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Richard George
Assistant General Counsel

October 2, 2015

Via Electronic Filing and U.S. Mail

Oregon Public Utility Commission
Attention: Filing Center
PO Box 1088
Salem OR 97308-1088

Re: UM 1744 – NW Natural’s Application of an Emission Reduction Program

Attention Filing Center:

Enclosed for filing in UM 1744 is Portland General Electric Company’s **Response Testimony**.
This document is being filed by electronic mail with the Filing Center.

Thank you in advance for your assistance.

Sincerely,

A handwritten signature in blue ink, appearing to read "Richard George", with a long horizontal flourish extending to the right.

Richard George
Assistant General Counsel

JRG:jrb
Enclosures

**BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON**

**UM 1744
In the Matter of
NORTHWEST NATURAL GAS COMPANY,
dba NW NATURAL**

**Application for Approval of an Emission Reduction
Program**

PORTLAND GENERAL ELECTRIC COMPANY

Response Testimony of

Joe Barra

October 2, 2015

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I. Introduction and Summary

1 **Q. Please state your name and position with Portland General Electric Company**
2 **(PGE).**

3 A. My name is Joe Barra. I am a Senior Consultant in Customer Strategy & Business
4 Development.

5 **Q. Are you the same Joe Barra that previously provided testimony in this proceeding?**

6 A. Yes.

7 **Q What is the purpose of your response testimony?**

8 A. My testimony reiterates concerns expressed about Northwest Natural's (NWN) original
9 filing and supports testimony submitted by PacifiCorp and the Citizens' Utility Board
10 (CUB) in response to that filing. My testimony also responds to Staff's request that PGE
11 propose a methodology for calculating the carbon reductions.

12 **Q. Please summarize the issues with NWN's filing raised in your original testimony.**

13 A. My testimony addressed three key issues for PGE:

14 1. As a matter of policy, it is inappropriate to use ratepayers' funds to promote
15 fuel switching;

16 2. As a matter of policy, it is inappropriate to use funds collected from electric
17 utility customers and designated for electric energy efficiency to promote natural
18 gas conservation;

19 3. The methodology used by NWN in calculating the avoided greenhouse gas
20 emissions associated with displaced utility electric generation contains significant
21 analytical flaws.

1 **Q. With regard to Issue 1, does PGE have additional policy concerns about the use of**
2 **customers' funds to promote fuel switching?**

3 A. In addition to the concerns initially expressed, PGE supports CUB's recommendation that
4 NWN's filing be amended to consider all of the impacts of fuel switching for customers
5 of both NWN and the electric utilities.

6 **Q. With regard to Issue 2, does PGE have anything to add to its original testimony?**

7 A. PGE would like to reiterate that any savings would be natural gas savings - there would
8 be no reductions in kWh usage at the combined heat and power (CHP) customer site. To
9 produce the same amount of kWh, a well-designed CHP system at a customer site will
10 use less natural gas than a theoretical utility natural gas plant because of the CHP
11 system's increased efficiency (i.e., smaller heat rate). For this reason, any incentives
12 provided by the ETO should be sourced from funds collected from NWN customers for
13 natural gas conservation measures.

14 **Q. Please explain how the ETO justifies the award of electric customer incentive**
15 **dollars to the gas company for CHP.**

16 A. The ETO¹ assumes the saved natural gas from installation of a CHP system would fuel a
17 modern Combined Cycle Combustion Turbine (CCCT) to generate electricity. As a
18 result, the ETO converts the saved natural gas into "kWh equivalents" by using the heat
19 rate of the theoretical natural gas plant².

20 **Q. Does PGE agree with the assumption of kWh savings?**

21 A. No.

¹ See Exhibit 1.

² The natural gas plant is assumed to be a modern CCCT with a 6,800 Btu/kWh heat rate.

1 **Q. Staff has asserted that ETO's conversion of gas savings to kWh savings for CHP**
2 **projects is a practice that started nearly a decade ago. Why did PGE wait until now**
3 **to raise objections?**

4 A. As NWN notes in its filing, there was little CHP activity in Oregon during the prior
5 decade. Given that NWN is proposing a program aimed at significantly accelerating
6 customer adoption of CHP and the ETO is proposing to triple their incentive (from
7 \$.08/kWh to \$.25/kWh), PGE is raising its objections now.

8 **Q. Has PGE questioned the ETO about its practice to use electric customer funding for**
9 **natural gas savings?**

10 A. Yes. The ETO is relying on Department of Justice advice that its practice is not illegal.
11 It has also stated, through its Director of Operations, Steve Lacey, that it is operating
12 under the direction given by the Oregon Public Utility Commission (OPUC). Given
13 PGE's concerns, Lacey reports that until it receives further direction from OPUC Staff,
14 the ETO is not making incentive offers for CHP.³

15 **Q. Does PGE have additional concerns about the ETO's methodology?**

16 A. No. Other than its objections to the conversion of gas savings, PGE supports ETO's use
17 of a modern CCCT as an appropriate proxy for the avoided generation resource.

18 **Q. With regard to Issue 3, what methodology does PGE propose to calculate the carbon**
19 **emissions reductions in its filing?**

20 A. Consistent with what the ETO uses for natural gas savings, PGE supports the use of a
21 modern CCCT as the avoided generation resource in establishing a baseline for carbon
22 emissions reductions adjusted for line losses. In our case, that would be the Carty

³ See Exhibit 2.

1 Generation Station (Carty), which is the same resource we use in calculating our standard
2 avoided cost prices. The carbon intensity for Carty is forecast to be approximately 810
3 lbs of CO₂e/MWh⁴.

4 **Q. You proposed a general approach to the methodology for calculating carbon**
5 **emissions reductions. What would you propose if the methodology were to be utility**
6 **specific?**

7 A. If a utility-specific methodology for calculating carbon emissions reductions is used, PGE
8 would refer to our latest Avoided Cost Filing⁵ and 2013 Integrated Resource Plan⁶ (IRP).
9 Consistent with PGE's Avoided Cost Filing, during periods of resource sufficiency, PGE
10 proposes the avoided generation resource in establishing a baseline for carbon emissions
11 reductions adjusted for line losses is market purchases. The 2013 IRP assumes that the
12 carbon intensity of market purchases is 900 lbs of CO₂e/MWh⁷. This carbon intensity
13 results from a CCCT with a 7,500 Btu/kWh heat rate, representative of F-Class
14 technology units.⁸ We note that in practice, the emissions from market purchases may
15 vary depending on the specific generator, which could be a hydro facility (0 lbs of
16 CO₂e/MWh), a renewable facility, a gas facility, another fossil fuel facility, or an
17 unspecified facility. Oregon Department of Environmental Quality sets the carbon
18 intensity for unspecified market purchases at 1,100 lbs of CO₂e/MWh.⁹

19 During periods of resource deficiency, PGE proposes the avoided generation
20 resources in establishing a baseline for carbon emissions reductions adjusted for line

⁴ See page 115 of [PGE's 2013 IRP](#).

⁵ <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=19526>

⁶ https://www.portlandgeneral.com/our_company/energy_strategy/resource_planning/docs/2013_irp.pdf

⁷ See page 216 of [PGE's 2013 IRP](#).

⁸ See page 216 of [PGE's 2013 IRP](#).

⁹ <http://www.deq.state.or.us/eq/climate/docs/GHGiouProtocols.pdf>

1 losses are what PGE would have built or acquired in absence of the proposed CHP
2 program. Consistent with PGE's Avoided Cost Filing, the avoided generation resource in
3 the resource deficiency period is a modern CCCT. As the proposed CHP program will
4 reduce PGE's system load, PGE's post 2020 Oregon Renewable Portfolio Standard¹⁰
5 (RPS) additions would be diminished. In accordance with the 2013 IRP's 'preferred
6 portfolio' and the RPS, every MWh of system load reduced by a CHP program will lower
7 PGE's need for renewable additions by an average of 0.21 MWh between 2020 and 2026
8 in addition to replacing 1 MWh of PGE's modern CCCT additions. The carbon intensity
9 associated with this mix of avoided generation resources is forecast to be approximately
10 667 lbs of CO₂e/MWh as illustrated in the attached PGE Exhibit 3.

11 The 10-year baseline (from 2017 to 2026)¹¹ carbon intensity average for
12 emissions reductions, reflecting the different avoided generation resource in PGE's
13 resource sufficiency and resource deficiency periods, is approximately 760 lbs of
14 CO₂e/MWh¹². This carbon intensity number more accurately reflects the avoided carbon
15 intensity on PGE's system.

16 **Q. Does PGE have other concerns with NWN's filing?**

17 A. Yes. We understand that SB 844 was intended to promote projects the primary purpose
18 of which was to achieve carbon emissions reductions, not projects that would have been
19 undertaken anyway for other reasons. During the legislative session, the focus of SB 844
20 eligible projects was on developing natural gas fueling infrastructure. In fact, the Oregon
21 Trucking Associations, Inc. provided testimony in support of SB 844, relying on

¹⁰ https://www.oregon.gov/energy/P-I/Pages/RPS_home.aspx

¹¹ The reason for the 10-year horizon starting in 2017 is due to NWN's proposal for issuing 10 years of incentives to CHP program participants and the assumption that CHP systems would take 2-years to come online.

¹² See CO₂e tab of Exhibit 3.

1 opportunities in the transportation sector and switching heavy trucks from diesel fuel to
2 natural gas.¹³ However, NWN has not proposed natural gas fueling infrastructure in this
3 docket but has switched its focus to CHP instead. In fact, NWN has long been pursuing
4 CHP opportunities as part of their ordinary course of business. In the workshop held on
5 September 19, 2015, NWN acknowledged ongoing discussions with at least two large
6 customers regarding CHP. NWN's proposed \$10/ton incentive for pursuing these
7 opportunities is inappropriate and unnecessary, as well as being at odds with the intent of
8 SB 844.

9 **Q. What does PGE recommend in regards to the issues raised?**

10 A. PGE recommends the OPUC deny the CHP Program as filed by NWN.

11 **Q. Does this conclude your testimony?**

12 A. Yes.

¹³ <https://olis.leg.state.or.us/liz/2013R1/Downloads/CommitteeMeetingDocument/28465>

List of Exhibits

<u>PGE Exhibit</u>	<u>Description</u>
201	Natural Gas Combined Heat & Power (CHP) Guidelines
202	Email from Steve Lacey to Karla Wenzel, October 1, 2015
203	Carbon Intensity of Avoided Generation Resource Workbook

Natural Gas Combined Heat & Power (CHP) Guidelines

Eligibility

- Minimum Efficiency – Systems must meet or exceed a Fuel Chargeable to Power (FCP) heat rate of 6,120 Btu/kWh. This translates to a 56% FCP efficiency. The calculation of FCP heat rate can include a credit for the efficiency of the boiler that the heat recovery is offsetting. The Higher Heating Value (HHV) energy content of gas should be used for the FCP calculation. FCP is calculated as follows.

$$FCP = \frac{Gas\ Input\ (Btu) - \frac{Heat\ Recovered\ (Btu)}{Offsetting\ Boiler\ Efficiency}}{Net\ Electricity\ Generated\ (kWh)}$$

- Cost Effectiveness – All projects must pass Energy Trust of Oregon’s cost effectiveness screening.
- Selling power offsite – Only CHP systems that use the power and heat on site, behind the meter, are considered conservation and eligible to participate.
 - Systems that are intended to occasionally sell power to the grid may be eligible, however, Energy Trust of Oregon will only fund the portion of total electric generation that is used on site.
- Serving Utility – Eligible customers must be Pacific Power or PGE customers in Oregon.
- Fuel Source – The primary fuel source for the prime mover of the CHP must be natural gas.

Incentives

- Projects are processed as Custom projects, and follow all the normal program caps and guidelines, such as:
 - Incentives > \$500k require Board approval and must provide energy savings at a significantly better than average cost to Oregon ratepayers. Incentives will typically be negotiated at a lower rate than standard incentives detailed below.
 - Program-specific annual site incentive caps apply.
- Incentive Rates – Incentives will be provided at a rate of \$0.08/kWh, capped at 50% of eligible project costs.
 - Self-direct entities are eligible for incentives consistent with Energy Trust of Oregon’s most current self-direct policy, 4.10.000-P.
- Incentive Calculation – Incentives will be calculated based on net performance incremental to that of modern central power plants. For this calculation, the baseline heat rate is 6,800 Btu/kWh. Once FCP is determined, the savings can be calculated using the following equation.

$$Savings_{kWh} = \left(1 - \frac{FCP}{6800}\right) \times kWh_{CHP}$$

Determining the annual electric generation (kWh_{CHP}) and heat recovered requires an in-depth technical analysis (refer to CHP Technical Assessment section).

Preliminary Scoping

In order to procure technical resource assistance, or to begin a 3rd party review by Energy Trust of Oregon, the Energy Trust contractor must conduct a preliminary scoping meeting and site visit with the eligible end-use customer. In addition to providing standard information and format as per scoping for any custom project, a CHP Scoping Report should address the following questions:

- Is there access to natural gas or nearby low or no-cost renewable fuels (ex. landfill gas, farm manure, sawdust and other wood waste, food processing waste, etc.)?
- Does the facility operate for more than 5,000 hours per year?
- Does the facility have a large and relatively stable need for heat and electricity as is common in institutions such as hospitals or universities and industries such as pulp and paper, lumber and wood products, metal finishing, plastics, and food processing facilities?
- What is the proposed CHP system size and thermal application? Does the site have the ability to utilize most or all of the waste heat produced by a CHP system? (An ideal system is sized to the base thermal load to minimize wasted thermal energy.)
- Is there an existing central heating/cooling plant and distribution system in place?
- Does the customer have plans to replace major equipment or expand production or facility operations that will require added electric or thermal capacity?
- Is the customer concerned about power quality and/or reliability from the grid?
- Has the customer successfully implemented other energy efficiency measures and is motivated to reduce energy costs further?

CHP Technical Assessment

Following the preliminary scoping, a custom technical assessment study must be performed prior to an incentive offer. Energy Trust of Oregon will provide a technical assessment to the end use customer free of charge, through an Allied Technical Assistance Contractor (ATAC) chosen and managed by the Program. Alternatively, a facility or project developer can perform their own CHP study, without Energy Trust funding, and may submit that study to the Program for review and approval.

Technical assessments must quantify CHP performance to a high degree of accuracy and defensibility to serve as the basis for determination of an incentive. Below is an outline of major items to address in a CHP technical assessment.

1. Executive Summary
 - a. Facility Overview – Description of buildings, processes, annual hours of operation, seasonality, etc. This should identify and summarize key data of major equipment such as central plants, large process loads, HVAC equipment, etc.
 - b. Energy Usage – Existing facilities should provide three years of historic electric and gas usage data. New facilities should demonstrate, through engineering analysis, estimates

of annual electric and gas usage. Data should be as granular as possible and in no greater intervals than monthly.

- c. Proposed CHP Overview – Provide a high level summary of the system.
 - d. Economic Summary
2. CHP Details
- a. Include preliminary equipment selection data including type and efficiency rating of prime mover, (i.e. gas turbine, reciprocating engine, etc.) and equipment specifications.
 - b. Describe the annual use for heat and electric output from the CHP.
 - c. Provide floor plan to specify the location of the CHP.
 - d. Identify any required facility upgrades to accommodate the electric and heat output, rejected waste heat, etc.
3. Energy Analysis
- a. Describe analytical approach, provide submetering data, analytical files, etc.
 - b. Load profiles for heat and electric loads must be established in hourly intervals for a representative, full year. Interval metering and/or submetering is preferred to support load profile analysis.
 - c. Identify periods where CHP capacity may exceed the facilities ability to use electric or heat available from the CHP.
 - d. Perform hourly energy balance for one year period including CHP electric and heat output, parasitic loads, use of heat and electric and heat rejection.
 - e. Account for estimated downtime including planned maintenance and unplanned outages.
 - f. Document heating efficiency of heating load offset by heat recovery.
 - g. Calculate FCP accounting for offsetting boiler efficiency according to the formula below. The Higher Heating Value (HHV) of gas should be used in this calculation.

$$FCP = \frac{\text{Gas Input (Btu)} - \frac{\text{Heat Recovered (Btu)}}{\text{Offsetting Boiler Efficiency}}}{\text{Net Electricity Generated (kWh)}}$$
 - h. Calculate annual electric generation (kWh_{CHP}) using established annual load profiles and net system output.
 - i. Calculate performance incremental to central power plants according to the formula below.

$$\text{Savings}_{kWh} = \left(1 - \frac{FCP}{6800}\right) \times kWh_{CHP}$$
 - j. If applicable, determine appropriate incentive rate in accordance with Energy Trust of Oregon's most current self-direct policy, 4.10.000-P.
 - k. Calculate incentive based on savings incremental to central power plants.
4. Cost Details
- a. Provide detailed cost estimates that itemize equipment and installation costs.
 - b. Identify and price any required structural or building improvements required.
 - c. Include any required electrical upgrades and interconnect expenses.
 - d. Include design, permitting, rigging, commissioning and any other expenses.

Energy Trust of Oregon January 2015

- e. Identify required CHP system maintenance and include estimated costs.
 - f. Provide any quantifiable non-energy benefits, such as avoided maintenance costs.
 - g. All costs should be supported by additional detail included in the appendix.
5. Commissioning Plan
- a. Include all relevant operating criteria to ensure operation of the system as designed.
 - b. Include CHP controls including sequence of operations and integration with existing controls, if applicable.
 - c. Include a verification checklist of all equipment and operating parameters that should be verified by Energy Trust of Oregon to ensure complete installation and optimized operation.

From: [Steve Lacey](#)
To: [Karla Wenzel](#)
Cc: [Kim Crossman](#); [Debbie Goldberg Menashe](#)
Subject: RE: UM 1744 NWN CHP filing
Date: Thursday, October 01, 2015 8:51:09 AM
Attachments: [CHP Guidelines-Final_010515.docx](#)
[4.11.000_Combined Heat and Power Policy.doc](#)

Hi Karla: Sorry for this belated response, board meeting yesterday.

Energy Trust will not be providing testimony on UM 1744. We are operating under the direction given to us by the OPUC and the DOJ opinion on how we should treat natural gas fired CHP.

I have attached a document describing the process we follow in addressing CHP opportunities. The incentive item needs to be updated. Our recently revised CHP policy lifts the prescribed \$.08/kWh and allows the incentive to be set per program parameters, which currently is set at a maximum of \$.25/kWh and a \$500,000 cap.

Until we receive further direction from OPUC staff, we are not making incentive offers and will not be adjusting the \$.08/kWh until reviewed by our Conservation Advisory Council.

Feel free to reference these documents in your testimony as they are of public record.

Best regards,
Steve

Steve Lacey, CEM
Director of Operations

Energy Trust of Oregon
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This email is intended for its addressee(s) and may contain confidential information. If you receive this email in error, please notify me and delete it promptly. Thank you.

+ Please consider the environment before printing this email.

From: Karla Wenzel [mailto:Karla.Wenzel@pgn.com]
Sent: Wednesday, September 30, 2015 9:16 AM
To: Steve Lacey <Steve.Lacey@energytrust.org>
Subject: UM 1744 NWN CHP filing

Hi Steve:
Is the ETO going to be submitting testimony in the NWN CHP filing (by Friday

this week) going through the use of electric customer incentive monies for CHP and the background and reasoning? It'd be great if you were to add clarity to how the process goes. If not, how do you feel about writing us a letter explaining the approach? We'd use the letter as an attachment to our testimony.

Pls. advise and thanks very much.
karla

Karla Wenzel

503-464-8718

Purpose of this Workbook:

The purpose of this workbook is to calculate the carbon intensity of Portland General Electric's (PGE) avoided generation resource across the 10-year period from 2017 to 2026. The reason for the 10-year horizon starting in 2017 is due to Northwest Natural's proposal for issuing 10 years of incentives to combined heat and power (CHP) program participants and the assumption that CHP systems would take 2-years to come online. The carbon intensity of PGE's avoided generation resource is the baseline to calculate emissions reductions due to a CHP program.

Method 1:

This method reflects the Energy Trust of Oregon's methodology for calculating the emissions reductions due to a CHP program using a modern combined-cycle combustion turbine (CCCT) as PGE's avoided generation resource.

Method 2:

This method reflects PGE's methodology for calculating the emissions reductions due to a CHP program. It references PGE's latest Avoided Cost Filing and uses inputs from its 2013 Integrated Resource Plan (including new resources identified in the 'preferred portfolio'). The method identifies the avoided generation resource (and its respective carbon intensity) in both PGE's resource sufficiency period (2017-2020) and resource deficiency period (2021-2026). Consistent with PGE's Avoided Cost Filing, the avoided generation resource during the resource sufficiency period is market purchases. During the resource deficiency period, the avoided generation resource is a modern CCCT and additional Oregon Renewable Portfolio Standard eligible generation deferred by the CHP program. Conservatively, the method does not assume that additional RPS eligible generation replaces generation from the CCCT and consequently emissions. Instead, the method calculates the weighted average carbon intensity of the avoided CCCT generation and the avoided renewable resource generation. Using these inputs, the method calculates a 10-year average carbon intensity.

Avoided Generation Resource	Source	Carbon Intensity (lbs of CO2e/MWh)
Market Purchases	Portland General Electric's 2013 IRP (pg. 216)	900
Modern CCCT	Portland General Electric's 2013 IRP (pg. 115)	810
RPS Adjusted Modern CCCT	Portland General Electric's 2013 IRP (pg. 115)	667

Additional Renewable Generation Deferred by CHP Program 21%

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Standard Resource Sufficiency/Deficiency	Sufficient	Sufficient	Sufficient	Sufficient	Deficient	Deficient	Deficient	Deficient	Deficient	Deficient
Oregon Renewable Portfolio Standard (RPS)	15%	15%	15%	20%	20%	20%	20%	20%	25%	25%

