BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of Wisconsin Electric Power Company for a Certificate of Public Convenience and Necessity to Construct and Operate the South Oak Creek CT Project, Consisting of Five Natural Gas-Fired Single-Cycle Combustion Turbines Generating Up to 1100 MW total at the South Oak Creek Facility in the City of Oak Creek, Milwaukee County, Wisconsin	)	Docket No. 6630-CE-317

DIRECT TESTIMONY OF DR. YANELLI NUNEZ ON BEHALF OF HEALTHY CLIMATE WISCONSIN AND THE UNION OF CONCERNED SCIENTISTS

I. INTRODUCTION AND QUALIFICATIONS

Q: Please state your name, employer, and business address.

A: My Name is Yanelli Nunez. I am an employee of PSE Healthy Energy ("PSE"). My business address is 1440 Broadway, Suite 750, Oakland, California 94612.

Q: On whose behalf are you submitting this direct testimony?

A: I am testifying on behalf of Healthy Climate Wisconsin ("HCW") and the Union of Concerned Scientists ("UCS").

Q: Please summarize your qualifications, experience, and education.

A: I have a PhD in Environmental Health Sciences from Columbia University's Mailman School of Public Health, and a Bachelor of Science with a minor in public health from San Diego State University. My work experience is outlined in detail in my resume, Ex.-HCW/UCS-Nunez-1. I am currently employed as a Research Scientist at PSE.

Q: Please describe PSE and your work as a Research Scientist.

A: PSE is a scientific research institute generating energy and climate solutions that protect public health and the environment. We provide expertise in public health, environmental science, and engineering and bring science to energy policy through actionable research, communications, and advising. My work as a Research Scientist focuses on performing research in climate, energy, environmental health, and environmental equity using data science and applied statistics. This includes developing data analysis approaches and analyzing and deriving insights from complex demographic, energy, and environmental datasets. I write briefs, reports, and proposals summarizing technical concepts and project outcomes and present complex quantitative findings to both technical and non-technical audiences.

Q: Have you testified before the Public Service Commission of Wisconsin (the "Commission") previously?

A: No.

Q: Have you provided comments in similar regulatory proceedings?

A: Yes. For example, I previously created maps and conducted geospatial analyses presented during hearings with the Albuquerque Air Quality Control Board regarding the proposed Health, Environment, and Equity Impacts ("HEEI") Rule. Adopted in December 2023, the HEEI Rule allows the City of Albuquerque's Environmental Health Department to address the disproportionate impacts of air pollution on Bernalillo County residents' health.

Additionally, I recently authored a short-form report analyzing various environmental justice mapping tools and their methodologies. This report was prepared for a neighborhood coalition and submitted as part of public comments on the Overburdened

Areas Maps currently under development by the City of Albuquerque's Environmental Health Department as part of the HEEI Rule implementation.

Q: Are you sponsoring any exhibits?

A: Yes. I am sponsoring the following exhibits:

- Ex.-HCW/UCS-Nunez-1: Resume of Yanelli Nunez;
- Ex.-HCW/UCS-Nunez-2: Report entitled "Health, Equity, and Economic Impacts of Proposed Gas Power Plants in Wisconsin: Oak Creek and Paris Projects;"
- Ex.-HCW/UCS-Nunez-3: User's Manual for the CO-Benefits Risk Assessment Screening Model (Version 5.1);
- Ex.-HCW/UCS-Nunez-4: InMAP: A Model for Air Pollution Interventions; and
- Ex.-HCW/UCS-Nunez-5: Wisconsin Opportunity in Domestic Energy Production: The Economic and Health Benefits of 100% In-State Energy Production.

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to analyze the public health, environmental equity, and economic impacts associated with changes in air quality resulting from the construction and operation of the proposed Oak Creek combustion turbine project ("the Project"). The Project is a fossil gas electricity generating facility with a capacity of approximately 1,100 MW, which Wisconsin Electric Power Company ("WEPCO" or the "Company") seeks a certificate of public convenience and necessity ("CPCN") for in this proceeding. My testimony describes: (1) potential environmental equity concerns and demographic

characteristics associated with the Project's location, (2) projected emissions and the health and economic impacts of the Project, and (3) projected greenhouse gas emissions attributable to the Project. In sum, my testimony uses health, projected emissions, and demographic data to estimate the potential economic harm the Project would cause to Wisconsinites and the country if built.

Q: What is your recommendation to the Commission?

A: I recommend that the Commission reject WEPCO's request for a CPCN and direct the Company to pursue an alternative generation portfolio that minimizes emissions, to the extent possible, to meet WEPCO's forecasted load and avoid the health and economic impacts associated with the Project.

II. OVERVIEW OF THE PROJECT

Q: Please describe the Project.

A: The Project consists of five new combustion turbine generators with a capacity of approximately 220 megawatts each (totaling a combined capacity of 1,100 megawatts) and an estimated annual capacity factor between 10% and 20%. According to the proposal, the facility has an operating life of no less than 30 years.[1]

Q: Is WEPCO planning on constructing fossil gas infrastructure in addition to the Project?

A: Yes. In addition to the Project, WEPCO has also submitted applications to construct the Paris Generation Project, consisting of seven fossil gas-fired reciprocating internal combustion engines ("RICE"); the Oak Creek LNG project, a new liquified fossil gas facility and pipelines; and the Rochester Lateral project, a new 33-mile fossil gas

[1] Ex.-WEPCO-Application-6630-CE-317 OCCT CPCN_Application_CONFIDENTIAL_Revised_Redlined_6.13 (REDACTED COPY): 4-6.

transmission pipeline. WEPCO has also proposed to convert two coal plants—Elm Road Generating Station and Weston Unit 4—to 100% fossil gas generating facilities.[2]

III. REPORT, CONTENT, AND METHODOLOGY

Q: Please describe the "Health, Equity, and Economic Impacts" report that PSE prepared.

A: For this docket, PSE prepared a report entitled "Health, Equity, and Economic Impacts of Proposed Gas Power Plants in Wisconsin: Oak Creek and Paris Projects." The report documents the methodology and findings of analysis that PSE conducted for two proposed fossil gas plant facilities in Wisconsin: the Oak Creek combustion turbines that are the subject of this case and the Paris RICE units, which the Commission is considering in Docket No. 6630-CE-316. We examined: (1) environmental equity and demographic considerations, (2) air pollutant emissions and their associated health and economic impacts, and (3) greenhouse gas emissions. The report is attached to my testimony as Ex.-HCW/UCS-Nunez-2. The report uses two reduced-form air models bundled with health and demographic data to estimate the economic harm the Project and the Paris RICE facility would have if built. However, the report does not consider the health and economic impact of WEPCO's other proposed projects where it would construct fossil gas pipelines, build a liquified natural gas facility, and convert existing coal plants to 100% fossil gas generating facilities.

[2] 05-AF-109, 5-AF-109 Accounting Request Related to Pre-Certification Costs_REVISED CONFIDENTIAL (REDACTED COPY): 2-3 (PSC REF#: 501790) (Any information contained in this citation, based solely on this citation, is not record evidence. (NRE)).

Q: How did PSE evaluate the health and economic impacts associated with the emissions of the Project?

A: PSE used two models to estimate the health and economic impacts resulting from the Project. First, PSE utilized the U.S. Environmental Protection Agency's ("EPA") CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool ("COBRA").[3] This model, first released in 2001, is widely used in scientific literature. Also, policymakers frequently utilize COBRA to inform their decision-making processes. COBRA places a unit value ($) on various health impacts resulting from air pollution. For example, the unit value for premature mortality (generally associated with the highest economic impact) is based on the Value of a Statistical Life ("VSL"), which the EPA estimates using willingness-to-pay surveys and labor market studies. These methods assess how much people value risk reductions or are compensated for higher-risk jobs. The EPA currently uses a VSL of $7.4 million (2006), adjusted to the analysis year for inflation. The unit values included in COBRA allowed PSE to estimate the economic impact stemming from the health impacts associated with the Project. Second, PSE utilized the Intervention Model for Air Pollution ("InMAP"), which provides higher geospatial resolution relative to COBRA, to map the health and economic impacts associated with the Project.[4]

Both tools utilize reduced-complexity air quality modeling to calculate changes in air quality following the construction of fossil fuel electricity generating facilities using projected emissions data. When used together, COBRA provides an overall understanding of the scale of public health and economic impacts from each proposed facility, while

[3] *See* Ex.-HCW/UCS-Nunez-3.

[4] *See* Ex.-HCW/UCS-Nunez-4.

InMAP offers the spatial resolution necessary to map those impacts in greater detail. Notably, EPA's methodology for characterizing health and the associated economic impacts in COBRA has undergone rigorous review by two National Academy of Sciences panels and multiple EPA Science Advisory Boards. To calculate health and economic impacts, PSE used the maximum annual emissions for the Project from Table 5-9 of the revised application plus annual total start-up and shutdown emissions from Table 5-7.[5] Table 5-9 shows WEPCO's estimate of the maximum expected annual emissions from the Project—five turbines and the facility operating at a 20% capacity factor.

Q: Are there any limitations to the models that PSE utilized?

A: Yes. COBRA estimates atmospheric PM2.5 and ozone-related health impacts; however, the health endpoints included in COBRA do not capture all the pathways through which these pollutants affect health. For example, research has found associations between preterm birth and a mother's exposure to air pollution, but this adverse health outcome and its economic impact are not evaluated in COBRA. Similarly, InMAP only evaluates PM2.5-related premature mortality and does not consider other adverse health outcomes or ozone-related health impacts. Additionally, these models do not capture the direct impacts of volatile organic compounds, many of which EPA has identified as hazardous air pollutants. For example, fossil fuel combustion can produce benzene, a known carcinogen, but neither COBRA nor InMAP have the capability to calculate the health and economic impacts directly associated with benzene. Further, COBRA and InMAP do not capture the health impacts of other factors, such as the on-site disposal of toxic materials. Finally, COBRA and InMAP also do not account for the health and economic costs associated with

[5] Ex.-WEPCO-Application-6630-CE-317 OCCT CPCN_Application_CONFIDENTIAL_Revised_Redlined_6.13 (REDACTED COPY): 5-27 (Table 5-7), 5-28 (Table 5-9).

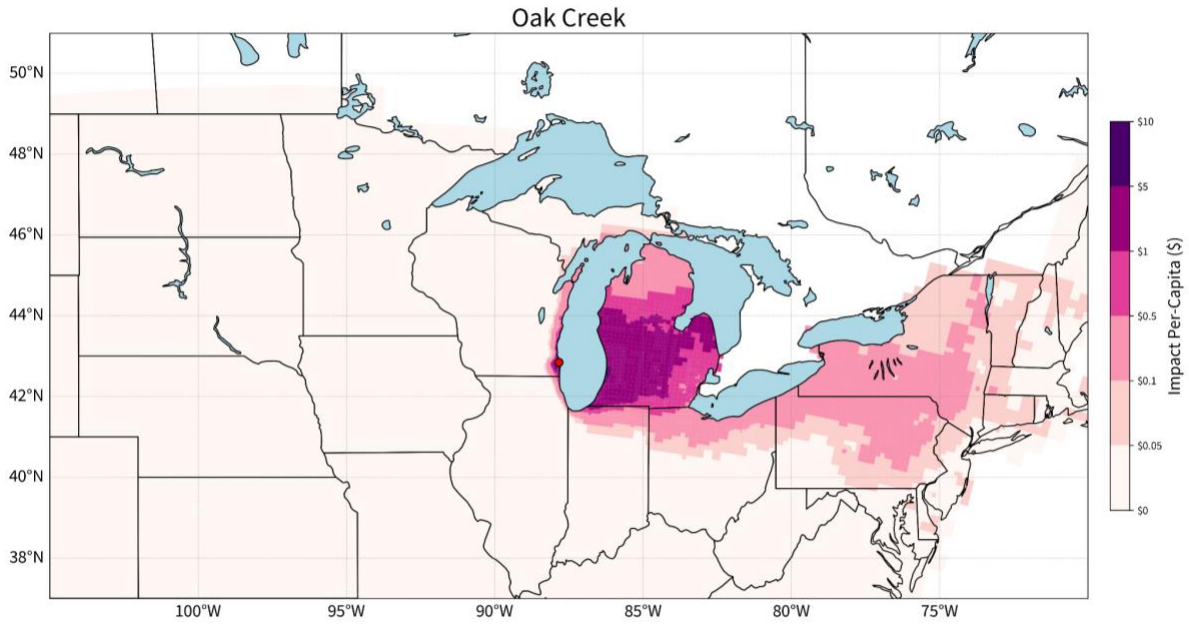
increased and cumulative greenhouse gas emissions. Therefore, COBRA and InMAP likely understate the public health and economic impacts associated with the Project.

Q: What are the "Health, Equity, and Economic Impacts" report's key findings concerning the Project's overall emissions and health and economic impacts?

A: The Project produces health and economic impacts for Wisconsin and the rest of the country. Across the nation, the Project's maximum projected annual emissions are estimated to cause between 5.5 and 8.8 statistical premature mortalities each year, approximately eight emergency room visits for respiratory conditions, and 23 incident cases of asthma nationwide, among other adverse health outcomes. These emissions are also projected to result in an annual nationwide 1,507 missed school days and 363 lost workdays due to illness. The economic impact of these health events is substantial. PSE found that the annual mortalities, nonfatal heart attacks, asthma cases, emergency room visits, missed school days, lost workdays, minor restricted activity days, and other adverse health outcomes produce economic harm of $92.8 million to $144.8 million each year nationwide.

The figure below shows the per capita economic impacts stemming from PM2.5-related premature mortality associated with the Project.

Figure 1: Spatial Distribution of the Project's Per Capita Economic Impact in Dollars[6]



Put simply, this map shows where the Project will contribute to premature mortality and the annual costs that the Project will impose on communities. The InMAP analysis shows the Project's health and economic impacts from pre-mature mortality associated with PM2.5 exposure are highest near the facility in Southeast Wisconsin but spread across multiple states, especially downwind from the facility site. For example, COBRA estimates that the Project would cause between 0.73 to 1.2 statistical premature mortalities annually and produce economic harm of between $12.3 to $19.2 million per year in Michigan, the downwind neighboring state.

Notably, the health and economic impacts detailed above reflect only a single year of facility operations. However, according to WEPCO's application, the Project will

[6] Ex.-HCW/UCS-Nunez-2-13 (Figure 2).

operate for no less than 30 years.[7] Projecting the same economic harm every year over a thirty-year period would result in a total nationwide economic impact for the Project of between $2.7 billion and $4.3 billion.

Q: What are PSE's findings about the emissions and health impacts of the Project in Wisconsin specifically?

A: In Wisconsin alone, the Project's maximum projected annual emissions are estimated to result in between 1.7 and 2.7 statistical premature mortalities each year, 458 missed school days, and 118 lost workdays due to illness, among other adverse health outcomes. The economic impact in Wisconsin ranges from $28.1 million to $44.9 million annually. This economic impact represents just a single year of facility operations, which means that over a 30-year operational lifespan, the cumulative economic burden to Wisconsin could reach between $843 million to $1.3 billion, along with 51 to 84 statistical premature mortalities. I also note that researchers from the University of Wisconsin – Madison have likewise found that reducing and/or eliminating Wisconsin's reliance on fossil fuels would reduce statistical premature mortalities and provide health and economic benefits for the state.[8] As shown in Figure 1, communities along Lake Michigan and near the facility will experience the bulk of the health and economic impacts due to the location of the Project. This economic burden also adds to the worsening impacts of climate change. In 2024, extreme weather events and other climate effects cost Wisconsin between $500 million and $1 billion.[9]

[7] Ex.-WEPCO-Application-6630-CE-317 OCCT CPCN_Application_CONFIDENTIAL_Revised_Redlined_6.13 (REDACTED COPY): 4-6.

[8] *See* Ex.-HCW/UCS-Nunez-5-11, 15 (Table 3).

[9] Ex.-HCW/UCS-Nunez-2-13-14.

Q: Please describe the current air quality in the communities adjacent to the Project.

A: Based on PSE's assessment, the communities near the proposed site locations are already affected by ozone pollution. The proposed locations are in areas that currently do not meet the 8-Hour Ozone National Ambient Air Quality Standard ("NAAQS"), which was set to provide public health protection. Air pollution emissions from the proposed facilities will contribute to ozone formation which would exacerbate the air quality issues these communities are already facing. Additionally, the analysis performed by PSE using the EPA's Environmental Justice Screening and Mapping Tool ("EJScreen") indicates the area where the Project would be located has high emissions of toxic air pollutants from existing industrial facilities based on reports to the EPA's Toxics Release Inventory ("TRI") Program. The Toxic Release to Air EJScreen indicator, which captures toxic releases to air from TRI facilities, is 60% higher than the state average and three times higher than the federal average for the communities near the proposed Oak Creek project. Thus, the Project would operate in an area already affected by industrial air pollution.

Q: What will the real life impact of the Project be for the communities near the Project?

A: The Project will release air pollution into nearby communities, increasing the likelihood of adverse health outcomes such as premature mortality, cardiovascular disease, and respiratory diseases, among others. In running EJScreen for the City of Oak Creek, we found that the 3-mile area around the Project site is above the state average for ozone and air toxics, as well as proximity to superfund sites.[10] The City of Oak Creek is located south of Milwaukee, with the proposed site just a two-and-a-half-mile drive from Deerfield Elementary School; the Early Childhood Education Center, a preschool and childcare

[10] Ex.-HCW/UCS-Nunez-2-6 (Table 2).

facility; and Country View Assisted Living, an assisted living and memory care facility. The Project is also located next to the Bender Park Hiking Trail on the shores of Lake Michigan. Exposure to ground-level ozone and other toxic air pollutants, can have negative health implications for the surrounding community, especially for vulnerable populations such as children, older adults, and people with health conditions. Children face an elevated risk from environmental stressors, including air pollutants, due to their developing bodies, while older populations are also at higher risk because aging bodies are less capable of compensating for environmental impacts.[11] Air pollution exposure is linked to a wide range of adverse health outcomes, affecting virtually every system in the body, including our cardiovascular, respiratory, and neurological systems, as well as loss of work, school, and activity days due to illness. The results of the EJScreen indicate that the addition of the Project would risk adding pollution to a high-density community already burdened with high cumulative pollution from other sources.

Q: Did you analyze the greenhouse gas emissions attributable to the Project and, if so, what did you find?

A: The Project would produce an estimated 1.28 million tons of carbon dioxide equivalents (CO_2e) per year. The CO_{2e} emissions reflect maximum on-site greenhouse gas emissions reported in the Project application.[12] This accounting of greenhouse gas emissions does not include sources like upstream methane leakage, which can increase the climate footprint of fossil gas plants.

[11] *Older Adult and Air Quality*, **AirNow,** https://www.airnow.gov/air-quality-and-health/older-adults/#:~:text=As%20people%20age%2C%20their%20bodies,disease%20and%20asthma%2C%20and%20diabetes (last visited Jan. 13, 2024) (NRE).

[12] Ex.-WEPCO-Application-6630-CE-317 OCCT CPCN_Application_CONFIDENTIAL_Revised_Redlined_6.13 (REDACTED COPY): 5-28 (Table 5-9).

Q: What action do you recommend that the Commission take in this proceeding?

A: I recommend that the Commission reject the CPCN because of the health and economic consequences I describe, which PSE details in the report. The Project will have health and economic impacts on Wisconsin and the rest of the country which could be avoided with generation portfolios that do not rely on fossil fuels.

IV. ALTERNATIVES TO THE PROJECT

Q. Did you review alternative modeling scenarios to serve WEPCO's forecasted load while developing your testimony?

A. Yes, I reviewed Clean Wisconsin's testimony from the Paris RICE CPCN docket, 6630-CE-316. Specifically, I read the testimony of Mr. Jester from 5 Lakes Energy and Ms. Hotaling of Energy Futures Group.

Q. What did the witnesses discuss in their testimony?

A. Mr. Jester takes issue with WEPCO's load forecast which informed the Company's proposal to construct both the Project and the Paris RICE facility. Specifically, he noted that WEPCO does not have a contract for the new load that is driving the need for the Project and the Paris RICE facility.[13] He also noted that large user customers typically explore multiple sites before committing to a specific utility.[14] He recommends that the Commission reject the CPCN request for the Paris RICE facility because of the uncertainty surrounding WEPCO's load forecast.[15]

Ms. Hotaling used the PLEXOS software to modify the modeling which WEPCO performed and proposed alternative generation portfolios for the Company based on

[13] 6630-CE-316, Direct-CW-Jester-p-4-6 (NRE).
[14] *Id.* at 6-7 (NRE).
[15] *Id.* at 18 (NRE).

various assumed forecasted loads.[16] Ultimately, she concluded that if WEPCO's forecasted load increase is reduced by half, the Company should reduce the capacity of the Project from 1,185 MWs to 474 MWs.[17] Similarly, if WEPCO's load does not grow at all, her modeling runs find that WEPCO should forego constructing the Project and should instead develop solar, wind, and battery storage resources.[18]

Q. What conclusions do you draw from the testimony of these witnesses?

A. While I have not analyzed WEPCO's load forecast, I note that Clean Wisconsin's proposal to reduce the size of the Project or replace it with renewable resources would reduce and/or eliminate the PM2.5 and ozone-related health and economic impacts PSE observed. The Commission should take all reasonable steps to reduce air pollution stemming from the Project because of the health and economic impacts discussed above. Thus, I recommend that the Company direct WEPCO to pursue an alternative generation portfolio that, to the extent possible, eliminates the Project's health and economic impacts.

V. SUMMARY AND RECOMMENDATIONS

Q: Please summarize your findings and testimony.

A: Based on the modeling and analysis PSE performed, the Project will have substantial health and economic impacts, both nationwide and in Wisconsin specifically. The Project will contribute to premature fatalities, nonfatal heart attacks, incidences of asthma, missed school days, lost workdays, and other adverse health outcomes associated with air pollution. In total, the economic impact of the Project, over its thirty-year life, could be between $2.7 billion and $4.3 billion across the country and $843 million to $1.3 billion in

[16] *See* 6630-CE-316, Direct-CW-Hotaling-p-3 (NRE).
[17] *Id.* at 16-17 (NRE).
[18] *Id.* at 17 (NRE).

Wisconsin. Moreover, these figures might understate total health and economic harm due to the modeling limitations of COBRA and InMAP.

Q: What recommendations do you have for the Commission in this case?

A: I recommend that the Commission reject WEPCO's request for a CPCN and direct the Company to pursue an alternative generation portfolio that minimizes emissions, to the extent possible, to meet WEPCO's forecasted load. Taking this step will significantly reduce the health and economic impacts associated with the Project.

Q: Does this conclude your testimony?

A: Yes.