State-Level Benefits from Potential Federal Appliance Standards

Nebraska																
Summary of Benefits by Product				Annual Savings in 2020				Annual Savings in 2030				Economics			
Products	Effective Date	Annual Savings per Unit	Incre-mental Cost per Unit[1]	Electricity	Primary Energy	Summer Peak Capacity	Value of Bill Savings[2]	Electricity	Primary Energy	Summer Peak Capacity	Value of Bill Savings[2]	Pay Back Period[3]	Benefit / Cost Ratio[4]	Net Present Value[5]	Cumulative Energy Savings through 2030
	Year	kWh, {gal}, or [therms]	$	GWh	BBtu	MW	$Million	GWh	BBtu	MW	$Million	Years		$Million (2009$)	TBtu
Residential															
Battery chargers	2014	4	$ 1	55.6	579.1	7.7	$ 4.3	55.6	558.7	7.7	$ 4.3	1.9	2.7	$ 21	8.1
Central AC & HP	2016	545	$ 255	31.0	322.7	30.4	$ 2.4	99.8	1,003.1	98.1	$ 7.8	5.1	1.8	$ 21	8.1
Clothes dryers *(total)*	2014	-	$ 50	22.0	251.1	3.3	$ 2.0	56.0	616.9	8.3	$ 5.0	-	1.6	$ 12	5.6
(electricity)	2014	93	$ 50	22.0	229.8	3.3	$ 1.7	56.0	562.7	8.3	$ 4.4	6.9	1.7	$ 12	5.1
(gas)	2014	[3.5]	$ 50	-	21.4	-	$ 0.2	-	54.2	-	$ 0.6	12.8	0.9	$ (0.3)	0.5
Clothes washers *(total)*[6]	2015	244	$ 96	23.1	362.5	3.4	$ 3.2	46.2	708.1	6.9	$ 6.3	-	3.8	$ 82	7.6
(electricity - machine)	2015	22	$ 9	4.5	47.2	0.7	$ 0.4	9.1	91.1	1.3	$ 0.7	2.6	7.0	$ 2	1.0
(electricity - water heating)	2015	222	$ 87	18.6	193.5	2.8	$ 1.5	37.1	373.4	5.5	$ 2.9	-	-	$ 7	4.1
(gas)	2015	[10.1]	$ 87	-	121.8	-	$ 1.4	-	243.6	-	$ 2.7	3.1	5.1	$ 1	2.6
(water)	2015	{5233.5}	$ -	Bil. Gal.-->	1.7	-	$ -	Bil. Gal.-->	3.3	-	$ -	-	-	$ 72	-
Direct heaters	2013	48	$ 326	-	66.3	-	$ 0.8	-	133.5	-	$ 1.6	4.7	2.2	$ 6	1.4
(gas)	2013	[69.2]	$ 326	-	79.2	-	$ 0.9	-	158.4	-	$ 1.8	4.2	2.5	$ 7	1.7
External power supplies	2013	2	$ 1	12.6	131.6	1.7	$ 1.0	12.6	127.0	1.7	$ 1.0	6.0	0.8	$ (1)	1.9
Furnaces *(gas)*	2013	[83.7]	$ 520	-	1,618.6	-	$ 18.0	-	3,776.7	-	$ 42.1	5.6	2.1	$ 139	35.0
Furnaces *(oil)*	2013	[34.6]	$ 17	-	20.2	-	$ 0.4	-	47.1	-	$ 0.5	0.4	89.8	$ 6	0.4
Furnace fans	2016	659	$ 100	47.8	498.6	18.4	$ 3.7	154.1	1,550.0	59.3	$ 12.1	1.9	5.1	$ 57	12.5
Microwave ovens	2012	16	$ 2	10.8	112.3	1.6	$ 0.8	11.4	114.7	1.7	$ 0.9	1.8	3.9	$ 6	1.7
Pool heaters	2013	[20]	$ 44	-	17.9	-	$ 0.2	-	17.9	-	$ 0.2	2.0	2.6	$ 1	0.3
Refrigerators	2014	130	$ 52	40.4	421.4	6.1	$ 3.2	102.6	1,032.0	15.4	$ 8.0	5.1	2.4	$ 30	9.4
Room AC	2014	86	$ 35	10.3	107.8	14.6	$ 0.8	19.9	200.0	28.0	$ 1.6	5.2	1.8	$ 4	2.2
Water heaters	2013	-	$ -	47.0	780.2	6.5	$ 6.9	87.8	1,346.8	12.1	$ 12.0	-	3.3	$ 58	15.6
(electricity)	2013	220	$ 65	47.0	490.3	6.5	$ 3.7	87.8	882.8	12.1	$ 6.9	3.8	2.6	$ 29	10.1
(gas)	2013	[14]	$ 30	-	290.0	-	$ 3.2	-	463.9	-	$ 5.2	1.9	4.6	$ 29	5.6
Commercial															
Beverage vending machines	2012	682	$ 157	2.0	20.4	0.5	$ 0.1	3.2	32.5	0.8	$ 0.2	3.5	2.9	$ 1	0.4
Commercial boilers	2013	[513.6]	$ 2,968	-	31.9	-	$ 0.3	-	74.4	-	$ 0.6	6.8	2.2	$ 3	0.7
Clothes washers *(total)*[6]	2012	-	$ 503	2.3	69.0	0.8	$ 0.7	2.9	85.6	1.0	$ 0.7	8.9	1.1	$ 1	1.2
(electricity)	2012	208	$ 446	2.3	24.5	0.8	$ 0.2	2.9	29.6	1.0	$ 0.2	-	-	$ (5)	0.4
(gas)	2012	[26.8]	$ 57	-	44.6	-	$ 0.5	-	55.9	-	$ 0.5	-	-	$ 3	0.8
(water)	2012	{5827}	$ -	Bil. Gal.-->	0.1	-	$ -	Bil. Gal.-->	0.1	-	$ -	-	-	$ 3	-
Fluorescent ballasts	2014	18	$ 2	13.8	143.9	4.5	$ 0.9	34.1	342.6	11.1	$ 2.7	1.7	6.3	$ 11	3.2
Fluorescent lamps	2012	11	$ 2	154.7	1,612.6	50.6	$ 10.3	154.7	1,555.7	50.6	$ 10.3	3.2	1.4	$ 28	26.4
Incandescent reflector lamps	2012	62	$ 3	45.7	476.6	11.3	$ 3.0	45.7	459.8	11.3	$ 3.0	0.7	2.2	$ 20	8.8
BR \ exempted reflector lamps	2013	38	$ 1	20.7	216.2	5.1	$ 1.4	20.7	208.6	5.1	$ 1.4	0.6	2.0	$ 6	4.0
Liquid-immersed transformers	2016	2	$ 2	6.8	70.6	0.9	$ 0.4	21.8	219.5	3.0	$ 1.4	14.3	1.1	$ 1	1.8
Low-voltage dry type transformers	2016	25	$ 5	15.5	161.6	2.1	$ 1.2	50.0	502.4	6.9	$ 3.3	3.2	4.7	$ 20	4.0
Metal halide lamp fixtures	2015	360	$ 35	27.8	289.7	9.1	$ 2.2	78.3	787.5	25.6	$ 5.2	1.4	8.5	$ 30	6.7
Reach-in refrigerators and freezers	2016	1,658	$ 199	4.8	50.0	1.1	$ 0.4	12.8	128.5	3.0	$ 0.8	1.8	4.9	$ 4	1.2
Small electric motors	2015	132	$ 20	22.7	236.1	3.6	$ 1.8	28.8	289.9	4.6	$ 1.9	2.3	2.5	$ 8	3.8
Walk-in refrigerators and freezers	2015	2,128	$ 273	3.6	37.2	0.8	$ 0.3	7.8	78.4	1.8	$ 0.5	1.9	4.6	$ 2	0.8
Total				**621**	**8,706**	**184**	**$ 71**	**1,107**	**15,998**	**364**	**$ 136**			**$ 573**	**173**

Product	Emissions Reductions in 2020			Emissions Reductions in 2030[7]		
	CO2 1000 MT	NOx Tons	SO2 Tons	CO2 1000 MT	NOx Tons	SO2 Tons
Residential						
Battery chargers	49.0	32.4	149.5	49.0	32.4	149.5
Central AC & HP	0.03	19.0	87.5	87.9	58.2	268.4
Clothes dryers	20.6	13.8	59.3	52.2	34.9	150.6
(electricity)	19.4	12.9	59.3	49.3	32.7	150.6
(gas)	1.2	0.9	0.01	2.9	2.3	0.01
Clothes washers	27.0	18.6	62.2	53.9	37.1	124.3
Direct heaters[8]	3.2	2.6	-3.3	0.01	5.2	-6.6
External power supplies	11.1	7.4	34.0	11.1	7.4	34.0
Furnaces *(gas)*	87.7	67.7	0.4	204.6	157.9	1.0
Furnaces *(oil)*	1.1	0.8	0.01	2.6	2.0	0.01
Furnace fans	42.2	27.9	128.7	157.7	90.0	414.7
Microwave ovens	9.5	6.3	29.0	51.0	6.7	30.7
Pool heaters	1.0	0.7	0.005	1.0	0.7	0.005
Refrigerators	35.6	23.6	108.8	90.4	59.9	276.1
Room AC	9.1	6.0	27.8	17.5	11.6	53.5
Water heaters	57.2	39.7	126.6	102.5	70.6	236.3
(electricity)	41.4	27.5	126.5	77.4	51.2	236.2
(gas)	15.7	12.1	0.08	25.1	19.4	0.1
Commercial						
Beverage vending machines	1.7	1.1	5.3	2.8	1.9	8.7
Commercial boilers	1.7	1.3	0.01	4.0	3.1	0.02
Clothes washers	4.5	3.2	6.3	5.6	4.1	7.9
Fluorescent ballasts	12.2	8.1	37.2	30.0	19.9	91.7
Fluorescent lamps	136.3	90.3	416.2	136.3	90.3	416.2
Incandescent reflector lamps	40.3	26.7	123.0	40.3	26.7	123.0
BR \ exempted reflector lamps	18.3	12.1	55.8	18.3	12.1	55.8
Liquid-immersed transformers	6.0	4.0	18.2	19.2	12.7	58.7
Low-voltage dry type transformers	13.7	9.0	41.7	44.0	29.2	134.4
Metal halide lamp fixtures	24.5	16.2	74.8	69.0	45.7	210.7
Reach-in refrigerators and freezers	4.2	2.8	12.9	11.3	7.5	34.4
Small electric motors	20.0	13.2	60.9	25.4	16.8	77.6
Walk-in refrigerators and freezers	3.1	2.1	9.6	6.9	4.5	21.0
Total	**641**	**457**	**1,673**	**1,295**	**849**	**2,973**

Notes:

[1] For purposes of the analyses, incremental costs for residential and commerical clothes washers are apportioned based on the individual components' contribution to overall energy consumption.

[2] Value of bill savings is based on energy savings in 2020 or 2030 and current average state energy prices. This value does not take account of the incremental cost of more efficient products.

[3] Payback period is the length of time required to recoup any increase in product cost from advances in efficiency.

[4] The benefit / cost ratio is a measure of the annual energy bill savings of an efficient product versus its incremental cost.

[5] Net present value is the total monetary value of bill savings achieved by products sold under the standards between now and 2030 minus the total incremental product cost incurred by purchasers as a result of the standards over the same period expressed in current dollars. Both costs and savings are discounted using a 5% real discount rate.

[6] The payback period and benefit / cost ratios for residential and commercial clothes washers take into account savings from the machine, water heating, and water consumption. For residential clothes washers, the two payback periods were calculated for a clothes washer utilizing electricity vs. natural gas for water heating. Benefit / cost ratios were calculated for total savings and costs (electric, natural gas, and water) as well as for clothes washers utilizing electricity vs. natural gas for water heating. For commercial clothes washers, we assume that only natural gas is used for water heating. Therefore only one payback period and benefit / cost ratio were calculated.

[7] 2030 emissions reductions for NOx and SO2 are calculated using 2020 emission factors.

[8] Negative savings for direct heaters represent the emissions generated from the incorporation of electronic ignition, a technology that is not included in the current federal standard.