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March 19, 2012 NWN Advice No. WUTC 12-3

VIA ELECTRONIC FILING

Dave Danner, Secretary and Executive Director
WASHINGTON UTILITIES &
TRANSPORTATION COMMISSION
1300 S Evergreen Park Drive, SW
Post Office Box 47250
Olympia, Washington 98504-7250

Re: Schedule G, Energy Efficiency Services and Programs – Residential and Commercial

Northwest Natural Gas Company, dba NW Natural ("NW Natural" or "Company"), files the following tariff sheet stated to become effective with service on and after **May 1, 2012**:

First Revision of Sheet G-1,
Schedule G,
"Energy Efficiency Services and Programs – Residential and Commercial."

The purpose of this filing is to revise the Company's Energy Efficiency Plan ("Plan") which by reference on Sheet G.1 is part of the Company's Tariff. The Plan is revised to add two new residential, energy efficiency measures to the Company's offering and to include parameters for the Company's annual filing for program cost recovery.

The Company would like to begin offering a $150 incentive to residential customers that install a gas tank water heater with a 0.67 efficiency factor and an incentive of $3 per square foot of collector for customers installing solar thermal pool heating systems. Attached is a work paper summarizing each measure and providing the estimated therm savings. Also included for each is an Energy Trust "Blessing Memo" demonstrating that Energy Trust staff has analyzed and approved the measure as appropriate for inclusion in the program, and a cost effectiveness calculator demonstrating the measure's total resource cost. The Company looks forward to providing these new savings opportunities to its Washington customers.

The Plan is further revised to establish guidelines for the Company's annual filing for program cost recovery. The Company has historically filed to recover energy efficiency program costs as part of its Purchased Gas Adjustment ("PGA) filing which is submitted each year by October 1. Staff and Public Counsel requested that program cost recovery be separated from the PGA filing and presented in a stand-alone tariff filing to allow for a separately docketed,

public process. The Company has no objection to this request and outlines in its Plan the proposed filing that it will submit annually.

Also, language is added to the Plan to establish that as of January 1, 2013, the Company will begin adding a message on applicable customers' monthly bills stating how much of their currently billed amount is being collected to pay for the residential and commercial energy efficiency programs. This bill message is being added in response to Staff's and Public Counsel's request that costs be separately itemized. Parties have agreed to a monthly bill message rather than a line item in the bill since the Company's rate structure and billing system make it very difficult to bill a separately stated per therm charge. The effective date of the bill message is delayed because the Company has limited resources available to make billing system programming changes and it must prioritize this change with other outstanding work. Also, while this change is best implemented in the system during a rate change (November 1, 2012), the message must become effective after all prorated bills-- those including the old and new Schedule 230 rate adjustment-- have cycled out. As such, customers will begin seeing the bill message regarding energy efficiency program costs at the beginning of next year.

Finally, a housekeeping change is also made on Sheet G.1. The referenced URL for additional program information has changed with recent updates to the Company's webpage. That web address is updated herein.

The Company respectfully requests that the tariff sheets filed herein be approved to become effective with service on and after May 1, 2012.

As required by WAC 480-80-103(4)(a), I certify that I have authority to issue tariff revisions on behalf of NW Natural.

A copy of the filing is available for public inspection in the Company's main office in Portland, Oregon and on its website at www.nwnatural.com.

Please address correspondence on this matter to me with copies to the following:

Kelley Miller, Rates Specialist
Rates & Regulatory Affairs
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Please call me if you have any questions.

Sincerely,

/s/ Jennifer Gross

Jennifer Gross
NW Natural

enclosures

NW Natural's 2012
Energy Efficiency Plan

I. Background

Northwest Natural, dba NW Natural ("NW Natural" or Company"), began offering its current energy efficiency programs to Washington customers on October 1, 2009. The Washington Utilities and Transportation Commission's ("WUTC's") Order No. 04 in the Company's 2008 rate case, docketed as UG-080546, directed NW Natural to create and begin offering a program.

II. Oversight

NW Natural's energy efficiency programs were developed and continue to evolve under the direction and oversight of the Energy Efficiency Advisory Group ("EEAG") which is comprised of interested parties to the Company's 2008 rate case. The EEAG includes representatives from NW Natural, Energy Trust of Oregon ("Energy Trust"), WUTC Staff, Public Counsel, Northwest Industrial Gas Users ("NWIGU"), The Energy Project, and NW Energy Coalition.

III. Program Administration

NW Natural's general energy efficiency programs are administered by the Energy Trust, which is an independent, nonprofit organization dedicated to helping utility customers save electric and gas energy. Energy Trust was formed in 2002 in response to Oregon legislation that restructured electric utilities[1] for multiple reasons including allowing non-residential customers to purchase their electricity from providers other than the utility and reassigning the responsibility for demand side management from utility operations to the Energy Trust.

NW Natural began using Energy Trust as the delivery arm for its Oregon energy efficiency program in 2003. Since NW Natural's Washington service territory is contiguous with its Oregon territory, it made sense to have Energy Trust extend the boundaries of the Oregon program offerings into Washington.

As agreed to in UG-080546, Energy Trust administered the Company's program for one pilot year. During this time, the EEAG monitored the program's performance and assessed whether Energy Trust should be the ongoing program administrator. On May

[1] SB 1149, codified as ORS 757.612, mandated the creation of an independent entity capable of providing demand side management services to utility customers.

25, 2011, NW Natural made a compliance filing in UG-080546 wherein it stated the EEAG's opinion to allow Energy Trust to continue administering NW Natural's energy efficiency programs in Washington. On June 8, 2011, Public Counsel separately filed a letter supporting this decision.

NW Natural's Washington Low Income Energy Efficiency Program ("WA-LIEE") is administered by Clark County Community Action Agency, Klickitat County Community Action Agency and Skamania County Community Action Agency.

IV. Programs Offered

NW Natural offers the following general energy efficiency programs:

> Residential – Residential customers with gas heated homes are offered home energy reviews wherein an energy consultant identifies measures that could be installed to improve the customer's home's efficiency. Specific incentive offerings are also available for the installation of certain efficient gas appliances.
>
> New Homes – The New Homes program encourages builders to construct homes to an energy efficiency standard that is better than Washington building code. Qualifying homes must meet the criteria established in Energy Star's Builder Option Package ("BOP") for natural gas heated new construction.
>
> Commercial – Commercial customers are offered incentives for prescriptive efficient gas appliance installations, as well as efficient installations unique to the customer's facilities that are identified in a custom study.

Specific measure offerings are as listed in Appendix A to this Plan."

Under NW Natural's low income energy efficiency program, agencies administering the program leverage other funding sources with WA-LIEE dollars to provide whole-house weatherization services to qualifying customers. Agencies are paid $3,500 per home for cost effective energy efficiency installations as well as an average of $440 per home for health and safety repairs. Program details are available in the Company's Schedule I, "Washington Low Income Energy Efficiency Program (WA-LIEE)."

V. Program Evaluation, Monitoring and Verification ("EM&V")

Impact Evaluations

Deemed gross savings by measure are used to determine total therms reported as saved per program year. The deemed savings used will be consistent with the most current impact studies performed on the programs that the Energy Trust delivers in Oregon until after mid-2012 when such impact evaluations will include results from the

Washington-delivered programs. The Energy Trust performs the impact study wherein they analyze customers' energy usage data before and after a measure is installed. The savings from all measures' are analyzed annually unless sample sizes based on participation rates are not statistically significant. From the impact evaluation, the Energy Trust is able to determine if average savings are consistent with deemed savings. If they are not, the deemed savings are "trued-up" once annually to reflect the findings. A link to the annual true up report as well as a short summary of the results will be provided in the quarterly report following the report's release.

Process Evaluations

Besides impact evaluations, the Energy Trust annually issues a request for proposal ("RFP") for a third party to perform a process evaluation on all general energy efficiency programs offered. The third party studies and reports on the processes employed for each program. Study results are available on the Energy Trust's website: www.energytrust.org. A link to the annual process evaluation as well as a short summary of the results will be provided in the quarterly report following the report's release.

VI. Process for Program Changes

NW Natural will file to revise Appendix A of its Energy Efficiency Plan when it plans to add, change, or remove a long- term incentive offering. Every year the Company will consider if program year changes are needed. If they are, the Company will revise its EE Plan to make requested program modifications when it makes its annual advice filing, submitted no later than December 1, to revise the performance metrics and budget that are also included in the Plan. This does not preclude the Company from filing to revise Schedule G or its EE Plan at any time during the year. Advice filings revising or adding measures will include:

1) A benefit cost ratio ("BCR") calculator demonstrating the measure's life, measure cost, the quantifiable non-energy benefits, the utility system benefits and the societal BCR; and

2) A blessing memo which refers to an in-house Energy Trust document that summarizes the vetting of a measure before it is introduced as a program offering. The EEAG will be given the opportunity to review all tariff filings before they are filed. The Company will generally give the EEAG ten business days to review a draft filing. The EEAG's review process will not be less than five business days.

3) New programs proposed mid-cycle will include a program-specific plan addressing the possible need for program-specific metrics.

Please note that not all advice filings must include the EE Plan. The EE Plan will only be included when it is being revised.

The Company will work to resolve issues with EEAG members before filing. If the EEAG cannot completely recommend approval of a filing, the Company may still choose to make the filing with the WUTC with the understanding that EEAG members may intervene in that public proceeding.

VII. Annual Schedule for Program Planning

By November 15 of each year, the Company will provide the EEAG with the following proposals for the next program year, which will subsequently be filed with the WUTC in a new docket that will contain all the required reporting for the calendar year, including a link to the Purchased Gas Adjustment (PGA) filing wherein program costs are recovered:

Budget

The Company will provide a total estimated program budget for the next calendar year. The budget will present expected expenditures by program and customer class.

Please note that this budget forecast will be based on the best information available at the time. As the year progresses, budgeted dollars may be reallocated among various programs or new offerings that are approved by the WUTC.

Funding Schedule

A funding schedule is a contractually-agreed-to timeline between NW Natural and Energy Trust wherewith NW Natural will provide Energy Trust the necessary money for program administration and delivery. The amounts dispersed to the Energy Trust in one year are the sum of all funds needed for that program year determined by subtracting any unspent or uncommitted funds previously dispersed to the Energy Trust for the Washington program from the total forecasted budget.

Metrics

The Company will propose performance metrics that will address the following:

- Total program costs
- Projected therm savings consistent with most recent IRP
- Average levelized cost for measures
- A ceiling for average cost per therm
- Projected homes to be weatherized in the WA-LIEE program

The Company expects that Total Resource Cost (TRC) and Utility Cost (UC) at the portfolio level should always be greater than 1.0 and will report compliance to this on an annual basis.

The Company will come to agreement with the EEAG on the next year's budget and performance metrics before making a tariff filing with the WUTC to modify this plan so that it incorporates the next year's projected costs and metrics accordingly. This filing will be made annually not later than December 1 for a January 1 effective date.

Generally, milestones for the program year will be as follows:

Program Year Schedule	
January 1	Start of program year
April 25	Annual report for previous program year is filed.
May 25	Q1 report on January 1 through March 31 of current year
August 25	Q2 report on April 1 through June 30 and YTD
October 1	Tariff filing submitted for program cost recovery.
November 1	Requested effective date of program cost recovery filing.
November 15	Share next year's budget range, funding schedule, and proposed performance metrics with EEAG no later than this date
November 25	Q3 report on July 1 through September 30 and YTD
December 1	Latest date to file EE Plan for next program year
January 1	Start of next program year; new EE Plan effective

VIII. Reporting

The Company will file all required reporting with the WUTC in the docket established for the current program year.

Quarterly

The Company will report on its program on a calendar year basis. Quarterly reports will be provided to the EEAG and filed with the WUTC on the following schedule:

1Q – May 25

2Q – August 25

3Q – November 25

Annual

An annual report will be due annually for the previous year by April 25th.

EEAG Review

The EEAG will meet either in person or by teleconference to review each quarterly and annual report.

Content of Reports

The quarterly reports will include

- Quarterly progress toward annual program metrics
- A breakdown of costs by program and customer sector
- A reporting on percentage of program costs spent on customer incentives
- The funding received to date
- The 2Q report will include a 6 month check in on WA-LIEE
  - program year costs,
  - homes served,
  - estimated total therms saved per home, and
  - total therm savings to-date
- The quarterly report following the annual release of the impact and process report will include a link to that report and a short summary of the findings

The annual report will include the following:

- Budget compared to actual results by program
- Cost-effectiveness calculations on a program by program and total portfolio basis
- Measure level participation (units installed and savings) under each program
- Reporting on achievement of metrics
- Evaluation results (if performed)
- WA-LIEE program results including:
  - total program year costs
  - homes served
  - estimated total therm savings, and
  - average therms saved per home.

IX. Annual Program Budget

Budgets

Forecasted program costs for the next calendar year will be reviewed annually in November when metrics are also proposed for the following program year.

Actual Costs

Each year, the Company will file its annual report by April 25 which will detail costs and acquisitions for the previous program year. This filing will trigger the EEAG's review of general energy efficiency and WA-LIEE program costs.

X. Cost Recovery

Energy Efficiency and WA-LIEE program costs are deferred and later amortized for recovery from applicable customers on an equal cents per margin basis as established annually in the temporary rate adjustments, Schedules 215 and 230, respectively. Beginning in 2012, the Company will annually submit a stand-alone filing concurrently with its PGA filing, for cost recovery of its energy efficiency program expenses for the prior calendar year. That annual filing will include the following information:

- Background on the Company's energy efficiency programs and cost recovery.
- A copy of the prior program year's Annual Report which will include detail on the achievement of performance metrics; the forecasted budget for that year and actual expenditures.
- Average monthly bill impact of proposed rate for applicable customers.
- Work papers demonstrating the analysis behind the collection rate.

Beginning on January 1, 2013, the Company will include a message on applicable Customers' monthly bills stating how much of their current monthly bill represents costs collected to pay for the residential and commercial energy efficiency programs.

XI. 2012 Performance Metrics

Below are the 2012 program metrics. Each metric is followed by a statement explaining how it was determined.

- Total residential and commercial program costs will be between$1,431,461 and $1,614,982

The total costs for this metric correlate to the range of costs estimated to achieve all cost effective therms for the programs being offered as determined in the Company's 2011 Integrated Resource Plan ("IRP"), filed in Docket No. UG-100245.

- Therms saved will be between 212,553 and 250,062

The program's primary goal is to meet system demand with the least cost conservation as required per WAC 480-90-238(1). The therm savings target is aligned with the demand-side management targets for the programs offered as identified in the Company's 2011 Modified IRP.

- Average levelized cost for the portfolio of measures will not to exceed $0.65 per therm

This metric is unchanged from the prior year. The profile of NW Natural Washington service territory makes it harder to reduce the averaged levelized cost per therm than it would be in an area with more industrial customers since therm savings are acquired more cost effectively for bigger customers than for residentials.

- First year therms will cost less than $6.50 per therm

This metric is reduced from $8.00 per therm the first year and $7.00 the second.

- Total Resource Cost (TRC) and Utility Cost (UC) at the portfolio level are greater than 1.0

The TRC and the UC shall be calculated as prescribed in Schedule G. A value greater than 1.0 demonstrates that the benefits received are greater than the costs. This test is applied at the portfolio level to allow measures that are less cost effective to be bundled with more cost effective.

Schedule I, Washington Low Income Energy Efficiency (WA-LIEE) 2012 Performance Targets

In 2012, the WA-LIEE program will strive to weatherize 20-40 homes for a cost of $89,300to $178,600. Assumptions are as provided below in Table II.

Table II – WA-LIEE 2012 Performance Targets

Estimated homes served	20-40
Estimated Average Cost of Incentives per home	$3,500
Maximum Cost per home ($3,500 incentives + $440 health, safety and repairs and $525 administration costs)	$4,465
Maximum cost based on estimated homes served	$89,300 to $178,600
Estimated therms saved per home	211
Total estimated therms saved	4220 to 8440

XII. 2012 Budget and Funding Schedule

Below is the 2012 budget for the residential and commercial energy efficiency programs and the WA-LIEE program.

Programs 2012 Budget		
Commercial		
Retrofit	$596,829 to $673,346	121,678 to 143,150
Residential		
Retrofit	$531,798 to $599,977	63,373 to 74,556
New Homes	$302,834 to $341,659	27,503 to 32,356
Total For Schedule G Programs	**$1,431,461 to $1,614,982**	**212,553 to 250,062**
WALIEE	$89,300 to $178,600	4220 to 8440
TOTAL	**$1,520,761 to $1,793,582**	**216,776 to 258,502**

APPENDIX A to EE Plan
The Company's Residential and Commercial Program offers incentives for measures as listed below.

RESIDENTIAL PROGRAM INCENTIVES

The following are offerings for Residential customers:

DESCRIPTION	INCENTIVE
Weatherization	
Air Sealing	50% of cost, up to $275
Air Leakage Test	$35.00 per site tested
Attic/Ceiling Insulation	$0.25 per square foot
Duct Insulation	50% of cost, up to $100
Floor Insulation	$0.30per square foot
Knee-Wall Insulation	$0.30 per square foot
Boiler Pipe Insulation	$0.50 per linear foot
Wall Insulation	$0.30 per square foot
Duct Sealing	50% of cost up to $325
Duct Leakage Test	$35.00 per duct system tested
Windows (0.25 to 0.30)	$2.25 to $3.50 per square foot
Heating	
Gas Furnace	$100.00
Direct Vent Gas Unit Heater	$100.00
Direct Vent Gas Fireplace	$100.00 to $150.00
Intermittent Pilot Ignition	$100.00
Gas Boiler	$200.00
Water Heating	
Gas Tankless Water Heater	$200.00
Gas Water Heater	$35.00 - $150.00
Clothes Washer with gas water heat (MEF 2.2+)	$30.00
Solar Thermal Pool Heating	$3 per square foot of collector
Direct Install Measures	
Faucet Aerator	Free to customer
Home Energy Review	Free to customer
Showerhead	Free to customer
Shower wand	Free to customer
Water Heater Set Back	Free to customer
Distributor or Retail Buy Down	
Showerhead	$8.50

APPENDIX A to EE Plan (Continued)

RESIDENTIAL NEW CONSTRUCTION

Tankless Hot Water Heating	$ 200.00 per unit
Energy Star Builder Option Package*	$ 600.00 per home
Showerhead	Free to customer
Clothes Washer with gas water heat (MEF 2.2+)	$30.00

* Building requirements are as stated on this site: http://www.energystar.gov/index.cfm?c=bop.pt_bop_washington

COMMERCIAL

General

Custom	$1 per therm

Heating

Steam Traps, Small Commercial, <12 hrs/day, small-med pressure	$ 100.00 per trap*
Gas-fired Condensing Boiler > 2500 kbtuh 0.9 EC	$ 4.00 per kBtu hr in
Gas-fired Condensing Boiler < 300 kbtuh 0.9 AFUE	$ 4.00 per kBtu hr in
Gas-fired Condensing Boiler >= 300 kbtuh, <= 2500 kbtuh 0.9 ET	$ 4.00 per kBtu hr in
Boiler Vent Damper	$ 1,000.00 per unit
High Efficiency Unit Heater - Non-Condensing with Electronic Ign	$ 1.50 per kBtu hr in
High Efficiency Condensing Furnace <225,000 kBtuh	$ 3.00 per kBtu hr in
Direct-fired Radiant Heating	$ 6.50 per kBtu hr in
Pipe Insulation	$2.00 to $6.00 per linear foot
Building Envelope insulation	$0.30 per sq ft
Rooftop Unit Tune Ups	$1,250 to $1,050
Greenhouse Thermal Curtain	$0.9 per sq ft

* Pre-verification of steam traps required for dry cleaners

Water Heating

Domestic Tankless/Instantaneous Water Heater with Electronic Ignit	$ 2.00 per kBtu hr in
Domestic Tankless/Instantaneous Water Heater with Standing Pilot	$ 1.50 per kBtu hr in
Condensing Tank	$ 2.50 per kBtu hr in
Commercial Clothes Washer, Gas Water Heat, Partial Gas	$ 200.00 per unit
Showerhead Gas	$ 6.00 to $10 per unit
Commercial Bathroom Faucet Aerators (0.5 gal per minimum; 15 unit minimum)	$3.00 each
Commercial Kitchen Faucet Aerators (1.5 gal per minimum; 15 unit minimum)	$5.00 each
Ozone Laundry System	$40 per pound of washing capacity up to a max of 35% of cost of system

APPENDIX A to EE Plan (Continued)

Food Service

Gas Full-Size Convection Oven	$ 300.00 per unit
Gas Fryer	$ 1,000.00 per unit
Gas Griddle	$ 150.00 per unit
Gas Steam Cooker	$ 1,300.00 per unit
Dishwasher - Single Tank Conveyor - Low temp - Gas hot water	$ 500.00 per unit
Dishwasher - Single Tank Door/Upright - Low Temp - Gas water heat	$ 400.00 per unit
Dishwasher - Single Tank Conveyor - High temp - Gas hot water	$ 500.00 per unit
Dishwasher - Single Tank Door/Upright - High Temp - Gas water heat	$ 400.00 per unit
Dishwasher - Undercounter - high temp - Gas water heat	$ 200.00 per unit
Turbo Pot – limit one per applicant	$40 per pot*

* Customers installing one other food service measure may receive one free turbo pot while promotional quantities last.

SPECIAL PROVISIONS

1. One time bonuses or coupons may be periodically offered to supplement standard incentives.
2. Limited time incentive offerings for measures may be offered.

NW Natural Washington Program
March 2012 Measure Additions

Measure Name	Description	Therm Savings	Incentive $
RESIDENTIAL			
.67 EF Tank Water Heater	Gas storage water heater designs which may be used to improve the efficiency to 0.67EF are increased insulation and improved flue baffles, electronic ignition, and/or an electromechanical flue damper. This measure does not include condensing water heaters or tankless water heaters which have an EF greater than 0.80. 0.67 EF tank water heaters offer a more affordable alternative to tankless water heaters and are experiencing a downward trend in installation costs.	31	$150
Solar Thermal Pool Heating	In a solar pool heating system, pool water circulates through a large series of collectors, usually black, flat panels located on your roof, and absorbs the sun's energy. The incentive is applied up front, reducing the amount that customers have to pay to the trained and approved trade ally contractors that perform the installations.	Approximately 1.4 therms per square foot of collector	$3 per square foot of collector

Blessing Memo for 0.67 EF Gas Tank Water Heater in NW Natural Washington State Service Territory

End Use: Gas storage water heaters sold to retailers, water heater contractors, and homeowners

Scope: Gas storage water heaters with an Energy Factor greater than or equal to 0.67.

Program: "Blessed" for New or Existing Single Family Homes in the New Homes or Home Energy Savings Programs, as well as New or Existing Manufactured Homes Programs, on the basis of continuing market transformation.

Description of the Measure
Gas storage water heater designs which may be used to improve the efficiency to 0.67EF are increased insulation and improved flue baffles, electronic ignition, and/or an electromechanical flue damper. These options may be combined with power venting at additional cost. Power vented models are included in this measure but very little uptake is expected for them, as a result of the cost. This measure does not include condensing water heaters or tankless water heaters which have an EF greater than 0.80.

Purpose of Re-Evaluating Measure
The program has proposed a new combination of consumer and distributor incentives. Cost effectiveness is re-evaluated by this memo.

BCR Calculator: (link: E:\Planning\Cross-Program Measures\Residential\Water Heating\EF67 gas storage water heater\bencost\ETO CEC 67EF gas storage water heat.xlsx)

Measure	Measure Lifetime (Maximum 70 yrs)	Annual Gas Savings, therm	Total Cost	ETO Incentives	Gas Utility System BCR	Combined Societal BCR
$150 customer incentive	12	31	$246	$150	1.5	0.93

Measure Analysis
The gas water heater baseline is derived from a study Michael Blasnik completed for the Energy Trust in 2009. The study found that the average household water heating energy use was 218 therms. This analysis uses this estimate as a baseline for energy use.

Savings, Economics, and Incentives
With an improvement from 0.58 EF to 0.67 EF, the water heater will use 29 fewer therms. Models with an EF of 0.70 have an energy savings of 37 therms, which pushes the weighted average savings of both units to 31 therms. Approximately 80% of the water heaters in the program to date have been 0.67EF, and 20% have been 0.70EF.

There is considerable variability in the cost of the water heaters. Recent quotes ranged from a $200 incremental cost for a 0.67 EF unit to $430 incremental cost for a 0.70 EF unit. The prices may be weighted, as they were for energy savings, 80% for the cheaper models and 20% for the more expensive ones, for the reason that less expensive equipment will capture the greater part of the market share. The weighted

incremental cost is $246. If it is not already available, an electrical connection has an additional cost of approximately $150. Retrofit installations for which an electrical connection is not already available are not included in this analysis, as the additional cost of electrical work will likely preclude the installations in those sites. The new construction scenario or a retrofit installation in which an electrical connection is available is shown in the cost effectiveness calculator above.

The societal benefit cost ratio remains slightly below 1. However, the Energy Trust program over the past year has succeeded in making this product available through a number of distributers and installers. Over the same period of time, the incremental cost has dropped by approximately $60. Encouraging market development with upstream incentives is expected to continue the price trend, by increasing competition and availability. Additionally, continuing the incentive for these units will encourage market transformation.

$150 of the incentive goes to the consumer. $25 goes to the distributor or contractor.

The lifetime of this measure is 12 years, which is consistent with the measure life of previous water heater measures.

Program Requirements
Gas storage water heaters with an Energy Factor greater than or equal to 0.67 and Energy Star approved qualify for this measure. Power vent models also qualify for this measure.

Exclusions
Condensing units, whether storage or tankless, are excluded from these measures.

Currently, the only residential tank condensing models available are very expensive or lack a flame retention guard. These are excluded from this blessing memo.

Manufacturers have created a category of “hybrid” gas water heaters between tankless and storage, that have a greater than 2 gallon tank and a greater than 75 kBtu/hr burner. Field testing of the hybrids is needed to determine their energy savings potential. These are also excluded from this blessing memo.

Paul Sklar, E.I.
Planning Engineer

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Energy Trust of Oregon Savings Calculation

Residential Sector

Version: 05/25/10	Starting Year: 2010		Today's Date:	3/7/2012
Projec				
Project Name:	0.67 EF Gas Tank Water Heater			
Organization Name				
Project Location:				
Installation Date:				
Program:	New Residential	*Select Electric Sponsor*	Energy Trust	*Select Gas Sponsor*	Energy Trust

Energy Conservation Measures: Input Yellow Cells

	Project	Measure	Select Electricity Measure Description:	Electricity Load Profile	Select Gas Measure Description	Measure Lifetime (Maximum 70 yrs)	Annual Electricty Savings, kWh	Annual Gas Savings, therm	Total Cost	ETO Incentives	Non Energy Benefits (if any)	Gas Utility System PV of Benefits	Societal PV of Benefits	Gas Utility System BCR	Combined Societal BCR
9	$150 consumer incentive	0.67 EF Gas Tank Water Heater	None	na	Resid Hot Water	12	0	31	$246	$150		$229	$229	1.53	0.93

Blessing Memo for Solar Thermal Pool Heating in NW Natural Washington State Service Territory

End Use
Solar thermal water heating

Scope
Domestic hot water, commercial use, agricultural or industrial processes, and pool heating.

Program
Based on the referenced analysis and associated cost-effectiveness screening, the measure described below is "blessed" on a prospective basis for inclusion in all Energy Trust programs. Sectors in which domestic hot water uses or pool heating are typical in the Existing Buildings and New Building Efficiency programs include lodging, dorms, and assisted living facilities. Commercial uses are varied, including but not limited to restaurants, offices, carwashes, and laundries. To date, industrial and agricultural solar water heating projects have included a dairy, a brewery and a plant nursery.

Description of the Measure
The Solar Rating and Certification Corporation (SRCC) rates solar thermal systems with an efficiency rating similar to the Energy Factor (EF) used to rate gas and electric water heaters. Energy Trust models energy savings with RETScreen based on the SRCC rating. Incentives for solar DHW will be based on the fuel of the back-up water heating system and the energy savings estimates. Incentives for solar water heat in the residential sector when the back- up water heat is electric are currently $0.40 per kWh of projected annual energy savings up to a maximum of $1,500, and will not change. Incentives for solar water heat with gas back-up in the residential sector are currently $0.30 per kWh (approximately $5.85 per therm, assuming a 0.60 EF for the gas back-up). This memo will increase that amount to $8 per therm, bringing it to a level very close to the incentive for systems with electric back-up. Incentive for solar pool heating will continue to be calculated from the area of the collector. Incentives for pool heating systems with gas back-up may be increased to $3.00 per square foot of collector, the same level as for systems with electric back-up. This memo also standardizes incentive levels for solar water heating with both electric and gas back-up across the commercial and industrial sectors, at the same amount established for residential.

Purpose of Evaluating Measure
Costs of solar thermal water heating were most recently analyzed using 2008 data. It would not yet be time to re-examine solar thermal system costs, but changes to the incentive structure require a new cost-effectiveness calculation. This memo will take the opportunity to add analysis of pool heating systems, which were not directly addressed in the last solar thermal memo. Additional analysis will also separate out average cost and energy savings from commercial and industrial projects.

BCR calculator (link: E:\Planning\Cross-Program Measures\multisector\solar thermal\2011 solar thermal\bencost\ETO C-E solar thermal 2011.xlsx)

Table 1: Cost-Effectiveness Calculation

Measure	Measure Lifetime (Maximum 70 yrs)	Median Annual Gas Savings, therm	Median Cost	ETO Incentives	Non Energy Benefits (if any)	Utility System PV of Benefits	Societal PV of Benefits	Gas Utility System BCR	Combined Societal BCR
Pool (GAS)	20	543	$4,950	$1,185		$6,467	$6,467	5.5	1.3

Measure Analysis

Install costs and energy savings are median values from 2010 projects, the last year for which a complete set of data are available. Note that solar pool heating with electric back-up is rare and only one project was completed in 2010. Therefore, both cost and savings for installations of this type may vary widely from the values given here. Over the same period of time there were 16 solar pool heating projects with gas back-up, 85 projects with electric DHW, and 65 projects with gas DHW, so the median values have a higher level of confidence for those types of installation.

There were fewer projects in the commercial sector than the residential sector in 2010, 7 with gas back-up and 5 with electric back-up. Although the number of projects is insufficient to provide a definite comparison with DHW projects, there is very little difference in the range of cost per unit of energy savings. The similarity suggests that contractors with experience in DHW installations are entering the commercial market and applying both the same installation techniques and cost structures.

No single type of business can be considered typical of industrial and agricultural water heating because of the diversity of the sector. At best, the program can base its incentive structure on the domestic and commercial sectors, and learn more as more projects are completed.

Savings, Economics and Incentives

The avoided cost of the energy saved for solar thermal systems continue to be less than the installed costs, as they have been throughout the history of the Energy Trust. However,

(1) solar thermal has large, difficult-to-quantify non-energy benefits from the customer perspective. PUC and Energy Trust staff have agreed to use a proxy for the benefit, estimated as the amount that the customer pays for the measure less the first three years of energy bill savings, and the present value of tax credits is deducted from total measure cost in estimating societal cost. Note: The PUC plans to re-examine the approach to these benefits in 2012 for efficiency measures in general, so we may need to re-examine the approach to cost-effectiveness for this measure in later years.

(2) tax credits are available for solar water heat in Oregon which reduce the cost to the consumer. PUC and Energy Trust staff have agreed that the present value of those tax credits can be deducted from the installed cost as billed to the customer. This reflects the fact that forecasts of avoided costs for power are net of generation tax credits; by doing the same for solar water heat and other conservation measures we are achieving a rough equivalence of treatment in our analysis.

The overall stability of the installed cost continues to indicate that solar pre-heat for DHW is cost effective from the societal perspective only with the inclusion of the non-energy benefits. It is interesting to note that the proxy is 57% of the present value of the societal benefit for solar water heat with electric back-up and 72% of the societal benefit with gas back-up. Solar pool heating systems are cost-effective from both a utility perspective and the societal perspective without the proxy.

Energy savings estimate in RETScreen are generally proportional to water use and collector size. Larger commercial or industrial projects receive proportionally greater savings and incentives, based on larger water heating loads and collectors with a greater surface area. In 2010, the average commercial or industrial projects was scaled up by a factor of 6, for both cost and savings, in comparison to the average residential project.

Measure life remains 20 years.

Program Requirements
Installation according to the Energy Trust solar water heating installation requirements.
Water heating fuel for the back-up system must be provided by an Energy Trust utility.

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Energy Trust of Oregon Savings Calculation

Residential Sector

Version: 02/14/08	**2012**		**Today's Date:**	**3/7/2012**
Projec				
Project Name:	Residential: Solar Measures			
Organization Name	current avoided costs			
Project Location:				
Installation Date:				2012
Program:	**New Residential**	***Select Electric Sponsor***	**Energy Trust**	***Select Gas Sponsor***

Energy Conservation Measures: Input Yellow Cells

	Project	Measure	Select Electricity Measure Description:	Electricity Load Profile	Select Gas Measure Description	Measure Lifetime (Maximum 70 yrs)	Annual Electricty Savings, kWh	Annual Gas Savings, therm	Total Cost	ETO Incentives	Non Energy Benefits (if any)	Gas Utility System PV of Benefits	Societal PV of Benefits	Gas Utility System BCR	Combined Societal BCR
		Pool (GAS)	**na**	**na**	**Solar DHW Z1**	**20**	**0**	**543**	**$4,950**	**$1,185**		**$6,467**	**$6,467**	**5.46**	**1.31**

Non Energy Benefits= ((measure cost - rebates- PV of tax credits)-3 years energy savings)

2010

Key Inputs for NEB Proxy

	Electric	Gas	mmercial Elec	Commercial Gas		
3 yrs Energy Savings $	$754	$352	$706	$1,988	FED and OR TCs	5.64
Present Value of Tax Credits (ST + FED)	$2,627	$2,627	$2,285	$6,813	$ 3,302	2.59
Total Upfront Install Cost (2010 avg)	$8,200	$7,850	$10,784	$33,901	proposed rate	4.32
ETO Avg Incentive	$960	$842	$1,210	$5,352	$ 8.00	6.36

***based on current avg. costs

Current PROXY