Small Business Economic Impact Statement
Residential Heating Duct Testing

Prepared by

State Building Code Council

Department of General Administration

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Executive Summary

Impact on small business

Permanent rulemaking regarding requirements for duct testing when existing residential furnaces are replaced or repaired will result in some cost outlay for small businesses, which will be offset by the additional revenue provided through the required testing. ~~However,~~ A number of these businesses will be purchasing, or already have purchased, the necessary equipment in order to comply with the requirements for duct testing for new residential construction. Instruction on the requirements and testing methodology is being provided free of cost by Washington State University's Extension Energy Program.

While this proposed rule ~~does~~ may pose a financial impact on small business to purchase the equipment, the cost for the equipment is offset by the additional revenue coming in from the testing itself, resulting in an overall neutral to positive impact. ~~it is a~~ This impact is also a mitigated impact over the previously adopted rule, which ~~requiring~~ required both testing and sealing of ducts. At the same time, the proposed rule provides a benefit to homeowners, who will ultimately bear the majority of the cost, in education and a potential for significant energy savings.

The proposed rule is anticipated to be job neutral. There are jobs anticipated to be gained for testing personnel, these gains would most likely be more closely associated with the testing requirements for new construction, which would be the driving factor. There are also potential job gains in any duct sealing work generated by the testing results. ~~On the other hand,~~ There has also been testimony provided that ~~may be some jobs lost if fewer~~ homeowners may elect to not replace or repair existing heating equipment, resulting in a loss of business for the installer.

Section I: Introduction/Compliance with the Rules

Background

The proposed rule modifies requirements in the 2009 Washington State Energy Code (WAC 51-11). The rule as originally adopted required that when a heating system was altered or replaced the duct systems attached to the equipment be tested for leaks and sealed. Prior to being implemented, businesses impacted by this rule petitioned the Council to rescind or modify these requirements. HVAC installers testified that they were unable to provide accurate estimates to customers seeking to replace their furnaces. While the cost for the furnace, the labor to install the furnace, and the duct testing were all known costs, the costs for sealing of the duct system could not be estimated until the ducts were tested and examined.

The Council established an emergency rule to help mitigate costs for replacement furnaces by requiring that the existing ducts be tested but not sealed. The sealing could be performed at the discretion of the homeowner. This allowed the testing, which has an easily estimated cost, to be performed while the sealing, where the costs could vary greatly based on the length of installed ductwork and accessibility of the ducts, could be treated as a separate job. This emergency rule has been in place since the 2009 Washington State Energy Code was implemented on January 1, 2011.

Who is required to comply with the Rules?

When an existing residential furnace is replaced or repaired, the duct system for that piece of equipment must be tested for leakage. This is already a requirement for new construction. HVAC installers who already own the equipment can perform the test themselves or they can contract with a secondary firm to provide the service.

Some houses are exempt from these requirements. If a house has any of the following, the ducts do not have to be tested:

- All of the ductwork is contained inside your house or less than 40 linear feet is outside of the conditioned space.
- The ducts have been previously tested and sealed.
- The ducts contain asbestos.

Section II: Compliance Costs for Washington Businesses

Assumptions:

Since the testing is required to be performed when a furnace is being replaced or repaired, these costs would be passed on to the homeowner along with the cost of the furnace rather than fall to the installer/business owner. While installers may need to purchase duct testing equipment and train personnel to perform the test, they could contract the testing out to a third party. The initial cost of the equipment is approximately $1,900[1]. Training is currently provided by WSU at no cost. Testimony provided by the Washington HVAC Association reported that their members do not see a hardship in purchasing equipment; most have already made the investment in the equipment to comply with the requirements for new construction and feel this will have little impact. The average price being charged by installers to perform the testing is $200.

Leaky duct systems typically contribute to 20-40[2] percent of a home's heating and cooling costs. Duct sealing can increase a heating and/or cooling system's efficiency to a greater degree than upgrading to a high-efficiency furnace and with less of an investment. Estimated average energy savings are 1200 kilowatt hours per year in Climate Zone 1 and 2029 kilowatt hours in Climate Zone 2[2]. The percent saved ~~in gas homes~~ is about 14-~~15~~ 28[3] percent of total space heating energy use ~~and 12 percent in electric heated homes~~.

Average Testing Cost:

Industry experts estimate the cost for the testing at an average of $200 per system. The homeowner can then decide if they want to take the additional step of sealing existing ductwork to increase the energy performance of the system.

Many local utilities provide rebates when the testing is done in conjunction with duct sealing. Specific information on available rebates ~~can be found in the attached report~~was provided by ~~from~~ the Energy Policy Office of the Department of Commerce. That data can be found in Appendix 1.

Impact on sales or revenue

There ~~will~~ may be a negative impact on the sales and installation of replacement furnaces ~~as a portion of the market is priced out~~. Some homeowners ~~will~~ may choose to install a cheaper~~, less efficient~~ model to mitigate the increased installation costs associated with testing or elect to not replace the furnace.

[1] See Appendix 1, page A5.

[2] Northwest Power and Conservation Council, Regional Technical Forum (RTF) Residential: Heating/Cooling - PTCS Duct Sealing SF http://www.nwcouncil.org/energy/rtf/measures/measure.asp?id=138

[3] Bob Davis, Dave Baylon, others, Duct Sealing Pilot Project: Program Results For Puget Sound Energy, Ecotope, 1999

Section III: Analysis of Proportionate Impact on Small Businesses

Small businesses affected by the proposed rule are shown in Table One.

TABLE ONE: Small Businesses Impacted By Proposed Rule				
Type of business	**NAICS CODE**	**# IN STATE (50 Employees or less)**	**# IN STATE (More than 50 Employees)**	**ANTICIPATED IMPACTS**
Residential Remodelers	236118	1,854	52	~~Negative~~ Neutral to Positive – costs will be incurred for purchase of testing equipment or contract negotiations but will be offset by fees for required duct testing
Plumbing, Heating, and Air-Conditioning Contractors	238220	2,006	2	~~Negative~~ Neutral to Positive – costs will be incurred for purchase of testing equipment or contract negotiations but will be offset by fees for required duct testing~~. There may be some loss of sales or downgrade of equipment due to homeowner financing~~
Other Building Equipment Contractors	238290	190	6	Positive – there may be a minor positive impact on the duct insulation industry if the homeowner decides to seal the ducts in response to test results. It is anticipated that this will also be the category for independent testers who will gain jobs through contracts with installers and remodelers, as noted above.
Heating and Air-conditioning Equipment and Supplies, Wholesale	423730	41	3	Neutral – the number of wholesale units sold is not expected to increase or decrease due to the proposed rule

The impact on small businesses compared to the largest businesses in the state will not be disproportionate.

Permanent rulemaking regarding requirements for duct testing when existing residential furnaces are replaced or repaired will result in some cost outlay for all businesses. However, a number of these businesses will be purchasing, or already have purchased, the necessary equipment in order to comply with the requirements for duct testing for new residential construction. In addition, the additional revenue provided through the required testing will further offset this outlay. There are also potential job and revenue gains in any duct sealing work the homeowner elects to move forward with based on the test results.

Instruction on the requirements and testing methodology is being provided free of cost by Washington State University's Extension Energy Program.

While this proposed rule does pose a financial impact on small business, it is a mitigated impact over the previously adopted rule requiring both testing and sealing of ducts. It is also mitigated by the additional $200 fee for testing associated with the installation of each furnace or heating system.

Section IV: Small Business Involvement and Impact Reduction Efforts

Actions Taken to Reduce the Impact of the Rule on Small Businesses

The proposed rules are written ~~at the request of industry representatives~~in response to public comment to mitigate the effects of the required testing and sealing in the previously adopted rule and its unintended consequences during this economic downturn. The Council solicited testimony and worked with industry and trade associations to draft a proposed rule that is acceptable to the industry while also allows for the opportunity to reduce residential energy consumption.

Involvement of Small Business in the Development of the Proposed Rules

The Council held a number of public hearings and heard from a variety of industry and trade representatives at meetings across the state, including the following individuals:

- Washington HVAC Contractions – NAICS Code 238220
  - Larry Andrews, Andrews Mechanical
  - Jeff Demillia, Olsen Energy Source
  - Mike Frickberg, Washington HVAC Association
  - Jeff Holgate, Washington Energy Services
  - James King, Washington HVAC Association
  - Dan Schmause, Air Conditioning Contractors Association
  - Craig Williamson, MM Comfort Systems
- Washington Residential Remodelers – NAICS Code 236118
  - Adam Gloss, BelRed Energy Solutions
  - Garrett Huffman, Master Builders Association of King and Snohomish County
  - Derek Philips, BelRed Energy Solutions

In addition, the Council's Energy Code Technical Advisory Group (TAG) reviewed the current Emergency Rule, the language adopted in the 2009 Washington State Energy Code, and proposed language submitted from one of the industry stakeholders noted above. The members of that TAG represent stakeholders from the construction industry, local government and the enforcement community. These members recommended the Council retain the current Emergency Rule as permanently adopted language.

Section V: Number of affected businesses in Washington:

- Residential Remodelers 2,008
  (NAICS Code 236118)
- Plumbing, Heating, and Air-Conditioning 1,906
  Contractors (NAICS Code 238220)
- Other Building Equipment Contractors 196
  (NAICS Code 238290)
- Heating and Air-conditioning Equipment and.....44
  Supplies, Wholesale (NAICS Code 423730)

Section VI: Jobs created or lost as a result of these rules:

This proposed rule is anticipated to be job neutral, i.e., they will not result in any job gains or losses.

There are jobs anticipated to be gained for testing personnel, these gains would most likely be more closely associated with the testing requirements for new construction, which would be the driving factor.

There may be some jobs lost if homeowners are unable to finance the additional costs associated with the testing when replacing or repairing an existing furnace.

APPENDIX 1

Date: May 26 2011

To: Duane Jonlin, Krista Braaksma

From: Chuck Murray

RE: Existing Home Duct Sealing Cost / Savings

The following provides a summary of cost and savings data from several reliable Pacific Northwest Sources. This includes the Northwest Power and Conservation Council Regional Technical Forum (RTF) [1], Puget Sound Energy and Avista. I have also included a summary of utility rebates and some additional information on training and support.

Utilities have been incenting duct sealing both through prescriptive duct sealing and through performance tested duct sealing. Puget Sound Energy uses a prescriptive approach in their Duct Ninja Program. Bonneville Power Administration has used the Performance Tested Comfort System (PTCS) specifications, approved by the Regional Technical Forum, which provides a protocol for duct sealing contractors. The PTCS and Duct Ninja are not equivalent to the Washington State Energy Code requirements. The PCTS program is somewhat more rigorous than the WSEC, where the PSE program is a bit less rigorous with regard to testing.

The utility savings estimates are conservative. The RTF estimates savings for duct sealing using a "last-in" approach. This approach assumes that all other energy savings weatherization measures are installed within the home, such as insulation and windows. Also, the baseline duct system is not an "unsealed" duct system, but rather an average duct system. The impact of this approach is that savings estimates lower than will be achieved for many homes. On the other side, some homes will achieve lower savings. We do not have details on the methods used to establish the savings reported by utilities. But it is reasonable to assume they use a method similar to the RTF.

Similar to the cost and savings developed by the RTF, investor owned utilities include measure cost and savings in their integrated resource plans. The plans are developed with extensive stakeholder input. These plans are reviewed and approved by the Washington State Utilities and Transportation

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[1] The Pacific Northwest Electric Power Planning and Conservation Act, P.L. 96-501, 16 U.S.C. 839 et seq. ("Act"), in section 4.(e)(3)(D), requires the Pacific Northwest Electric Power and Conservation Planning Council ("Council") to develop "a regional conservation and electric power plan." The plan is to include a twenty year forecast of electricity demands and a resource plan for the development of conservation and generation to meet the demand at the lowest cost consistent with adequate and reliable electricity service.

Including conservation as a resource requires a rigorous verification and accounting of energy savings. In 1996, Congress directed the Council and Bonneville to establish a Regional Technical Forum ("RTF") to develop "consistent standards and protocols for verification and evaluation of energy savings, in consultation with all interested parties." (Senate Report 104-120 - Energy and Water Development Appropriations Bill, 1996). The RTF is funded by Bonneville Power Administration ("Bonneville"), regional utilities and the Energy Trust of Oregon and through the Council by provision of staff support. The RTF is managed by Council staff and reports to the Council.

Commission. Puget includes both gas and electric cost and savings. Avista only reported cost and unit savings for gas.

The data below are for testing and repair of existing residential duct systems. These sources do not have data on the cost of testing only. In a recent SBCC Energy TAG call, Larry Andrews noted the cost of $150 for testing alone.

Summary of Duct Sealing Cost / Savings

Northwest Power and Conservation Council Regional Technical Forum

Single Family Duct Tightness (Average Heating System)[2]

Climate Zone	Duct Test and Sealing Cost	Savings kWh/ Year
1	$538	1202
2	$538	2029

Puget Sound Energy, 2011 Draft Integrated Resource Plan, Appendix K2[3]

Climate Zone	Duct Sealing Cost	Cooling Savings kWh / Year	Heating Savings kWh/ Year	Savings Therms
Electric Furnace	$535	99	900	
Heat Pump	$535	99	615	
Gas furnace	$535	99		61

Avista 2009 Least Cost Plan[4]

Climate Zone	Duct Test and Seal Cost	Savings Therm
Gas furnace	$500	125

[2] Northwest Power and Conservation Council, Regional Technical Forum (RTF)_Residential: Heating/Cooling - PTCS Duct Sealing SF
http://www.nwcouncil.org/
http://www.nwcouncil.org/energy/rtf/measures/measure.asp?id=138

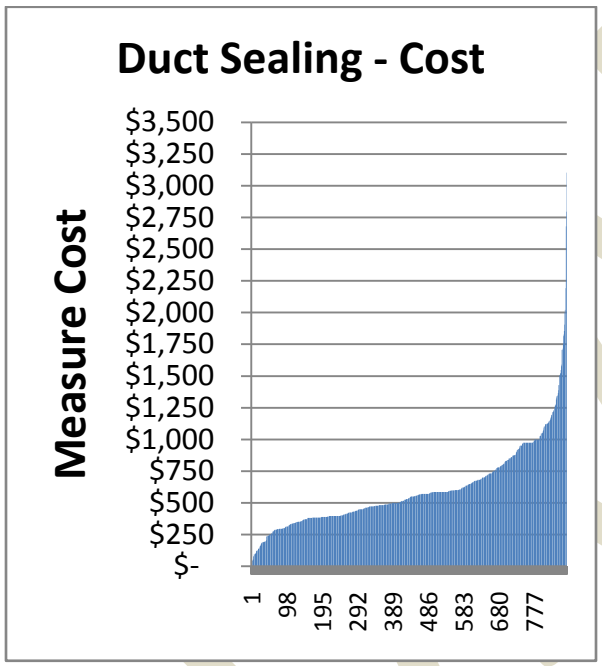
[3] Puget Sound Energy, 2011 Draft Integrated Resource Plan, Appendix K2
http://pse.com/aboutpse/EnergySupply/Pages/Resource-Planning.aspx

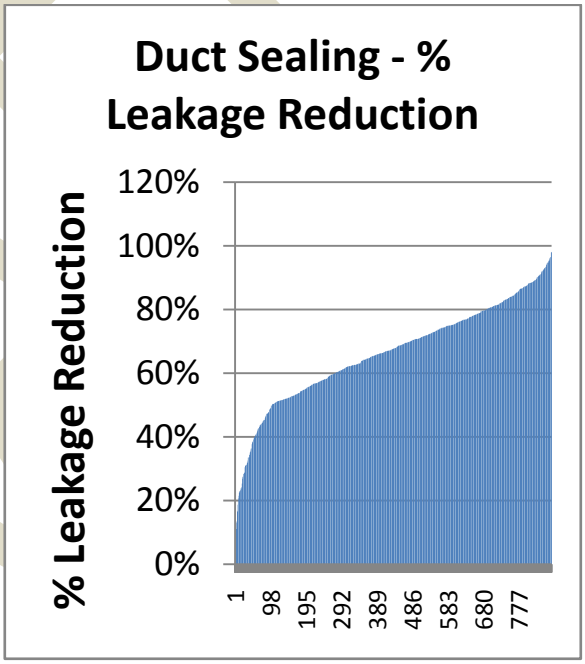
[4] Avista, 2007 Natural Gas IRP Appendices
http://www.avistautilities.com/inside/resources/irp/gas/Documents/Natural_Gas_2007_IRP_Appendicies.pdf

Detailed Cost and Savings

The RTF documents also provide the following detailed analysis. This analysis is based on a data set of 865 duct sealing jobs completed in Oregon 2007-2009. The table provides data by vintage of homes. The graphs provide the distribution of cost and reduction in duct leakage.

Co-hort	Average House Size	Average Vintage	Average % Reduction	Average CFM_pre	Average CFM_post	Average CFM_Delta	Post-Leakage (% of floor area)
Pre-1980	1,726	1962	68%	833	250	583	14%
Post79/Pre93	2,172	1986	62%	832	304	527	14%
Post92	2,218	1998	62%	709	271	438	12%





Field Study Results

In addition to the regional utility savings estimates included in the tables above, the results of a 1999 field study[5] conducted by Ecotope provides an additional data point for duct sealing savings. This pilot program included a robust prequalification screening for participants. This included duct testing to prequalify homes for duct sealing. This approach leads to higher levels of savings than the regional methodology. The results are presented in the following table

[5] Bob Davis, Dave Baylon, others, DUCT SEALING PILOT PROJECT: PROGRAM RESULTS for PUGET SOUND ENERGY, Ecotope, 1999

Ecotope: Cost/Benefit Per Home From Duct Sealing Only (averages)			
	Gas F.A.	**Electric F.A.**	**Electric H.P.**
Annual heating energy requirements (based on overall recruiting averages)[1]	906 Therms	14,460 kWh	13,470 kWh
Efficiency Improvement (in %)	14.9	12.5	12.7
Energy Savings[1]	135 Therms	1,800 kWh	1,709 kWh

Utility Rebates

Utility rebates for duct sealing are available to many of Washington's residential customers. Utilities that provide duct sealing rebates serve 86% of gas customers and an estimated 74% of electric customers. Currently 3 out of 4 gas utilities provide duct sealing incentives. There are 61 electric utilities in the State of Washington. To provide an estimate, the 17 largest electric utilities were examined. This group represents 91% of the residential customers in WA. Of these, 74% of customers are eligible for duct sealing rebates. Utilities do have restrictions on consumer participation in rebate programs. Not all of their customers will meet the qualifying criteria for rebates.

It is estimated that 63 percent of existing housing stock includes a ducted forced air heating system. Eighteen percent include a heat pump or forced air furnace. Forty-three percent of the housing stock has a gas forced air heating system.

WA Natural Gas Utilities

	Percent Residential Gas Customers	Rebate
Avista	13%	-
NW Natural	7%	$325
PSE	64%	$200
Cascade Natural Gas	16%	$150
Percent of WA Gas Customers Eligible for Rebates	86 %	

WA Large Electric Utilities (Representing 91% of residential customers)

	Percent of State Residential Customers	
Avista Corp	7.51%	-
Inland Power & Light Company	1.20%	$ 400
PUD No 1 of Benton County	1.39%	$ 400
PUD No 1 of Chelan County	1.25%	-
PUD No 1 of Clallam County	0.97%	$ 500
PUD No 1 of Clark County	6.05%	$ 250
PUD No 1 of Cowlitz County	1.56%	-
PUD No 1 of Grays Harbor Cnty	1.27%	$ 400
PUD No 1 of Lewis County	0.92%	$ 400
PUD No 2 of Grant County	1.22%	-
PUD No 3 of Mason County	1.09%	$ 500
PacifiCorp	3.71%	$ 250
Peninsula Light Company	0.97%	$ 500
Puget Sound Energy Inc	33.91%	$ 200
Seattle City of	12.58%	-
Snohomish County PUD No 1	10.48%	$ 400
Tacoma City of	5.37%	$ 450
Percent of large utility customers eligible for rebates.	74%	

Cost of Duct Testing Equipment:

A duct testing fan and manometer will provide the basic system needed to perform duct sealing tests. A blower door may also be desirable to reduce the labor required to perform the test, but is not

Energy Conservatory

Minneapolis Duct Blaster System
- Series B 110V System with DG-700 Digital Gauge (10 – 1,500 CFM) $1,875.00

Minneapolis Blower Door System Price *
- Model 3 110V System with Aluminum Frame and DG-700 Digital Gauge (300 - 6,300 CFM) $2,495.00

Subtract $850 when buying both a blower door and duct blaster. You only need one DG700 digital Gauge

A 7% discount is available to WSU Energy Program Duct Testing Graduates

Similar products and prices are available from RetroTec a Everson Washington equipment manufacturer.

Completed Duct Testing Training

WSU has compiled a list of individuals who have attended the one-day Duct Testing Training offered by the WSU Extension Energy Program and meet the minimum requirements to test ducts for the 2009 Washington State Energy Code. This list includes over 1400 individuals.

Additional Resources

WSU has also developed a detailed video to and three fold brochure to support duct testing and sealing contractors.

Duct Sealing Video

"Duct Sealing for Comfort, Energy and Indoor Air Quality" (16:45 min.)

http://vimeo.com/8129040

Benefits of Duct Sealing brochure

http://www.energy.wsu.edu/Documents/Duct%20Sealing%20brochure_final.pdf