being utilized.

Savings percentages (expected reductions in current budget amounts) associated with benefits were analyzed through a collaborative process including discussions with the affected groups and savings seen or projected in similar projects around the country.

Costs associated with new equipment (meters, communications, etc.) were obtained from the potential vendors of the equipment being considered for the SmartGrid project. This data was then reviewed to ensure that the costs modeled were the expected costs and not necessarily the current costs associated with small

pilot programs or small purchase orders. These costs are best estimates since contracts for large purchases are not yet in place.

III. COST BENEFIT ANALYSES PERFORMED BY THE SMARTGRID MODEL

Q. PLEASE DESCRIBE HOW COST AND BENEFITS ARE ANALYZED BY THE SMARTGRID MODEL.

A. A project Net Present Value (NPV) was calculated based on the costs, benefits, and assumption input into the model. Benefits were calculated for each of the twenty years in the model (2009-2028) and treated the same whether they were a direct budget expense, an avoided cost, or an increase in revenue. (Benefits are placed into these categories to facilitate further analysis such as revenue recovery/rates calculations and overall O&M increase/decrease calculations, but they are all treated alike for purpose of the project NPV calculations.)

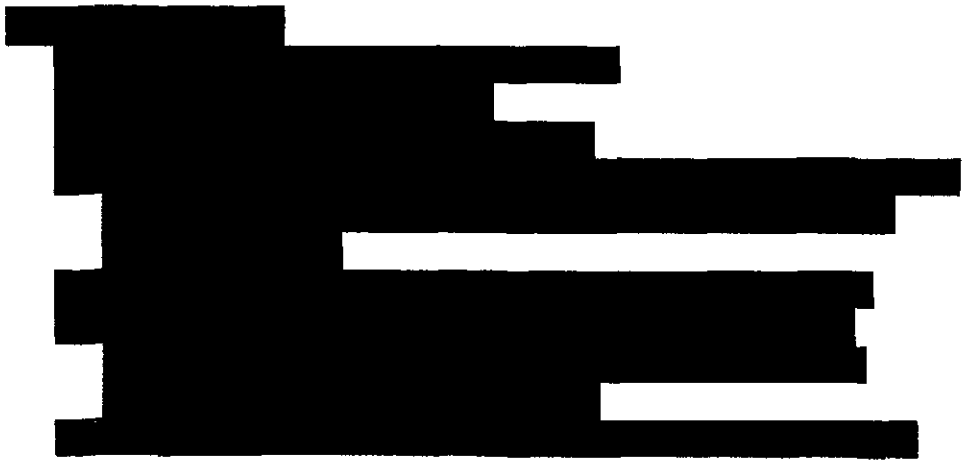
[redacted]

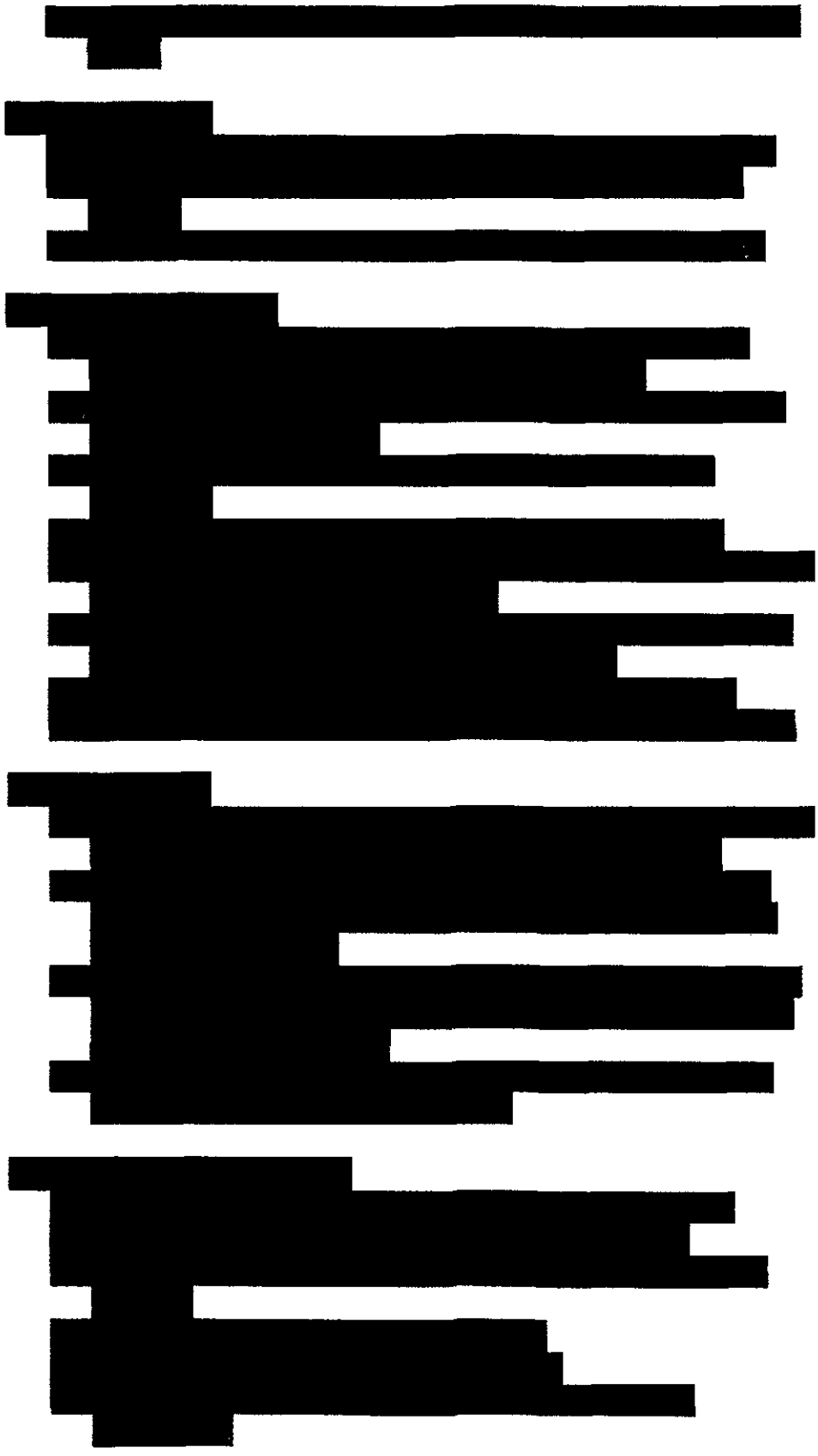
[redacted]

[redacted] – it does not consider the impacts of future rate cases or other unforeseen changes to the operating environment. Finally, as a project economic model, this analysis does not directly give rate impacts or revenue requirements, although the results of the model are used as a basis for those calculations.

Q. WHAT TYPES OF BENEFITS WERE INCLUDED IN THE SMARTGRID MODEL?

A. Benefits captured in the model generally include:





Q. WHAT GENERAL CATEGORIES OF COSTS WERE INCLUDED IN THE SMARTGRID MODEL?

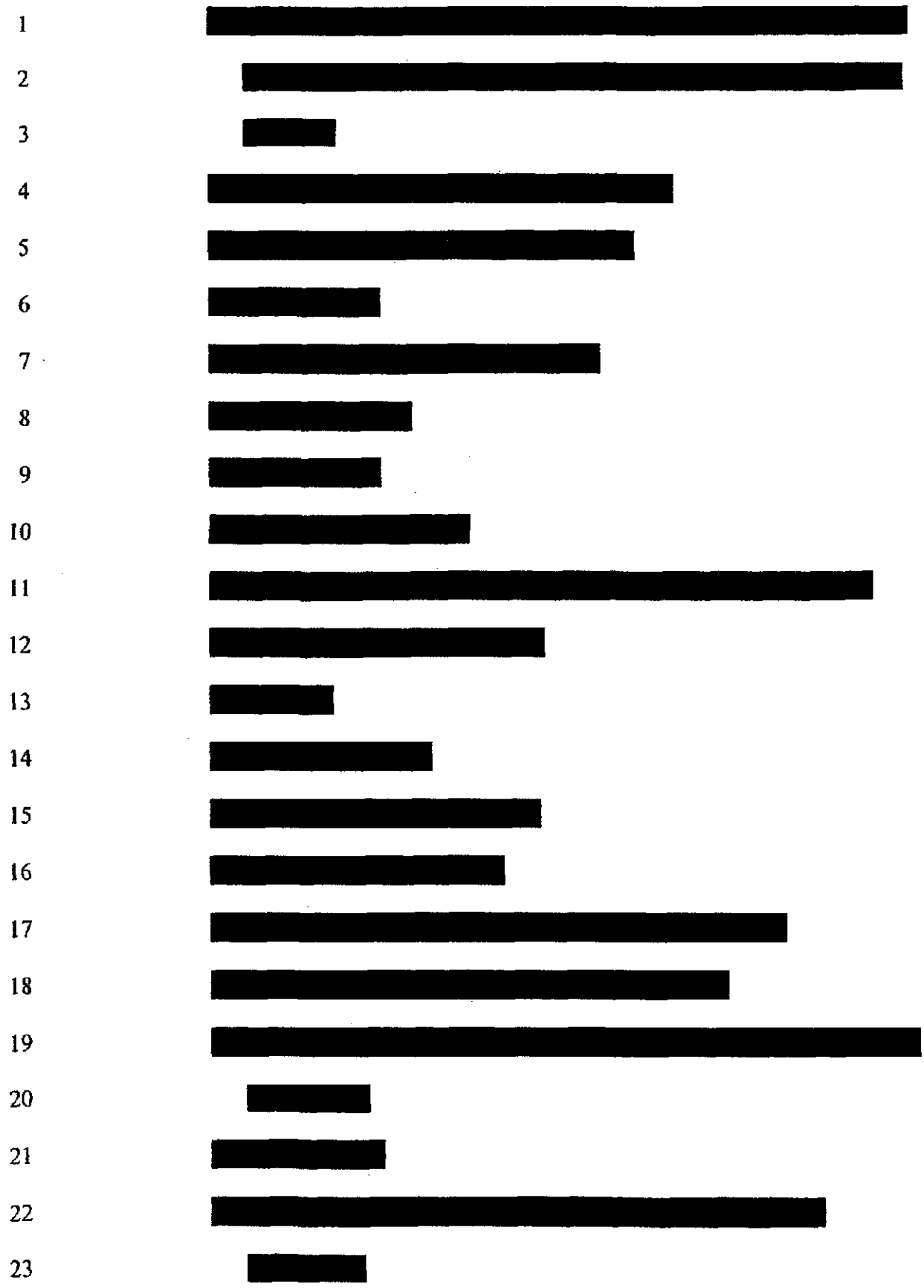
A. Cost components captured in the model include:

[redacted]

Q. PLEASE DESCRIBE ANY ADDITIONAL DATA USED IN THE MODEL.

A. In addition to the costs and benefits associated with the SmartGrid Initiative, the model also considers DE-Ohio service territory-specific data, specific financial assumptions, and relevant operating characteristics. These include:

[redacted]



Q. HOW IS THIS ADDITIONAL DATA USED BY THE MODEL?

A. This additional data is used to calculate benefits, costs, and NPV across the twenty years of the model.

Q. PLEASE DESCRIBE ATTACHMENT CDK-1.

A. Attachment CDK-1 is a summary of the cost benefit analysis I have described in my testimony, including specific assumptions, inputs, and results.

Q. WAS ATTACHMENT CDK-1 PREPARED BY YOU AND UNDER YOUR DIRECTION AND CONTROL?

A. Yes.

Q. WHAT WERE THE RESULTS OF THE MODEL?

A. In terms of capital expenditures, $431.56 million is forecasted to be spent during the five-year deployment of 2009-2013. (2008 deployments are included in 2009 data). Over twenty years, capital expenditures are expected to rise to $715.13 million with a twenty-year NPV of $463.41 million.

In terms of benefits, $74.41 million is forecasted to be saved during the five-year deployment of 2009-2013. (2008 deployments are included in 2009 data). Over twenty years, savings are expected to rise to $840.66 million with a twenty-year NPV of $353.01 million. (Benefits are less in the early years as many benefits are directly proportional to the amount of meters replaced or modules installed and several are dependent on longer information technology implementation schedules.)

In terms of O&M expenses, $51.65 million is forecasted to be spent during the five-year deployment of 2009-2013. (2008 deployments are included in 2009

data). Over twenty years, O&M expenses are expected to rise to $312.86 million with a twenty-year NPV of $142.35 million.

In terms of overall NPV for the cost/benefit model for the SmartGrid project, a twenty-year NPV of <$294.35> million is calculated.

Offsetting this NPV are customer and societal benefits ranging from approximately $380 million to $2.20 billion. Customer and societal benefits are wide-ranging due to the dependency on high-level industry estimates and studies.

Q. DID YOU PREPARE A MORE DETAILED EXHIBIT CONTAINING THE COMPONENTS AND RESULTS OF YOUR MODEL?

A. Yes. My report is attached as CDK-1.

IV. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

ATTACHMENT CDK-1

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