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**PUBLIC UTILITY COMMISSION  
OF OREGON**

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**UM 1744**

**STAFF RESPONSE TESTIMONY OF**

**Jason R. Salmi Klotz  
Max St. Brown**

**In the Matter of  
NORTHWEST NATURAL GAS COMPANY,  
dba NW NATURAL,  
Application for Approval of an Emission Reduction  
Program.**

**August 28, 2015**

CASE: UM 1744  
WITNESS: JASON KLOTZ

**PUBLIC UTILITY COMMISSION  
OF  
OREGON**

**STAFF EXHIBIT 100**

**Response Testimony**

**August 28, 2015**

1 **Q. Please state your name, occupation and business address.**

2 A. My name is Jason R. Salmi Klotz. I am a senior analyst with the Oregon Public  
3 Utility Commission (OPUC). My business address is 201 High Street SE Suite  
4 100, Salem, Oregon 97301-3612.

5 **Q. Please describe your educational background and work experience.**

6 A. My Witness Qualification Statement is found in Exhibit Staff/101.

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

8 A. To review the initial application (Application) for approval of a carbon emission  
9 reduction project submitted by Northwest Natural Gas Company (NW Natural  
10 or the Company).

11 **Q. Did you prepare an exhibit for this docket?**

12 A. Yes, Staff/101 identified above.

13 **Q. How is your testimony organized?**

14 A. My testimony is organized as follows:

15	Issue 1: Rate and Bill Impacts .....	5
16	Issue 2: Program Benefits.....	8
17	Issue 3: Cost Risk.....	11
18	Issue 4: Proposed Company Incentive .....	12
19	Issue 5: Measurement and Verification .....	14
20	Issue 6: Emission Reduction Incentive .....	16
21		

**Q. What are your recommendations?**

22 A. I make the following six recommendations.

23 Recommendation 1: Staff recommends NW Natural reevaluate the structure  
24 of the program and find other ways of assuring program participation while  
25 lowering the overall cost to ratepayers. Additionally, Staff notes that changes

1 to cost projections supplied by NW Natural have made analysis of the  
2 application challenging.

3 Recommendation 2: Staff recommends NW Natural revisit how it identified  
4 program benefits and take time to connect those benefits to the proposed  
5 program. Where possible NW Natural should leverage benefits to help assist  
6 with the cost and justification of the proposed program. NW Natural should  
7 also make an accounting of the potential emission reductions over the 20  
8 year measure life and look for opportunities to harness other potential  
9 benefits of this long measure life.

10 Recommendation 3: Staff recommends NW Natural supply information which  
11 shows how the cost of the program to ratepayers would change if it was  
12 unable to leverage the assistance of the Oregon Department of Energy  
13 (ODOE) or the Energy Trust of Oregon (ETO). Additionally, NW Natural  
14 should supply information about how program participation would change and  
15 how the individual unit payback period would change if NW Natural was  
16 unable to leverage the assistance of ODOE and ETO.

17 Recommendation 4: Staff recommends NW Natural re-evaluate its proposed  
18 Company incentive and develops a proposal that reflects the associated work  
19 and benefits obtained through implementation of the proposed emissions  
20 reduction program.

21 Recommendation 5: Staff recommends NW Natural create a baseline  
22 methodology for systems that are already producing steam, that the Company  
23 explain how Energy350 meets the definition of a third party independent

1 verifier, and demonstrate that the associated cost of Energy350's ongoing  
2 work is market competitive. This would entail a delineation of the specific  
3 tasks associated with the measurement, and monitoring and verification work  
4 to be conducted yearly at each site.

5 Recommendation 6: Staff recommends that NW Natural, revisit the participant  
6 incentive structure noting Staff witness St. Brown's testimony on the structure  
7 of the customer incentive. If, after exploring a market based auction method,  
8 NW Natural continues with the proposal of a flat rate incentive, per ton of  
9 emission reduced, then after the payback period has been reached at  
10 individual units, the Company ramp down the carbon emission savings  
11 incentive to a more market competitive payment.

12  
13 **Q. Do you support at this time approval of Northwest Natural's Application?**

14 A. No, as proposed, at this time I cannot support NW Natural's Application as filed.

15 **Q. Please explain why at this time you cannot support NW Natural's**  
16 **Application?**

17 A. I will first outline the issues I have identified at this early stage in the  
18 proceeding that make it so that I cannot support the Application. Then, I will  
19 follow with a detailed discussion of each issue.

- 20 1. Bill and Rate Impacts: NW Natural has supplied several different numbers  
21 to demonstrate the bill and rate impacts of the proposed program. These  
22 costs when using either data set are simply too high given the identified  
23 benefit. NW Natural filed an updated rate impact analysis in NWN OPUC

1 Information Request (IR) 3 Attachment-1. However, even these updated  
2 numbers show a significant potential cost uncertainty remains, which  
3 makes Staff unable to support NW Natural's Application.

4 2. Program Benefits: While there could be additional benefits of the proposed  
5 program, since NW Natural has not adequately identified them, Staff  
6 cannot use them in its assessment of the proposed program.

7 3. Cost Risk: If the proposed program cannot leverage the funds available  
8 through the Energy Trust of Oregon and the Oregon Department of  
9 Energy, the economics of NW Natural's proposed program become very  
10 different.

11 4. Proposed Company Incentive: NW Natural is proposing a \$10 per ton of  
12 CO<sub>2</sub>e emission reduction as an incentive for the Company. The rationale  
13 for this incentive is not directly connected to the current proposed program  
14 but is structured to incent the Company to undertake future efforts to  
15 develop future unnamed carbon reduction projects. Additionally the  
16 incentive appears to be out of proportion to the programs total costs.  
17 Further, in its initial Application, the Company does not acknowledge the  
18 other benefits it would receive from the proposed program.

19 5. Measurement and Verification: The proposed measurement and  
20 verification practices are, incomplete. There is little information on  
21 reporting requirements of the program participants, or the type of  
22 information which will be reported to the Commission and when it will be  
23 provided. Staff also could not identify a baseline methodology for current

1 steam usage. Further Staff is concerned about the independence of NW  
2 Natural's third party verifier Energy350.

3 6. Emission Reduction Incentive: Staff is concerned about how the \$30 per  
4 ton of CO<sub>2</sub>e participant incentive is structured. NW Natural's participant  
5 incentive should also account for the anticipated payback period and the  
6 project measure life of 20 years.

### 7 **Issue 1: High Customer Rate and Bill Impact**

8 **Q. Does Staff have concerns about the bill and rate impacts of NW Natural's**  
9 **application for a proposed emissions reduction project?**

10 A. Yes. Staff believes NW Natural's cited average monthly residential bill impact,  
11 which varies depending on the number of Combined Heat and Power (CHP)  
12 units in the program and their operating hours, are too uncertain and simply too  
13 high given the identified benefit (See NWN OPUC (IR 3) Attachment-1).  
14 Staff is also concerned about recent rate impact updates filed by NW Natural.  
15 The Company has filed a least one rate impact update in this proceeding. This  
16 has made analysis of the proposed project difficult and at times confusing. NW  
17 Natural has a duty to file final usable numbers for the proceeding. Further, the  
18 costs of the program vary widely given program adoption. It would be  
19 troublesome for the Commission to approve the Application with such  
20 potentially wildly varying cost impacts to customers.  
21 Finally, the cited average monthly cost of the program to residential customers,  
22 whether \$0.63, \$0.99, \$1.35, \$1.81 or \$2.50, are so high that they would likely

1 leave the average customer with little inclination to support additional costs for  
2 other subsequent programs.

3 **Q. Please explain these rate and bill impact concerns.**

4 Staff is concerned about the overall cost of NW Natural's Application to all  
5 customers and is deeply concerned about the overall average residential  
6 monthly cost cited by NW Natural. NW Natural states in footnote 7 of NWN/101  
7 Summers/27 that, "The average annual increase in a residential customer's  
8 monthly bill assuming a 100% utilization rate is \$2.50 based on average  
9 residential therm usage." However, in a subsequent response to Staff's data  
10 requests, NW Natural supplied OPUC (IR 3) Attachment-1. This response  
11 shows an estimated average monthly bill impact to a majority of residential  
12 customer spanning \$0.63 per customer per month to as high as \$1.35 per  
13 customer per month. This means a possible 2.2 percent rate increase to this  
14 one class of customers. This same data set shows some industrial ratepayers  
15 could see as high as an estimated 9 percent rate increase. Regardless of  
16 whether the impact to residential customers is a 2 percent rate increase or a  
17 \$0.63 average bill increase or even higher for other industrial customers the  
18 cost of the program is simply too high for one single project. Rate increases of  
19 this magnitude need much greater justification than the singular benefit  
20 identified by NW Natural.

21 **Q. Has NW Natural filed updated rate impacts of the Application?**

22 **A.** Yes. Through a subsequent filing as a response to Staff's data requests, NW  
23 Natural has refiled spreadsheets, as OPUC (IR 3) Attachment-1, showing rate



1 impacts of the proposed program. These changes to rate impacts have  
2 confused Staff and have likely confused other parties. One set of numbers  
3 supplied by NW Natural shows that a monthly rate increase for an average  
4 residential customer could be as high as \$2.50, (NW Natural's high utilization  
5 scenario). Although NW Natural did update its analysis of average residential  
6 monthly bill impacts by filing OPUC (IR 3) Attachment-1, the Company did not  
7 modify its analysis that led to the \$2.50 average residential monthly bill impact.  
8 This has led to a great deal of confusion for Staff.

9 **Q. Did the updated Company analysis cause you more confusion?**

10 A. Yes. The updated analysis supplied by NW Natural also shows that for one  
11 class of residential customers (Schedule 2R) the bill impact could be as high  
12 as \$1.35 per month based on average monthly usage or as low as \$0.63 all of  
13 which depends on the number of CHP megawatts participating in the program  
14 and operating hours of the units. The same updated spreadsheet shows  
15 some industrial customers will see as much as a 9.3 percent rate increase  
16 and most residential customers could see as much as 2.49 percent rate  
17 increase. As this is the first of possibly many carbon reduction projects  
18 undertaken by NW Natural the bill impact cited by the Company in this case  
19 would leave little appetite among NW Natural's ratepayers for additional  
20 projects. As explained below Staff believes that NW Natural could restructure  
21 the program at less cost. Finally, Staff witness Max St. Brown testifies that  
22 the Company would earn a margin of \$16,335,209 due to increased gas sales  
23 because of customer adoption of CHP. Therefore, the projected costs should

1 be revised to take into account the benefits the Company is expected to  
2 realize.

3 **Q. What is your recommendation about the bill and rate impacts of the**  
4 **Company's proposal?**

5 A. Staff recommends NW Natural re-evaluate the structure of the program and  
6 find some other ways of assuring program participation while lowering the  
7 overall cost to ratepayers.

8 **Issue 2: Program Benefits**

9 **Q. Please explain Staff's concerns about the lack of benefits identified in**  
10 **NW Natural's Application.**

11 A. NW Natural has identified only one benefit in its Application. In NWN/200,  
12 Speer/2, the Company's witness states that the proposed CHP program will  
13 provide increased system load or throughput from the additional incremental  
14 load. NW Natural identifies the annual benefit margin as \$132,283 for every  
15 10MW of newly installed CHP capacity.

16 The benefit identified does not justify the costs the ratepayers have been  
17 asked to bear. As will be discussed later in this section, Staff has identified  
18 additional possible benefits that NW Natural could explore. However, even  
19 with these additional identified benefits Staff is concerned that the overall cost  
20 of the proposed program would still be unjustifiably high.

21 **Q. Please explain why you concluded that the one identified benefit does**  
22 **not justify the costs of the Company's program.**

1 A. NW Natural's lone benefit of increased system load or throughput, does not  
2 justify the extraordinary expense proposed in NW Natural's Application. An  
3 average monthly residential bill increase over a ten year period needs greater  
4 justification than slight downward pressure on fixed system costs. Ratepayers  
5 need greater information on the benefits they and their community are likely to  
6 realize for their investment. Most of NW Natural's residential customers will  
7 see a nearly 2.0 percent rate increase from the proposed program (See NW  
8 Natural OPUC IR 3 Attachment 1 Sheet "Rate Impact\_equal" % of margin,  
9 which shows Schedule 2R customers will see a 1.8% rate increase). A  
10 lessened contribution to overall system fixed costs is not a weighty enough  
11 benefit to customers nor is it within the spirit of the legislation which focuses  
12 efforts on mitigating greenhouse gas emissions, powerful environmental  
13 pollutants which detrimentally affect all classes of customers and citizens and  
14 expose the company and its ratepayers to regulatory risk.

15 **Q. Please discuss the additional possible benefits that you have identified.**

16 A. Staff believes that a fix cost adjustment is not the only benefit received by  
17 ratepayers of the proposed CHP program. Other benefits, though not  
18 immediately or easily quantifiable, are present. For example, NW Natural is  
19 aware that CHP will reduce electric demand. This reduction in electric  
20 demand will affect NW Natural customers who are also electric customers.  
21 While this is a cross-utility benefit, it is also a household benefit that could be  
22 estimated or a least spoken of as a general benefit received by electric  
23 customers and of electric customers who are also NW Natural customers.

1 Another benefit identified by Staff but not noted by NW Natural is the fact that  
2 under the proposed and final Clean Power Plan rule developed and finalized  
3 by the Environmental Protection Agency (EPA) CHP is a compliance  
4 mechanism. Thus it is not a stretch to assert that NW Natural's customers'  
5 investment in the CHP program will have potential benefit for Clean Power  
6 Plan compliance. Lastly, NW Natural did not identify the possible benefit to  
7 the State's economy. NW Natural's customer's investment in CHP units at  
8 industrial and commercial sites may help to lower their overall cost of  
9 business. Accordingly, these investments may assist the participating Oregon  
10 companies' ability to compete in the broader market. These investments may  
11 also help Oregon retain businesses that employ Oregonians. Again, while  
12 these benefits may not be immediately quantifiable it is reasonable to assume  
13 and attempt to identify such various benefits.

14 **Q. Do you have other concerns with the alleged benefits of the Company's**  
15 **proposal?**

16 A. Yes. NW Natural is only accounting for emission reductions from CHP units  
17 during the first 10 years of the 20-year measure life. It is important that NW  
18 Natural justify why it chose to construct the proposed program around a 10-  
19 year program period as opposed to the 20-year measure life. There are  
20 multiple different scenarios where NW Natural could leverage the 20-year  
21 measure life to lower the overall cost of the proposed CHP program.  
22 Additionally, because of the 10-year program period NW Natural has selected,  
23 ratepayers may be losing out on valuable emission reductions and their

1 associated benefits which occur in years 11 through 20. NW Natural should  
2 revisit the 10-year program period and attempt to leverage the 20-year  
3 measure life to harness greater benefits for its ratepayers.

4 **Q. Please summarize your recommendations regarding Program Benefits**  
5 **related to the Company's proposal.**

6 A. Staff recommends that NW Natural revisit how it identified program benefits.  
7 Where possible NW Natural should leverage benefits to help assist with the  
8 cost and justification of the proposed program. NW Natural should also make  
9 an accounting of the potential emission reductions over the 20-year measure  
10 life and look for opportunities to harness other potential benefits of this  
11 programs long measure life.

12 **Issue 3: Cost Risk**

13 **Q. Please explain your concerns with the Application with regard to the**  
14 **inclusion of incentives and tax credits provided by other entities.**

15 A. Staff is concerned about the Applications demonstration that it will need to  
16 leverage ETO's incentives and ODOE's tax credits in order to increase  
17 participation rates and lower overall costs. At NWN/101, Summers/31 NW  
18 Natural identifies as a cost risk the erosion or removal of incentives offered by  
19 the ODOE or the ETO, or both, incentives. However NW Natural does not run  
20 a scenario where these incentives are not fully available to participants. While  
21 NW Natural does supply some information on costs to the participant without  
22 the ODOE and ETO incentives it does not discuss what the effect would be on  
23 the program if either or both of the ODOE and ETO incentives are not

1 available. Currently, ODOE through its Energy Incentives Program (EIP)  
2 competitively selects projects to be awarded Oregon state tax credits over a  
3 five-year period for qualified CHP capital investment, not to exceed 35 percent  
4 of certified project costs. The ETO offers an incentive payment to CHP  
5 customers based on the energy efficiency and cost effectiveness of the  
6 installed CHP system of \$0.08 per annual kilowatt hour saved up to 50 percent  
7 of the project cost which is capped at \$500,000.

8 **Q. What is your recommendation for this concern?**

9 A. Staff recommends that NW Natural supply information which shows how the  
10 cost of the program to ratepayers would change if it was unable to leverage  
11 the assistance of ODOE or ETO. Additionally NW Natural should supply  
12 information about how program participation would change and how the  
13 individual unit payback period would change if NW Natural was unable to  
14 leverage the assistance of ODOE and ETO.

15 **Issue 4: Proposed Company Incentive**

16 **Q. Has NW Natural properly justified its proposal to receive a \$10 incentive**  
17 **for each ton of emission reductions created by the proposed program?**

18 A. No, NW Natural has failed to demonstrate or properly justify, based on the  
19 effort entailed in the present program, why the Company should receive a \$10  
20 per ton incentive. NW Natural's proposed \$10 per ton Company incentive  
21 accounts for nearly a quarter of the overall program costs, which seems out of  
22 proportion given the identified program benefit of lowered overall fixed cost  
23 contribution.

1 **Q. Can you elaborate on this point?**

2 A. Yes, NW has proposed a \$10 per ton of CO<sub>2</sub>e emission reduction as a  
3 Company incentive as required by ORS 757.539(8). However, the Company  
4 has not demonstrated that the incentive is reasonable based on the tasks and  
5 benefits associated with the proposed program. Instead NW Natural justifies  
6 the \$10 Company incentive proposal on the premise that a \$10 incentive is  
7 needed to set precedence which will incent NW Natural to take future action.  
8 Based on the Company's testimony the proposed CHP program produces a  
9 great deal of carbon savings relative to other potential measures. (See  
10 NWN/101 at Summers/4 at Figure 1). Therefore, NW Natural's rationale for  
11 the proposed \$10 per ton Company incentive becomes more of a front loaded  
12 incentive for work not proposed or completed. This results in a relative windfall  
13 as compared to other potential projects cited in Figure 1 of NWN/101 at  
14 Summers/4.

15 **Q. Do you have other concerns with the Company's proposed incentive?**

16 A. Yes, the proposed \$10 per ton Company incentive is a significant program  
17 cost and represents nearly a quarter of the overall proposed program costs.  
18 This cost seems out of proportion given the benefit identified by NW Natural  
19 and the effort and risk to be undertaken by NW Natural and its shareholders in  
20 researching, developing and finally implementing the proposed program.  
21 There was little discussion in the testimony or during stakeholder workshops  
22 with regard to how the proposed \$10 per ton Company incentive related to the

1 present Application. The incentive, if granted, should reflect the effort  
2 undertaken to conceive and implement the emissions reduction program.

3 Finally, Staff witness St. Brown testifies that the Company will receive a benefit  
4 absent the \$10 Company incentive per MTCO<sub>2</sub>(e) emissions reduction. The  
5 benefit identified by Staff witness St. Brown is a margin received due to the  
6 addition of new customers. This is a significant multiyear benefit.

7 **Q. What is your recommendation concerning the Company's proposed**  
8 **incentive?**

9 A. Staff recommends that NW Natural re-evaluate its proposed Company  
10 incentive and develop a proposal that reflects the associated work and  
11 benefits obtained through implementation of the proposed emissions reduction  
12 program.

13 **Issue 5: Measurement and Verification**

14 **Q. Does staff have concerns about NW Natural's proposed measurement**  
15 **and verification plans?**

16 A. Yes, I do.

17 First, Staff was not able to find a baseline methodology for current steam  
18 usage.

19 Second, Staff does not understand how NW Natural is defining their  
20 relationship with Energy350. At several points in the testimony Energy350 is  
21 referred to as an independent third party verifier (NWN 100 Summers/15,  
22 NWN101 Summer/6, NWN/101 Summers/24). Staff is not sure this is the  
23 correct way to define Energy350's role in the program or its relationship to NW



1 Natural. Third, Staff is also concerned about the cost cited by NW Natural for  
2 ongoing measurement, monitoring and verification. Lastly, Staff is concerned  
3 that the Company has not submitted a proposal setting forth the information  
4 that will be reported to the Commission on how violation or anomalies will be  
5 addressed.

6 **Q. Can you elaborate on these four points?**

7 A. Yes. As to the first point, Staff was unable to determine if NW Natural has  
8 developed a baseline methodology for current steam usage. It would seem a  
9 legitimate assumption that most participants of the proposed CHP program will  
10 be installing new CHP units as opposed to retrofitting steam units to produce  
11 electricity. However, a baseline methodology for units currently producing  
12 steam is warranted because some participating units will be bottom cycling  
13 units.

14 **Q. Please continue with your second concern.**

15 A. Staff is concerned that NW Natural has hired Energy350 to conduct verification  
16 and assist participants with measurement of unit performance. NW Natural  
17 refers to Energy350 as an independent verifier. However, Staff is concerned  
18 that this label may be disingenuous. Energy350 has assisted NW Natural in  
19 the development of the proposed program. Energy350 is currently under  
20 contract to NW Natural. Staff is concerned that Energy350 is not truly  
21 independent of NW Natural. An independent verifier should be free to identify  
22 short-comings of the proposed program, measurement and verification plan  
23 and identify operational short comings once the program is running and

1 participants are reporting emission reduction information. A third party verifier  
2 should be willing to take the risk of attesting to the veracity and completeness  
3 of emission reductions reported from participants and from NW Natural.

4 **Q. Please explain your third concern with the Company's measurement and**  
5 **verification aspect of its program.**

6 A. In NW Natural's OPUC (IR 13) Attachment 1 Sheet CHP Budget, the Company  
7 shows the measurement and verification costs on line 41. For five participating  
8 sites NW Natural is showing an annual cost of \$25,000 per site. However, NW  
9 Natural did not supply any information to demonstrate that the cost of \$25,000  
10 per site per year is a reasonable cost.

11 **Q. Please continue with your fourth and final concern.**

12 A. Lastly, Staff is concerned that NW Natural has proposed a measurement and  
13 verification plan without submitting a proposal for the information that will be  
14 reported to the Commission and how violations or anomalies will be addressed  
15 by either Energy350 or NW Natural. It is true that NW Natural responded to a  
16 Staff information request by noting that an informal agreement had been  
17 reached during the workshop that NW Natural would work with Staff after  
18 approval of the Application to determine what information would be reported  
19 and when it would be reported (See OPUC IR 15 Response Document).  
20 However, Staff believes that NW Natural should formally propose reporting  
21 requirements as part of the Application so that the reporting protocols are part  
22 of the public record.

1 **Q. Please summarize your recommendations for measurement and**  
2 **verification of the Program.**

3 A. Staff recommends that NW Natural create a baseline methodology for systems  
4 that are already producing steam, that the Company explain how Energy350  
5 meets the definition of a third party independent verifier, and demonstrate that  
6 the associated cost of Energy350's ongoing work is market competitive. This  
7 would entail a delineation of the specific tasks associated with the  
8 measurement, monitoring and verification work to be conducted yearly at each  
9 site. Finally, the Company should formally propose reporting requirements as  
10 part of an amendment to the Application.

11 **Issue 6: Emission Reduction Incentive**

12 **Q. Please explain Staff's concerns regarding the \$30 per ton emission**  
13 **reduction incentive offered to participants of the proposed CHP program.**

14 A. Staff is concerned that NW Natural's \$30 per ton of emission reduction  
15 participant incentive is overly generous especially given the targeted payback  
16 period cited by the Company as needed for maximum CHP program  
17 participation. Most of the units studied by NW Natural show between a four to  
18 seven year payback period with a \$30 per ton incentive (See NW Natural OPUC  
19 (IR 11) Attachment -1). The referenced table shows that for units large enough  
20 to justify participation in NW Natural's proposed CHP program, whether using a  
21 simple payback or after tax payback period, most potential participants would  
22 reach payback in four to seven years. While this is a planned part of the  
23 program it does mean that in some cases years 5 through 10 become a windfall

1 period, where some individual sites could receive up to \$4.5M per year for  
2 continuing to operate their CHP unit in the program.

3 **Q. Please explain your concerns with a windfall payment.**

4 A. A windfall payment is unnecessary and is burdensome to ratepayers. Lowering  
5 the per ton participant incentive after unit payback has been achieved would be  
6 more reasonable and would lower the overall cost of the program. As noted in  
7 Staff witness St. Brown's testimony the overall structure of NW Natural's  
8 customer participation incentive of \$30 per ton of CO<sub>2</sub>e reduced may not be the  
9 most cost effective incentive structure. Staff Witness St. Brown offers  
10 alternatives incentive structures NW Natural should explore.

11 **Q. What is your recommendation for the emission reduction incentive?**

12 A. Staff recommends that NW Natural, revisit the participant incentive structure  
13 noting Staff witness St. Brown's testimony on the structure of the customer  
14 incentive. If, after exploring a market based auction method, NW Natural  
15 continues with the proposal of a flat rate incentive, per ton of emissions reduced,  
16 then after the payback period has been reached at individual units, the  
17 Company ramp down the carbon emission savings incentive to a more market  
18 competitive payment.

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

20 A: Yes. However, Staff reserves the right to reply to any new issues presented by  
21 other parties in their Response Testimony.

22

CASE: UM 1744  
WITNESS: JASON KLOTZ

**PUBLIC UTILITY COMMISSION  
OF  
OREGON**

**STAFF EXHIBIT 101**

**Witness Qualifications Statement**

**August 28, 2015**

**WITNESS QUALIFICATIONS STATEMENT**

NAME: Jason R. Salmi Klotz

EMPLOYER: Public Utility Commission of Oregon

TITLE: Senior Utility Analyst  
Energy Resources and Planning Division

ADDRESS: 201 High Street SE. Suite 100  
Salem, OR. 97301

EDUCATION: University of Montana – Missoula  
Bachelor of Arts conferred May 1999

Vermont Law School  
Masters of Studies in Environmental Law conferred  
2003

Vermont Law School  
Juris Doctor Conferred 2006

Admitted to Oregon State Bar 2012

EXPERIENCE: Vermont Public Utility Commission  
Legal Analyst – 2003 – 2005

Federal Energy Regulatory Commission  
Office of General Counsel 2005

California Public Utility Commission  
Public Utilities Regulatory Analyst 2006 – 2009

Bonneville Power Administration  
Smart Grid Project Lead 2009 – 2010

Northwest Energy Efficiency Alliance  
Senior Policy Advisor 2010 – 2013

Oregon Public Utility Commission  
Senior Analyst – Climate Change 2013 - Present

CASE: UM 1744  
WITNESS: MAX ST. BROWN

**PUBLIC UTILITY COMMISSION  
OF  
OREGON**

**STAFF EXHIBIT 200**

**Response Testimony**

**August 28, 2015**

1 **Q. Please state your name, occupation, and business address.**

2 A. My name is Max St. Brown. My business address is 201 High Street SE Suite  
3 100, Salem, Oregon 97301-3612.

4 **Q. Please describe your educational background and work experience.**

5 A. My Witness Qualification Statement is found in Exhibit Staff/201.

6 **Q. What is the purpose of your testimony?**

7 A. The purpose of my testimony is to review the initial application (Application)  
8 submitted by Northwest Natural Gas Company (NW Natural or the Company)  
9 for approval of a carbon emission reduction project.

10 **Q. Did you include any other exhibits for this docket?**

11 A. Yes. Staff/202, consisting of 8 pages, of which I prepared pages 2-3.

12 **Q. How is your testimony organized?**

13 A. My testimony is organized as follows:

14	Issue 1. Customer Incentive Structure.....	4
15	Issue 2. Benefits Accruing to the Company .....	18

16 **Q. Please summarize your conclusions and recommendations concerning**  
17 **the two issues you have identified.**

18 A. As for my first issue, Customer Incentive Structure, I conclude that the  
19 Company’s proposed incentive structure provides customers with incentives  
20 beyond those necessary to encourage participation in the proposed Combined  
21 Heat and Power CHP solicitation program. Determining the specific size of the  
22 proposed CHP solicitation program can be done using a stakeholder process  
23 as advocated in the Company’s response to Staff IR 37. I further recommend



1 that the Company produce a proposal for a reverse auction because a reverse  
2 auction can result in lower procurement costs than the Company's current  
3 proposal.

4 For my second issue, Benefits Accruing to the Company, I conclude that the  
5 Company's evidence provided thus far does not sufficiently demonstrate "that  
6 the public utility, without the emission reduction program, would not invest in  
7 the project in the ordinary course of business." See ORS 757.539(3)(d). I  
8 calculate that the Company would earn margin due to increased natural gas  
9 sales of \$16,335,209 because of customer adoption of CHP. This would be  
10 true even in the absence of the Company's proposed \$10 Company incentive  
11 per metric ton of carbon dioxide equivalent (MTC02(e)) of emissions reduction.  
12 Because the Company receives benefits absent the Company incentive per  
13 MTC02(e) of emissions reduction, Staff supports adjusting the Company  
14 incentive and including \$0 in the possible range of adjusted values.

15 **Q. Please give an overview of the Company's proposed CHP solicitation**  
16 **program.**

17 A. The Company filed its Application under ORS 757.539 for a program in which it  
18 solicits customers (program participants) to invest in on-site Combined Heat  
19 and Power (CHP). CHP can also be known as cogeneration. The Company  
20 also proposes a benefit for itself, essentially a company incentive per  
21 MTC02(e) of emissions reduction. The Company also proposes to actively  
22 solicit customers to participate, which would increase the Company's natural  
23 gas sales.

1 **Q. What is the Company's MTCO<sub>2</sub>(e) per year emissions reduction goal?**

2 A. At lines 17-18 of NWN/100, Summers/6, the Company's witness states "NW  
3 Natural's goal is to reduce greenhouse gas emissions through the Program by  
4 240,000 MTCO<sub>2</sub>(e) per year in the State of Oregon by the end of 2020."

5 **Q. Can you give some context to the 240,000 MTCO<sub>2</sub>(e) per year emissions**  
6 **reduction goal?**

7 A. Yes. The Environmental Protection Agency (EPA)'s Greenhouse Gas  
8 Equivalencies Calculator estimates that 240,000 MTCO<sub>2</sub>(e) per year emissions  
9 reduction is equivalent to 21,898 homes' energy use per year or 66.1 wind  
10 turbines installed.<sup>1</sup>

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<sup>1</sup> Calculator available at: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results>

**ISSUE 1. CUSTOMER INCENTIVE STRUCTURE****Q. Please summarize your findings on Customer Incentive Structure.**

A. Because the customers that can provide emissions reductions at the lowest cost through a CHP program may not be the same customers that can provide emissions reductions at the lowest cost through a different type of program, many small ORS 757.539 programs can achieve the same MTC02(e) per year emissions reduction goal as a single large program, but at a lower cost. Staff recommends that the Company limit the size of any given ORS 757.539 program so that customers with the highest costs of investing in emissions reductions do not need to be solicited. This recommendation is supported in the “Total Cost Curve for the Proposed CHP Solicitation Program” subsection. The Company’s proposed incentive structure provides customers with incentives beyond those necessary to encourage participation in the proposed CHP solicitation program. Staff recommends that the Company implement a reverse auction system for its proposed CHP solicitation program because, “competitive bidding results in lower procurement costs, facilitates demand revelations, allows order quantities to be determined (ex-post) on the basis of the received bids and limits the influences of favoritism and political ties.”<sup>2</sup> This recommendation is supported in the “Reverse Auction for Emissions Reduction Procurement” subsection.

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<sup>2</sup> See: Exhibit Staff/202, St. Brown/4, which includes page 130 of Iyengar, Garud and Anuj Kumar. 2008. “Optimal procurement mechanisms for divisible goods with capacitated suppliers,” *Review of Economic Design*. 12(2), pp. 129-154.

1 **Q. What approaches exist to determine whether a customer will**  
2 **participate in a CHP program?**

3 A. A standard approach is to consider the benefit to each customer of installing a  
4 CHP unit. Variables of consideration would be the benefits to each customer  
5 resulting from a CHP unit and the costs of installing, operating, and maintaining  
6 a CHP unit. Another approach is to survey customers, asking them “under what  
7 circumstances would you install a CHP unit?”

8 **Q. What is the Company’s proposed customer incentive structure?**

9 A. At NWN/100, Summers/8, the Company witness Ms. Barbara Summers  
10 proposes, “NW Natural will pay CHP customers \$30 per MTCO<sub>2</sub>(e) reduced,  
11 based on measured and verified performance.”

12 **Q. What approach has NW Natural proposed to forecast which customers**  
13 **would participate in its CHP program?**

14 A. The Company uses the following three-step process:

- 15 1. First, the Company determines a years-to-investment-payback cutoff for  
16 customers. Line 15 of NWN/100, Summers/7 describes that the program  
17 was designed to “achieve a 3 to 4 year simple payback.” Lines 16-18  
18 describe that “with a 3 to 4 year payback, ICF International, projects an  
19 expected customer adoption of about 30 to 40 percent of economic CHP  
20 potential in Oregon.” This payback corresponds to an 18.92 to 25.99  
21 percent return on investment (ROI).
- 22 2. Second, the Company relies on predictions from the ICF International  
23 report about the distribution of Oregon customers that could meet an

1 economically viable payback.<sup>3</sup> Table 17 on page 20 of the ICF  
2 International report presents this distribution of customers, grouped by  
3 their electric utility.

- 4 3. Third, the Company relies on predictions in the ICF International report  
5 as to what percentage of customers would adopt CHP among the group  
6 that can achieve an economically viable payback. Page 21 of the report  
7 describes that a customer may not adopt a project with a short payback  
8 period because the “customer does not believe that the [payback]  
9 results are valid,” or because the customer “has limited capital.”

10 **Q. What is the Company’s forecast?**

- 11 A. In the base case scenario, the Company forecasts that five customers will  
12 participate in the proposed CHP solicitation program, resulting in 120 MWs of  
13 installed capacity.<sup>4</sup>

14 **Q. What adoption rate does this forecast imply?**

- 15 A. At Lines 10-12 of NWN/100, Summers/6 the witness states, “ICF International  
16 identified 319 MWs with the economic potential to allow prospective CHP  
17 candidates to recover their initial investment in fewer than 10 years.” This  
18 translates into an adoption rate of 37.62 percent.

19 **Q. Can you accept the Company’s forecasts with a high degree of**  
20 **confidence?**

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<sup>3</sup> The ICF report is referenced in NWN/101, Summers/12.

<sup>4</sup> See cells F26:F27 in the “CHP Budget” tab of the Company’s response to Staff IR 3: File = *OPUC IR 3 Attachment-1.xlsx*.

1 A. No. The ICF International report's projection that a three-to-four year payback  
2 will result in a 30 to 40 percent adoption rate of economic CHP potential in  
3 Oregon should be subjected to a sensitivity analysis. The sensitivity analysis is  
4 necessary because the projection discussed on pages 21-22 of the ICF  
5 International report relies on Primen's 2003 Distributed Energy Market Survey  
6 to determine the percentage of customers with economically viable CHP that  
7 would participate.<sup>5</sup> However, Primen's 2003 Distributed Energy Market Survey  
8 was conducted in multiple U.S. states and Canadian provinces.<sup>6</sup> Staff is not  
9 convinced that survey respondents outside of Oregon are representative of  
10 customers in Oregon because energy markets differ by state and country.  
11 Further, a 2003 survey does not capture the effects on customer willingness to  
12 invest in CHP in either the 2007-2008 recession period or in light of the final  
13 Clean Power Plan rule developed by the EPA.

14 **Q. What impact does the three-to-four year simple payback goal have on**  
15 **costs for the CHP solicitation program?**

16 A. In the Company's current proposal, the years-to-simple payback goal dictates  
17 the level of customer incentive necessary. There is a direct inverse relationship  
18 such that if customers are paid more per MTC02(e) emission reduction, they  
19 will then receive payback on their CHP installation more quickly.  
20

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<sup>5</sup> Primen's 2003 Distributed Energy Market Survey is initially referenced on line 18 of NWN/100, Summers/7.

<sup>6</sup> See: pages 12 and 27 of Primen's 2003 Distributed Energy Market Survey.

1                   SUBSECTION 1: TOTAL COST CURVE FOR THE  
2                   PROPOSED CHP SOLICITATION PROGRAM.

3       **Q. What is the impact of paying all customers the same incentive?**

4       A. NWN/101, Summers/11 displays a customer payback acceptance curve from  
5       Primen's 2003 Distributed Energy Market Survey report. This curve is provided  
6       in Exhibit Staff/202, St. Brown/1. Differing years to payback requirements  
7       indicates that some customers will participate at greater payback values (and  
8       equivalently lower customer incentive levels) than others. Thus, paying a flat  
9       rate customer incentive will overpay those customers who require an incentive  
10      rate to participate that is lower than the flat rate.

11      **Q. Can you give an example?**

12      A. Yes. Imagine this hypothetical example of two customers: in order to incent  
13      participation, the first customer requires a \$30 per MTC02(e) emissions  
14      reduction incentive payment and the second customer requires a \$15 per  
15      MTC02(e) emissions reduction incentive payment. Under a flat rate customer  
16      incentive structure, both customers will only participate if the customer  
17      incentive is \$30 per MTC02(e) emissions reduction. Therefore, if the Company  
18      incentivizes both customer to participate under a flat rate customer incentive, it is  
19      overpaying the second customer by \$15 per MTC02(e) emissions reduction.

20      **Q. Is paying customers an incentive, beyond that necessary to achieve**  
21      **payback, a necessary condition for adoption of CHP in Oregon?**

22      A. No. NWN/100, Summers/7 cites Primen's 2003 Distributed Energy Market  
23      Survey report. This report, on page 9-14, describes the appeal of distributed

1 energy (CHP is a type of distributed energy) in terms of cost savings and  
2 improving power reliability. Furthermore, 65 sites (including three high-  
3 efficiency CHP sites in NW Natural's service territory) have already adopted  
4 CHP in Oregon, where a customer incentive from NW Natural was not  
5 needed.<sup>7</sup> Finally, the ICF International report predicts that there will be 64 MWs  
6 of new capacity of CHP installed in Oregon between 2014 and 2030 even  
7 when "local state or utility-specific incentives have not been included" as a  
8 driver of the report's prediction.<sup>8</sup>

9 **Q. What are the ICF International report's findings about CHP adoption in**  
10 **Oregon?**

11 A. Page 26 of the report states, "With more than 2,800 MW of existing CHP in  
12 Oregon, it is not unexpected that there will be significant levels of CHP and  
13 WHP [waste heat to power] market penetration in the near future." This  
14 prediction is not based on local state or utility-specific incentives.

15 **Q. Does the Company's proposed incentive structure lend itself to**  
16 **increasing marginal costs of eliciting participation?**

17 A. Yes. The curve in Exhibit Staff/202, St. Brown/1 has flipped the traditional axes  
18 of quantity on the horizontal axis and price on the vertical axis of an economic  
19 supply curve, so Staff has prepared Exhibit Staff/202, St. Brown/2 which  
20 displays similar information, but with the axes flipped back. The information is  
21 not identical because Staff has converted the payback periods to the simple

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<sup>7</sup> Sources: US DOE Combined Heat and Power Installation Database  
(<https://doe.icfwebservices.com/chpdb/state/OR>) and NW Natural's data response to UM 1744-PGE-  
DR 006.

<sup>8</sup> See: Pages 24 and 26 of the ICF International report.



1 rates of return implied by the payback periods. Exhibit Staff/202, St. Brown/2  
2 shows that in order for more customers to participate in the CHP solicitation  
3 program (movement along the x-axis), the Company must offer greater  
4 incentives for all customers (movement along the y-axis). The fact that the  
5 Company must overpay customers that were already willing to participate in  
6 order to entice additional customers to participate is an important characteristic  
7 of the Company's flat-rate per unit of MTC02(e) emission reduction customer  
8 incentive proposal.

9 **Q. Can you illustrate increasing marginal costs in another way?**

10 A. Yes. To illustrate increasing marginal program costs Staff has prepared Exhibit  
11 Staff/202, St. Brown/3. This exhibit displays the shape of a theoretical total cost  
12 curve for the Company's current proposed incentive structure. The slope of the  
13 curve represents the marginal cost of the proposed program. This exhibit  
14 demonstrates that there are increasing marginal costs of achieving greenhouse  
15 gas emissions reductions due to the fact that along the curve, movements in  
16 the X-axis direction result in increasingly larger movements in the Y-axis  
17 direction.

18 **Q. What is another way to describe increasing marginal costs?**

19 A. If the program's 240,000 MTC02(e) per year emissions reduction goal were cut  
20 in half, then the program's total cost would be reduced by more than half.

21 **Q. Have you prepared a way to demonstrate this description?**

22 A. Yes. Exhibit Staff/202, St. Brown/3 illustrates a general form of this  
23 interpretation: the cost to increase the program's [emissions reduction goal] by

1 one unit exceeds (the absolute value of) the cost to decrease the program's  
2 [emissions reduction goal] by one unit.

3 **Q. What is the relevance of this interpretation?**

4 A. It would become increasingly more expensive to expand any given MTC02(e)  
5 per year emissions reduction goal of the program. As the size of any given  
6 proposed CHP solicitation program is expanded, the opportunity cost of instead  
7 not pursuing other types of programs will become increasingly greater. Put  
8 simply, there is a strong theoretical argument that many small ORS 757.539  
9 programs could achieve the same MTC02(e) per year emissions reduction goal  
10 as a single large program, but at a lower cost.

11 **Q. What is Staff's recommendation regarding the Company's proposed**  
12 **incentive structure's increasing marginal costs of eliciting**  
13 **participation?**

14 A. Under a flat-rate incentive structure, overpaying customers is best avoided by  
15 restricting program participation to avoid customers that have large costs to  
16 invest in emissions reductions. Alternatives other than a flat-rate incentive  
17 structure are discussed in the next subsection.

18 **Q. What is Staff's recommendation for the MTC02(e) per year emissions**  
19 **reduction goal of the Company's proposed CHP solicitation program?**

20 A. Staff recommends that the Company limit the size of any given ORS 757.539  
21 program so that it avoids the increasingly vertical portion of any given  
22 program's total cost curve (i.e. the portion where emissions reductions gains  
23 require increasingly high program costs). Staff believes stakeholders should be

1 involved and thus is in support of the Company's response to Staff IR 37,  
2 which states:

3 "NW Natural thinks it would be helpful to discuss the following  
4 questions with the stakeholders: 1) What level of overall carbon  
5 savings would, in the stakeholders' view, represent a highly  
6 successful implementation of SB 844?"

7  
8 SUBSECTION 2: REVERSE AUCTION FOR EMISSIONS  
9 REDUCTION PROCUREMENT.

10 **Q. What incentive structures besides a flat rate per unit of MTC02(e)**  
11 **emission reduction has the Company considered?**

12 A. On NWN/101, Summers/10-11 the Company considered a bidding process.

13 **Q. Does a bidding process include a concept known as a "reverse auction."**

14 A. Yes, it does.

15 **Q. Please provide a definition of a reverse auction bidding process.**

16 A. Garud Iyengar and Anuj Kumar in the *Review of Economic Design* write, "Since  
17 the auctioneer is the *buyer*, the bidders are the *suppliers* or *sellers*, and the  
18 object being auctioned is the right to supply, procurement auctions are also  
19 called *reverse auctions*."<sup>9</sup> Staff has reproduced this literature in Exhibit  
20 Staff/202, St. Brown/4.

21 **Q. How could the Company's CHP solicitation program fit the definition of**  
22 **a reverse auction?**

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<sup>9</sup> See: page 130 of Iyengar, Garud and Anuj Kumar. 2008. "Optimal procurement mechanisms for divisible goods with capacitated suppliers," *Review of Economic Design*. 12(2), pp. 129-154.

1 A. The CHP solicitation program aims to achieve carbon emissions reductions.  
2 The Company would be the *buyer* of carbon emissions reductions and  
3 customers that can offer carbon emissions reductions are the *suppliers* or  
4 *sellers*.

5 **Q. How have auctions been used for renewable energy procurement?**

6 A. A Policy Research Working Paper from the World Bank describes, “Several  
7 countries have turned to public competitive bidding as a mechanism for  
8 developing the renewable generation sector in recent years, with the number of  
9 countries implementing some sort of auction procedure rising from nine in 2009  
10 to 36 by the end of 2011 and about 43 in 2013.”<sup>10</sup> Staff has reproduced this  
11 literature in Exhibit Staff/202, St. Brown/5.

12 **Q. How have reverse auctions been used for greenhouse gas emissions**  
13 **reductions?**

14 A. The French based consulting firm Microeconomix published a white paper in  
15 2006 describing, on pages 8-9, Climate Change Agreements in the UK, “the  
16 government offered incentive payments to UK companies committing to  
17 greenhouse gas emission reductions. The incentive payments amounting 215  
18 M£ were allocated by an Internet auction in March 2002. The auction was  
19 conducted with a descending price clock, on account that it was a procurement  
20 auction (or “reverse auction”): the government sought to purchase emission

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<sup>10</sup> Azuela, Gabriela Elizondo, Luiz Barroso, Ashish Khanna, Xiaodong Wang, Yun Wu, and Gabriel Cunha. 2014. “Performance of Renewable Energy Auctions: Experience in Brazil, China and India,” World Bank Policy Research Working Paper 7062, October 2014. Available at: [file:///H:/UM%201744%20\(NWN\),%20SB%20844/Azuela%20et.%20al.%20\(2014\)%20Performance%20of%20Renewable%20Energy%20Auctions.pdf](file:///H:/UM%201744%20(NWN),%20SB%20844/Azuela%20et.%20al.%20(2014)%20Performance%20of%20Renewable%20Energy%20Auctions.pdf)

1 reductions at minimum cost. The government posted a price per unit of  
2 emissions reductions, and firms bid the quantity of emission reductions that  
3 they were prepared to make at that price. In each new round, the government  
4 announced a successively lower price and bidders indicated the quantity of  
5 emission reductions that they were prepared to make at the lower price, until  
6 the market cleared.”<sup>11</sup> Staff has reproduced this literature in Exhibit Staff/202,  
7 St. Brown/6-7.

8 **Q. Would the Company be responsible for managing a reverse auction?**

9 A. No. Several U.S.-based consulting firms offer management services for  
10 reverse auctions.

11 **Q. What is Staff’s recommendation regarding a reverse auction?**

12 A. Because a reverse auction can result in lower procurement costs than the  
13 Company’s current proposal, Staff recommends that the Company produce a  
14 proposal for a reverse auction. The proposal should describe:

- 15 • Who would manage the reverse auction;
- 16 • The proposed cost of management services;
- 17 • The item being bid on (ex: customer incentive for emissions reductions);
- 18 • The bidders (ex: a list of the customers that will be solicited to participate in  
19 the auction);
- 20 • The venue of the auction (ex: online); and

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<sup>11</sup> Glachant, Matthieu and Gildas de Muizon. 2006. “Climate Change Agreements in UK: A Successful Policy Experience?” Microeconomix publications. April 26, 2006. Available at: <http://www.microeconomix.eu/publications/climate-change-agreements-uk-successful-policy-experience>

- 1           • The format of the auction including the timing, progression, and method of  
2           settlement (ex: descending-price clock reverse auction).

3           **Q. Why did the Company not propose a bidding process?**

4           A. Among other concerns, at NWN/101, Summers/11, the witness writes that a  
5           bidding process “may lead to a situation where costs of delivering the program  
6           are unnecessarily high.”

7           **Q. Is the Company’s concern about unnecessarily high costs valid?**

8           A. No. The existing economics and operations research literature is clear that a  
9           properly designed reverse auction (bidding process) can result in lower  
10          procurement costs than a non-market based approach, such as the Company’s  
11          current proposal. At NWN/101, Summers/10, the witness then lists three  
12          additional concerns with a bidding process.

13          **Q. Please address and respond to the first of the Company’s three  
14          additional concerns with a bidding process.**

15          A. At NWN/101, Summers/10 the witness states “a bidding process approach  
16          would leave the customer with uncertainty as to whether their project would be  
17          selected and the incentive that could be available. As a result, customers may  
18          not include the availability of an incentive in their decision-making process, or  
19          may not invest the time and effort to determine the feasibility of a CHP  
20          installation.”

21          **Q. How might this concern be mitigated?**

22          A. In cell A34 of NWN/101, Summers/52 the Company has proposed to recover  
23          expenses related to its development costs. If it is believed that the costs

1 prohibit customers from determining the feasibility of a CHP installation, then  
2 customers should be eligible to recoup reasonable costs associated with  
3 determining if a CHP installation is feasible. This opportunity should be  
4 restricted to customers within the 319 MWs of economic potential to recover  
5 their initial investment in fewer than 10 years, as described on lines 10-12 of  
6 NWN/100, Summers/6.

7 **Q. What is the Company's second concern with a bidding process?**

8 A. NWN/101, Summers/10 states, "the timing aspects of a competitive bidding  
9 process could ... stifle the development of projects by introducing a separate  
10 timing process that may not match individual customers' budgeting and  
11 planning cycles, and could cause projects to be needlessly delayed to match  
12 up with an annual cycle."

13 **Q. How might this concern be mitigated?**

14 A. The initial reverse auction will facilitate demand revelations. Bypassing an  
15 auction process negates the potential to gain valuable market information  
16 about the incentives at which customers find CHP installations feasible. This  
17 information would not need to be gathered on a yearly basis; in fact after  
18 market information is initially gathered, incentives that would extend into the  
19 future could be set based on the gathered information.

20 **Q. What is the Company's third concern with a bidding process?**

21 A. At NWN/101, Summers/10, the witness states, "if bidders were to expect that  
22 there would be very little competition during a bidding process, they would

1           have little reason to narrow their proposal to only the necessary payback, and  
2           may instead seek to maximize any payments available under the program.”

3       **Q. How might this concern be mitigated?**

4       A. Staff supports defining a minimum number of bidders necessary for the CHP  
5           program to move forward. This is standard practice, for example OAR 137-049-  
6           0160 requires at least three competitive quotes for public contracts for  
7           construction services unless three quotes are not reasonably available.<sup>12</sup>

8

9

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<sup>12</sup> See: [http://arcweb.sos.state.or.us/pages/rules/oars\\_100/oar\\_137/137\\_049.html](http://arcweb.sos.state.or.us/pages/rules/oars_100/oar_137/137_049.html)



**ISSUE 2. BENEFITS ACCRUING TO THE COMPANY**

**Q. Please summarize your findings on Benefits Accruing to the Company.**

A. Staff concludes that the Company's evidence provided thus far does not sufficiently demonstrate "that the public utility, without the emission reduction program, would not invest in the project in the ordinary course of business." See ORS 757.539(3)(d). Staff reaches this conclusion because Staff has calculated that, even in the absence of the Company's proposed \$10 Company incentive per MTC02(E) of emissions reduction, the Company would earn margin due to increased natural gas sales because of customer adoption of CHP. Staff has calculated this increased margin to be approximately \$16,335,209.

**Q. Does the Company need to receive a \$10 incentive per MTC02(e) emissions reduction?**

A. No. In the following line of questioning, Staff describes two methods by which the Company will receive a benefit even absent the \$10 Company incentive per MTC02(e) emissions reduction.

**Q. Please describe your first method.**

A. This section of my testimony is titled as follows:

METHOD 1: TOTAL MARGIN INCREASE BASED ON THE  
COMPANY'S RESPONSE TO STAFF IR 3.

**Q. Does the Company earn margin from additional customers due to the proposed CHP solicitation program?**

1 A. Yes. In response to Staff IR 22, the Company describes, “the increased  
2 revenue was evaluated by assuming an average CHP customer to be a 10 MW  
3 CHP plant with an annual usage of 4,574,607 therms.” In response to Staff IR  
4 3, the Company forecasts the total annual margin value to be \$136,647 per  
5 participating customer.

6 **Q. Does Staff find the Company’s forecast reasonable?**

7 A. Staff is not in agreement with the Company’s assumption, in its response to  
8 Staff IR 3, of an estimated CHP plant size of 10 MWs. This assumption seems  
9 unlikely given that the Company proposes to achieve a total capacity of 120  
10 MW with five participating customers.<sup>13</sup> In order to achieve the Company’s  
11 proposed total capacity of 120 MW, each of the five participating customers  
12 would need an average plant size of 24 MWs. Staff has an information request  
13 pending with the Company that asks the Company to clarify this matter.

14 **Q. Can the Company’s current forecast be used as a proxy in further  
15 computations?**

16 A. Yes. Because total MWs rather than MWs from an average CHP customer are  
17 relevant for computing totals, using the Company’s proposed forecast, which is  
18 based on the 10 MW average plant size assumption, should not dramatically  
19 alter results.

20 **Q. Can you compute the yearly Total Annual Margin increase in the  
21 highest cost year based on the Company’s response to Staff IR 3?**

---

<sup>13</sup> In response to Staff IR 3: File = *OPUC IR 3 Attachment-1.xlsx*. Cells = E26, F26, F27.

1 A. Yes. \$136,647, in cell K16 of file *OPUC IR 3 Attachment-2.xlsx* in response to  
2 Staff IR 3, represents the Total Annual Margin increase due to one 10 MW  
3 customer. In order to reach the Company's proposed 120 MW total capacity,  
4 there would need to be 12 of these customers.<sup>14</sup> Thus Staff has multiplied this  
5 number by 12 in order to arrive at a yearly Total Annual Margin increase based  
6 on the Company's response to Staff IR 3 of \$1,639,759.

7 **Q. What are the proposed CHP solicitation program's yearly Margin**  
8 **increases?**

9 A. Staff uses the Company's values as labeled. Because the Company labels cell  
10 J16 of file *OPUC IR 3 Attachment-2.xlsx* as, "Total Annual Margin," Staff  
11 assumes that it would reoccur annually associated with a 10 MW customer. In  
12 practice, when rates are adjusted in a rate case, this assumption may not hold.  
13 Exhibit Staff/202, St. Brown/8 provides the file *OPUC IR 3 Attachment-2.xlsx*  
14 which the Company provided in response to Staff IR 3. Because it would take  
15 several years before the Company's proposed total capacity of 120 MW is built,  
16 Staff discounts non-maximum cost years by their ratio to the maximum  
17 program cost year.

18 **Q. What is the sum of the total benefits due to margin increases, absent a**  
19 **\$10 incentive per MTC02(e) emissions reduction, accruing to the**  
20 **Company due to the proposed CHP solicitation program?**

---

21  
22  
<sup>14</sup> *ibid*

1 A. The final row of the table below provides this computation:

<b>Year</b>	<b>Ratio with highest cost program year<sup>15</sup></b>	<b>Yearly Margin (ratio * \$1,639,759)</b>
2017	63.10%	\$ 1,034,668
2018	62.90%	\$ 1,031,398
2019	100.00%	\$ 1,639,759
2020	99.25%	\$ 1,627,494
2021	98.95%	\$1,622,588
2022	98.95%	\$1,622,588
2023	98.95%	\$1,622,588
2024	98.95%	\$1,622,588
2025	98.95%	\$1,622,588
2026	98.95%	\$1,622,588
2027	38.61%	\$633,183
2028	38.61%	\$633,183
Total Margin increase based on the Company's response to Staff IR 3:		<b>\$16,335,209</b>

2

3 **Q. What should be considered when viewing the above table?**

<sup>15</sup> See: Row 51 of the tab "CHP Budget" in *OPUC IR 3 Attachment-1.xlsx* submitted in response to Staff IR 3.

1 A. The total benefit value is an approximation due to the Company's use of 10  
2 MW average plant size in its computation of Total Annual Margin increase due  
3 to one customer. As stated earlier, Staff does not agree with this assumption.

4 **Q. Please describe your second method.**

5 A. This section of my testimony is titled as follows:

6 METHOD 2, POTENTIAL BENEFIT DUE TO THE FACT THAT

7 CHP IS A CLEAN POWER PLAN COMPLIANCE MECHANISM.

8 **Q. What is the potential benefit due to the fact that CHP is a Clean Power**  
9 **Plan compliance mechanism?**

10 A. Staff witness Klotz's testimony further describes the Clean Power Plan rule  
11 developed and finalized by the EPA. Staff believes CHP being a compliance  
12 mechanism is a benefit to the Company.

13 **Q. Does the proposed CHP solicitation program benefit the Company,**  
14 **absent a \$10 per MTC02(e) emissions reduction Company incentive?**

15 A. Yes. As just explained, under the base case, Staff computes the Company's  
16 total benefit from the program, absent the \$10 Company incentive, at  
17 \$16,335,209.

18 **Q. Does Staff have a recommendation on the proposed Company**  
19 **incentive of \$10 per MTC02(e) of emissions reduction?**

20 A. Yes. Because the Company receives benefits absent the Company incentive  
21 per MTC02(e) of emissions reduction, Staff supports including \$0 in the range  
22 of possible monetary-incentive values.

1 **Q. Are you testifying that it is possible for the Company to receive a**  
2 **benefit absent the proposed Company incentive of \$10 per MTC02(e) of**  
3 **emissions reduction?**

4 A. Yes, because the Company obtains other yearly benefits from the proposed  
5 program as discussed in Staff's testimony.

6 **Q. Does Staff have any additional recommendations for the Company's**  
7 **proposed CHP solicitation program?**

8 A. Yes. Staff has identified that the Company's proposed incentive structure  
9 provides customers with incentives beyond those necessary to incent them to  
10 participate in the proposed CHP solicitation program. Staff has identified that  
11 the Company incentive per MTC02(e) of emissions reduction may be  
12 unnecessary in order for the Company to receive a benefit reflective of the  
13 effort undertaken to conceive and implement the emissions reduction program.  
14 Thus, Staff recommends that the Company reevaluate if these aspects of its  
15 proposal can be adjusted in order to achieve emissions reductions at a lower  
16 total cost.

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

18 A. Yes. However, Staff reserves the right to reply to any new issues presented by  
19 other parties in their Response Testimony.

CASE: UM 1744  
WITNESS: MAX ST. BROWN

**PUBLIC UTILITY COMMISSION  
OF  
OREGON**

**STAFF EXHIBIT 201**

**Witness Qualifications Statement**

**August 28, 2015**

### WITNESS QUALIFICATIONS STATEMENT

NAME: Max St. Brown

EMPLOYER: Public Utility Commission of Oregon

TITLE: Utility Economist  
Energy Rates, Finance & Audit Division

ADDRESS: 201 High Street SE. Suite 100  
Salem, OR. 97301

EDUCATION: Ph.D., Economics (2013)  
Washington State University

B.S., Economics (2009)  
Central Washington University

EXPERIENCE: I have been employed by the Public Utility Commission since July 2015, with my current position being a Utility Economist, in the Utility Program's Energy – Rates, Finance and Audit Division. My current responsibilities include analysis and technical support for rate, finance, and audit related proceedings, with an emphasis on forecasting and marginal cost studies.

Prior to working for the OPUC I served as an Assistant Professor of Economics at Eckerd College in St. Petersburg, FL from 2013 to 2015. I have taught courses including Econometrics, Labor Economics, and Intermediate Microeconomics. As a graduate student at Washington State University I taught six course sections, including Econ of Renewable Energy.

My published research in peer-reviewed academic journals includes a study of the U.S. renewable energy industry and includes international economic impact studies.

I served as a summer fellow at the American Institute for Economic Research during summers 2011 and 2012.



CASE: UM 1744  
WITNESS: MAX ST. BROWN

**PUBLIC UTILITY COMMISSION  
OF  
OREGON**

**STAFF EXHIBIT 202**

**Exhibits in Support  
Of Response Testimony**

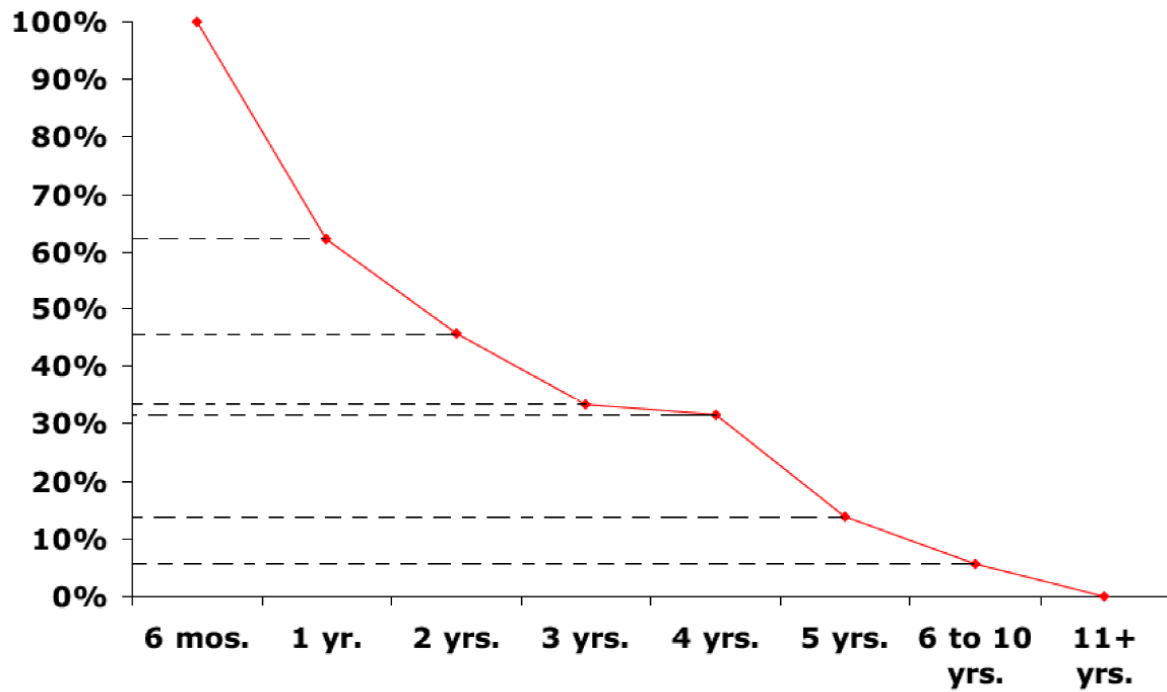
**August 28, 2015**

## Exhibit 202

Customer Adoption Payback Curve reproduced from NWN/101, Summers/11:

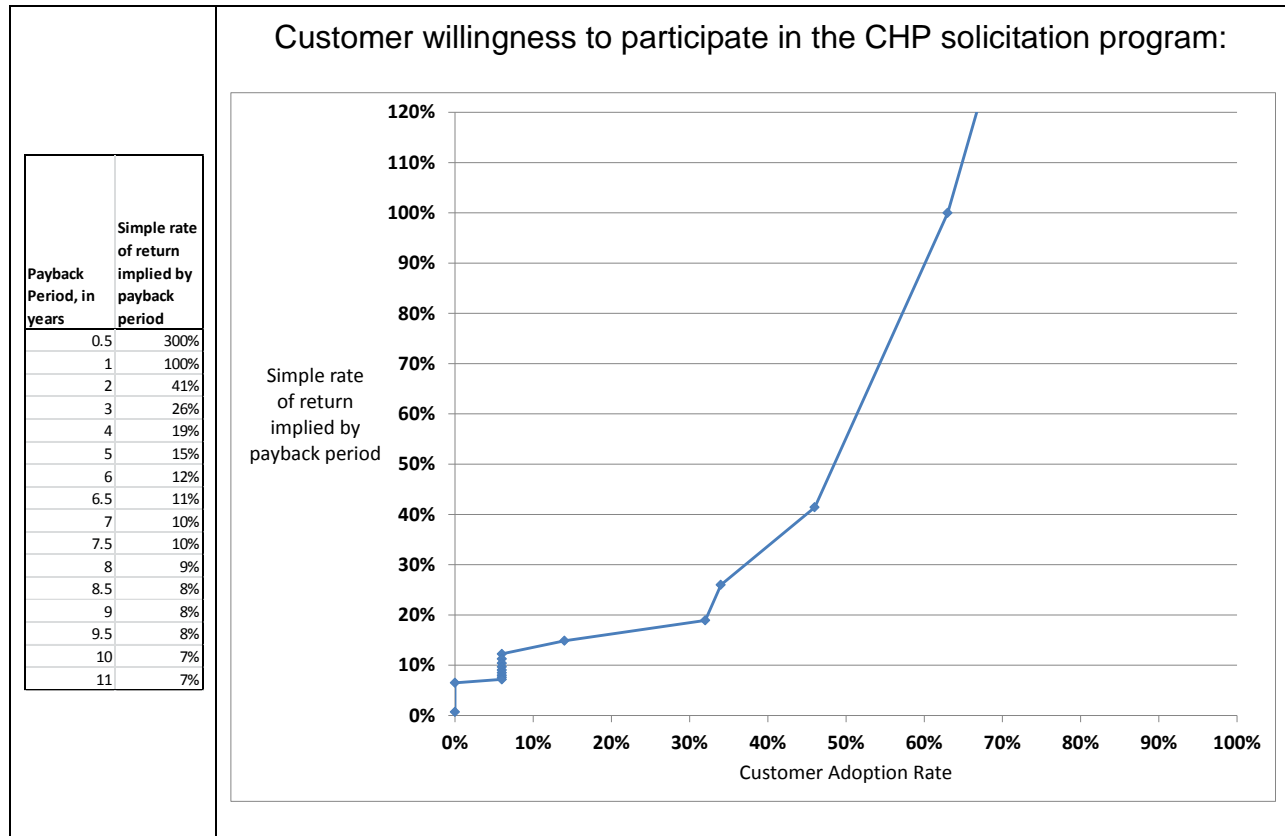
*Figure 4*

*Customer Adoption Payback Curve*



**Source:** *Primen's 2003 Distributed Energy Market Survey*

### Exhibit 202



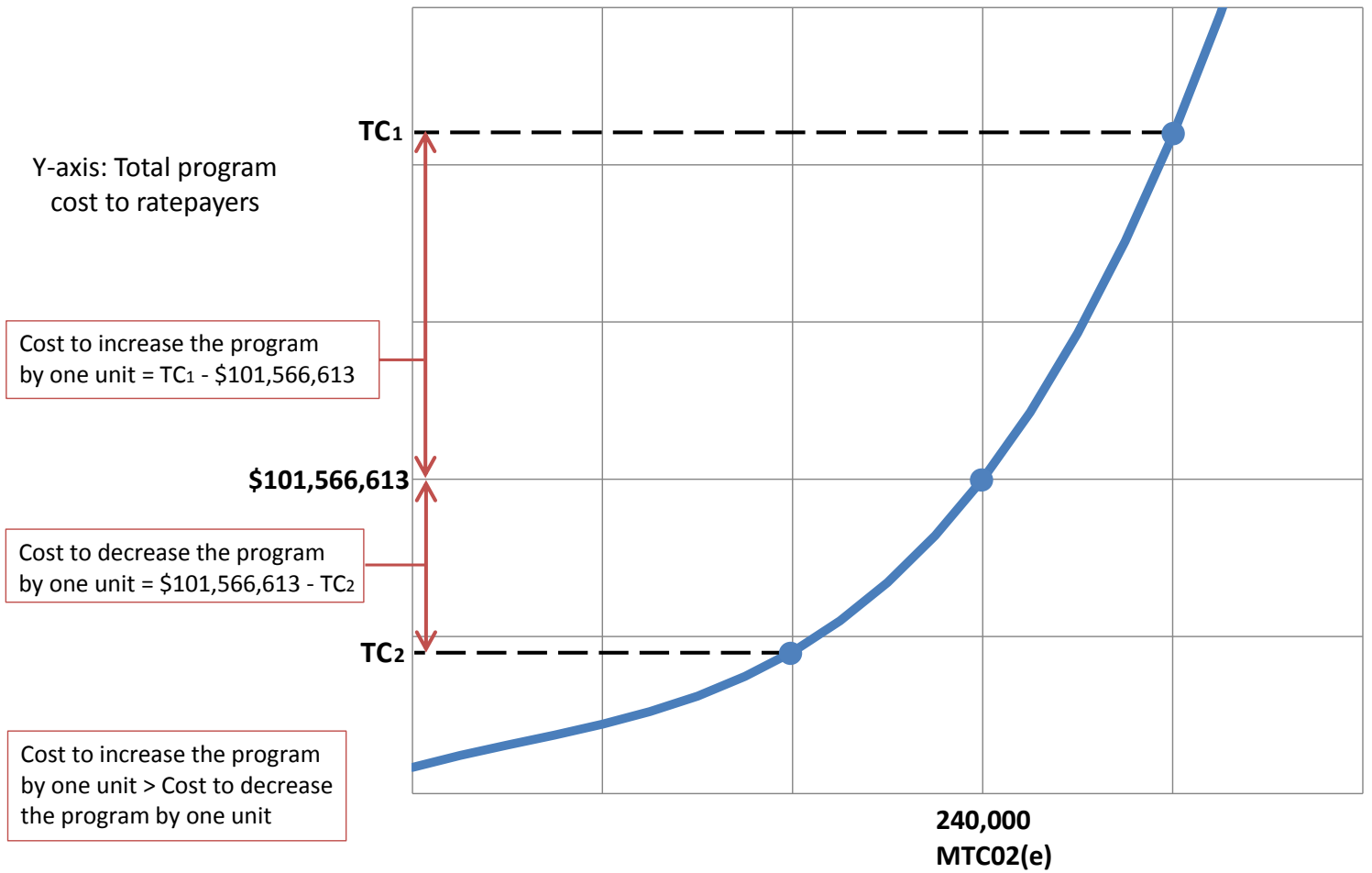
The simple rates of return implied by payback periods were completed using Microsoft Excel's =RATE() formula. This formula runs the following equation:

$$r = ( FV / PV )^{1/n} - 1$$

where r is the rate to be computed; FV is the future value (in this case, double the customer's initial investment); PV is the present value (in this case, the customer's initial investment); and n is the payback period, in years.

### Exhibit 202

Theoretical total cost (TC) curve for NW Natural's CHP solicitation program:



X-axis: Greenhouse gas emissions reduction per year in the State of Oregon by the end of 2020

## Exhibit 202

### 1 Background and Motivation

Auctioning of contracts to procure goods and services is now pervasive (see, e.g. Naegelen 2002; Dasgupta and Spulber 1990; Chen 2004, and references therein). Since the auctioneer is the *buyer*, the bidders are the *suppliers* or *sellers*, and the object being auctioned is the right to supply, procurement auctions are also called *reverse auctions*. The use of reverse auctions to award contracts has been vigorously advocated since competitive bidding results in lower procurement costs, facilitates demand revelation, allows order quantities to be determined (*ex-post*) on the basis of the received bids and limits the influences of favoritism and political ties. Moreover, the advent of the Internet has significantly reduced the transaction costs involved in conducting such auctions. There is now a large body of literature detailing the growing importance of reverse auctions in industrial procurement. According to Parente et al. (2001), the total value of the B2B online auction transactions totaled 109 billion in 1999, and that number was expected to grow to 2.7 trillion by 2004.

Although auction design is a well-studied problem, the models analyzed thus far do not adequately address the fact that the private information of the bidders is typically multi-dimensional, e.g. cost, capacity, quality, lead times, etc., and the instruments available to the buyer, i.e. the mechanism designer, to screen this private information is also multidimensional, e.g. multiple products, multiple components, different procurement locations, etc. This paper investigates mechanism design for a one-shot reverse auction with divisible goods and *capacitated* suppliers, i.e. suppliers with finite capacities. The production capacities, in addition to the production costs, are only known to the respective suppliers and need to be screened by an appropriate mechanism. Thus, in our model the private information of the supplier is two dimensional. However, we assume that the suppliers can only *underbid* capacity. We show how to construct the optimal revenue maximizing direct mechanism for this model. Although the general Bayesian mechanism design problem with 2-dimensional types is known to be hard, we are able to circumvent the difficulties in the general problem by exploiting the specific structure of the model, in particular that the suppliers are only allowed to underbid capacity. The basic insight is that the optimal mechanism does not give any information rent to a supplier for revealing capacity information when the production cost is known. We also present a low bid implementation of the optimal auction in a symmetric environment.

The paper is organized as follows. In Sect. 1.1 we discuss some of the relevant literature. In Sect. 2 we describe the model preliminaries. In this section, we also elaborate on the suppliers' incentive to lie about capacity and consider various special cases of the procurement auction problem. In Sect. 3 we present the optimal direct auction mechanism and its implementation via "pay as you bid" reverse auction. In Sect. 4 we discuss limitations of our model and directions for future research.

#### 1.1 Literature review

Myerson (1981) first used the indirect utility approach to derive the optimal auction in an *independent private value* (IPV) model. Che (1993) considers 2-dimensional

## Exhibit 202

POLICY RESEARCH WORKING PAPER 7062

### Abstract

This paper considers the design and performance of auction mechanisms used to deploy renewable energy in three emerging economies: Brazil, China, and India. The analysis focuses on the countries' experience in various dimensions, including price reductions, bidding dynamics, coordination with transmission planning, risk allocation strategies, and the issue of domestic content. Several countries have turned to public competitive bidding as a mechanism for developing the renewable generation sector in recent years,

with the number of countries implementing some sort of auction procedure rising from nine in 2009 to 36 by the end of 2011 and about 43 in 2013. In general, the use of auctions makes sense when the contracting authority expects a large volume of potentially suitable bids, so that the gains from competition can offset the costs of implementation. A study of the successes and failures of the particular auction design schemes described in this paper can be instrumental in informing future policy making.

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*The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.*

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## Exhibit 202

### 3.3 Contractual design

The CCAs share a common design across sectors even though they have been modified where necessary to reflect particular circumstances. Three structures for agreements have been proposed: (1) one full sector model with one target and a one stage all pass/all fail evaluation (2) an umbrella agreement between the Department of Environment, Food and Rural Affairs (DEFRA) and the sector association and underlying agreements between DEFRA and each company and (3) an umbrella agreement between DEFRA and underlying agreements retained and managed by the sectors.

Option 1 was hardly chosen. Companies have been reluctant to enter in a scheme based on a mechanism of collective compliance, generating potentially free riding behaviors: a company could lose the exemption even if it has complied with the target in the case the whole sector fails to comply. The majority of sectors uses option 2. Under this option, the compliance verification is made in two steps: the first step checks if the sector target is met. If so, all target units are deemed to have met their target and there is no second step. The second step comes only if the sector target is not met. In this case, each target unit is re-certified if it has met its individual target. Option 3 is quite similar to option 2 and has been chosen by six sectors. The rationale for this multi-level target is to avoid the cost of individual verification in case of global compliance. The initial idea was also that over-achievement by one participant would compensate for the under-achievement of another.

### 3.4 Monitoring and enforcement aspects

Contrary to most negotiated agreement observed in other EU countries, CCAs include a complete monitoring and enforcement apparatus. CCAs set a final 2010 target but also interim targets for each of the two-yearly milestones (2002, 2004, 2006 and 2008). For each milestone, individual sites have to report energy and production data to their sector association. Independent crosschecks can be undertaken by DEFRA. As far as enforcement is concerned, the key feature of CCAs is that they are both based on a collective liability principle through the umbrella agreement and an individual liability principle through the underlying agreement signed by individual sites. More specifically, if the sector target is met, there is no further action. Otherwise the non-compliant sites are identified. They are not re-certified for the discount and lose their tax exemption for the next two years even though they don't have to pay back the rebate corresponding to the non-compliance period. At the end of the next milestone, they could again benefit from the discount if they succeed to comply with the next interim target. In 2010, if a site fails to comply with its target, it will have to pay back the whole exemptions it has enjoyed.

### 3.5 CCAs and emission trading

Even if the detailed rules governing the interactions between emission trading and the CCAs had not been developed yet at the time they were negotiated, provision for emissions trading was included in the agreements. The emission trading scheme was launched in April 2002. It involves two types of participants: the so-called Direct Participants and the CCA companies.

The participation of the Direct Participants (DPs, hereafter) is totally voluntary. More specifically, the government offered incentive payments to UK companies committing to



## Exhibit 202

greenhouse gas emission reductions. The incentive payments amounting 215 M£ were allocated by an Internet auction in March 2002. The auction was conducted with a descending price clock, on account that it was a procurement auction (or “reverse auction”): the government sought to purchase emission reductions at minimum cost. The government posted a price per unit of emissions reductions, and firms bid the quantity of emission reductions that they were prepared to make at that price. In each new round, the government announced a successively lower price and bidders indicated the quantity of emission reductions that they were prepared to make at the lower price, until the market cleared.

All companies which were not involved in a CCA could participate. In the end, thirty four qualified for the incentive and share among themselves the incentive payments for accepting a total abatement of 4 Mt CO<sub>2</sub> to 2006. After taking into account the effect of the yearly abatement profile and corporate tax, the incentive rewards each ton of CO<sub>2</sub> with around £12. These companies are either large oil companies (BP, SHELL), which are not eligible for a CCA since the Climate Change Levy does not target fuel oil, companies emitting non CO<sub>2</sub> gases such as HFC (INEOS) or non energy intensive enterprises such as banks and supermarkets.

In parallel, CCAs firms were offered the opportunity to participate to the scheme on a Baseline & Credit basis: if CCA participants over-comply with their target, they can receive emission credits which can be traded on the emission market. Conversely, a CCA participant can buy emissions permits on the market to comply with its target. Linking the CCAs with emission trading rewards over-achievement and can increase their cost effectiveness.

We have seen that nearly all CCA participants use relative targets whereas DPs are required to meet absolute targets. One consequence is that, under particular conditions, trading between both types of participants can lead to reduce the environmental outcome of the DPs. To preserve the environmental integrity of the UK ETS, a Gateway mechanism has been designed: any transfer of allowance between a relative participant and an absolute one is approved by the public authority if and only if the net total flow of permits toward the relative sector is positive. This restriction is designed to ensure that whole scheme does bring about real absolute, rather than relative, emissions reductions. Given the risk of erosion of the environmental impact through the transfer of permits to the absolute participants, one could wonder why a simple prohibition of any permit transfers from the relative to the absolute group could not have done the job in a simpler way. The Gateway is seen as a better mechanism than a simple one-way trading since it increases the thickness of the market as the number of trading participants is increased by the connection of the two groups. Indeed, it could reduce some liquidity problems and sequential transactions which may prevent some cost-effective transactions from occurring. In practice, the Gateway has remained open since the beginning of the UK ETS. This means that the net flow of permit comes from the DPs to the relative CCA participants. When assessing the environmental strictness of CCA targets in Section 5, we will come back to that issue.



### Exhibit 202

32 Firm Trans	Therms per Block	Base Rate	Base Rate Adj	Total Temp Adj	Billing Rate	Margin Rate	Incremental Monthly Therms by Block	Incremental Margin
	Block 1	10,000	0.09385	0.00099	0.09488	0.09484	-	\$ -
	Block 2	20,000	0.07975	0.00085	0.08064	0.08060	-	\$ -
	Block 3	20,000	0.05632	0.00059	0.05697	0.05691	20,000	\$ 1,138
	Block 4	100,000	0.03286	0.00034	0.03327	0.03320	100,000	\$ 3,320
	Block 5	600,000	0.01877	0.00020	0.01906	0.01897	261,217	\$ 4,955
	Block 6	all else	0.00941	0.00010	0.00959	0.00951		
	Rate	MDDV Volume						
	Dist Capacity Charge (based on MDDV)	0.15748						
	Annual	Monthly						
	Incremental therms from an assumed average CHP customer	4,574,607	381,217					
	Note: See NWN Oregon Rate Schedule 32 Firm Transportation rate schedule tariff. <a href="https://www.nwnatural.com/uploadedFiles/252a17.pdf">https://www.nwnatural.com/uploadedFiles/252a17.pdf</a>							
							<b>Volumetric Revenue</b>	\$ 9,413
							<b>Demand Revenue</b>	\$ 1,973,72
							<b>Total Monthly Margin</b>	\$ 11,387.21
							<b>Total Annual Margin</b>	\$ 136,647

**Speer, Andrew J.:**  
Therms are additive by block (therms 0-10,000 are billed at the Block 1 Rate).

**Speer, Andrew J.:**  
No incremental therms assigned to the first two blocks; it is assumed the customer is already taking service at 30,000 therms per month.