

State-Level Benefits from Potential Federal Appliance Standards

Texas															
Summary of Benefits by Product	Effective Date	Annual Savings in 2020				Annual Savings in 2030				Economics					
		Annual Savings per Unit	Incremental 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
Products	Year	kWh, (gal), or (therms)	\$	GWh	BBtu	MW	\$Million	GWh	BBtu	MW	\$Million	Years		\$Million (2009\$)	TBtu
Residential															
Battery chargers	2014	4	\$ 1	671.4	6,998.5	92.6	\$ 86.1	671.4	6,751.4	92.6	\$ 86.1	1.1	4.5	\$ 503	98.0
Central AC & HP	2016	545	\$ 255	721.0	7,515.3	966.4	\$ 92.5	2,323.1	23,361.1	3,114.1	\$ 298.1	3.1	5.8	\$ 1,444	187.9
Clothes dryers (total)	2014	-	\$ 50	266.4	3,034.8	39.6	\$ 37.7	676.2	7,454.9	100.5	\$ 95.8	-	2.5	\$ 369	67.5
(electricity)	2014	93	\$ 50	266.4	2,776.7	39.6	\$ 34.2	676.2	6,799.8	100.5	\$ 86.8	4.2	2.9	\$ 362	61.7
(gas)	2014	[3.5]	\$ 50	-	258.1	-	\$ 3.6	-	655.1	-	\$ 9.0	10.4	1.2	\$ 8	5.7
Clothes washers (total) ⁶	2015	244	\$ 96	279.1	4,381.0	41.5	\$ 56.1	558.2	8,556.6	83.0	\$ 112.2	-	4.5	\$ 1,205	92.0
(electricity - machine)	2015	22	\$ 9	54.7	570.5	8.1	\$ 7.0	109.4	1,100.6	16.3	\$ 14.0	1.9	8.1	\$ 54	12.0
(electricity - water heating)	2015	222	\$ 87	224.4	2,338.9	33.4	\$ 28.8	448.7	4,512.6	66.7	\$ 57.6	-	-	\$ 223	49.1
(gas)	2015	[10.1]	\$ 87	-	1,471.7	-	\$ 20.3	-	2,943.4	-	\$ 40.6	2.7	5.5	\$ 62	30.9
(water)	2015	{5233.5}	\$ -	Bil. Gal.-->	20.2	-	\$ -	Bil. Gal.-->	40.3	-	\$ -	-	-	\$ 866	-
Direct heaters	2013	48	\$ 326	-	245.0	-	\$ 3.4	-	493.3	-	\$ 7.1	13.1	0.8	\$ (12)	5.1
(gas)	2013	[21.2]	\$ 326	-	292.6	-	\$ 4.0	-	585.2	-	\$ 8.1	11.2	0.9	\$ (4)	6.1
External power supplies	2013	2	\$ 1	152.6	1,590.7	21.1	\$ 19.6	152.6	1,534.6	21.1	\$ 19.6	3.7	1.3	\$ 32	23.1
Furnaces (gas)	2013	[25.6]	\$ 520	-	3,620.1	-	\$ 49.9	-	8,446.9	-	\$ 116.5	14.7	0.8	\$ (202)	78.2
Furnaces (oil)	2013	[10.6]	\$ 17	-	74.6	-	\$ 2.0	-	174.1	-	\$ 2.4	1.2	37.9	\$ 29	1.6
Furnace fans	2016	641	\$ 100	543.1	5,661.8	583.8	\$ 69.7	1,750.1	17,599.5	1,881.1	\$ 224.5	1.2	7.9	\$ 1,149	141.5
Microwave ovens	2012	16	\$ 2	130.2	1,357.0	19.4	\$ 16.7	137.8	1,386.1	20.5	\$ 17.7	1.1	6.4	\$ 124	20.8
Pool heaters	2013	[20]	\$ 44	-	216.8	-	\$ 3.0	-	216.8	-	\$ 3.0	1.6	3.2	\$ 17	3.3
Refrigerators	2014	130	\$ 52	488.5	5,092.6	73.5	\$ 62.7	1,240.2	12,471.1	186.5	\$ 159.1	3.1	3.9	\$ 755	113.2
Room AC	2014	86	\$ 35	125.0	1,303.0	176.0	\$ 16.0	240.4	2,417.3	338.4	\$ 30.8	3.2	2.9	\$ 131	27.0
Water heaters	2013	-	\$ -	568.4	9,428.5	78.4	\$ 121.2	1,060.9	16,275.1	146.4	\$ 213.4	-	4.8	\$ 1,174	188.9
(electricity)	2013	220	\$ 65	568.4	5,924.6	78.4	\$ 72.9	1,060.9	10,668.8	146.4	\$ 136.1	2.3	4.3	\$ 717	121.7
(gas)	2013	[14]	\$ 30	-	3,503.9	-	\$ 48.3	-	5,606.3	-	\$ 77.3	1.6	5.7	\$ 457	67.3
Commercial															
Beverage vending machines	2012	682	\$ 157	24.2	252.3	5.6	\$ 2.6	39.9	400.9	9.3	\$ 4.2	2.2	4.6	\$ 25	5.0
Commercial boilers	2013	[513.6]	\$ 2,968	-	393.4	-	\$ 4.4	-	917.9	-	\$ 10.3	5.1	3.0	\$ 58	8.5
Clothes washers (total) ⁶	2012	-	\$ 503	29.0	547.4	9.5	\$ 6.5	36.4	673.8	11.9	\$ 7.3	6.9	1.1	\$ 7	9.4
(electricity)	2012	208	\$ 446	29.0	302.1	9.5	\$ 3.1	36.4	365.8	11.9	\$ 3.9	-	-	\$ (45)	5.2
(gas)	2012	[26.8]	\$ 57	-	245.3	-	\$ 3.4	-	308.0	-	\$ 3.5	-	-	\$ 21	4.2
(water)	2012	{5827}	\$ -	Bil. Gal.-->	0.9	-	\$ -	Bil. Gal.-->	1.1	-	\$ -	-	-	\$ 31	-
Fluorescent ballasts	2014	18	\$ 2	170.4	1,776.4	55.8	\$ 18.1	420.5	4,228.4	137.6	\$ 53.9	1.1	10.0	\$ 242	39.4
Fluorescent lamps	2012	11	\$ 2	1,869.5	19,487.5	611.8	\$ 199.1	1,869.5	18,799.5	611.8	\$ 199.1	2.0	2.3	\$ 1,012	318.8
Incandescent reflector lamps	2012	62	\$ 3	552.5	5,759.4	136.3	\$ 58.8	552.5	5,556.1	136.3	\$ 58.8	0.4	3.6	\$ 515	105.9
BR \ exempted reflector lamps	2013	38	\$ 1	250.7	2,613.0	61.8	\$ 26.7	250.7	2,520.7	61.8	\$ 26.7	0.4	3.1	\$ 168	48.0
Liquid-immersed transformers	2016	2	\$ 2	85.6	892.4	11.8	\$ 9.1	275.8	2,773.9	38.1	\$ 29.4	8.9	1.7	\$ 95	22.3
Low-voltage dry type transformers	2016	25	\$ 5	187.4	1,953.0	25.9	\$ 24.0	603.7	6,071.0	83.3	\$ 64.3	2.0	7.6	\$ 434	48.8
Metal halide lamp fixtures	2015	360	\$ 35	335.8	3,500.3	109.9	\$ 43.1	946.3	9,516.3	309.7	\$ 100.8	0.9	13.7	\$ 601	81.5
Reach-in refrigerators and freezers	2016	1,658	\$ 199	57.9	603.8	13.5	\$ 7.4	154.5	1,553.2	35.9	\$ 16.4	1.1	7.8	\$ 78	14.5
Small electric motors	2015	132	\$ 20	273.7	2,853.4	43.4	\$ 35.1	348.4	3,503.4	55.2	\$ 37.1	1.4	4.1	\$ 188	45.4
Walk-in refrigerators and freezers	2015	2,128	\$ 273	43.2	449.9	10.0	\$ 5.5	94.2	946.9	21.9	\$ 10.0	1.2	7.4	\$ 52	9.8
Total				7,826	91,602	3,187	\$ 1,077	14,403	164,601	7,497	\$ 2,005			\$ 10,194	1,805

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	356.3	391.9	1806.5	356.3	391.9	1806.5	
Central AC & HP	0.4	229.5	1057.9	1232.8	1356.0	6250.7	
Clothes dryers	155.3	166.3	716.8	394.3	422.1	1819.6	
	(electricity)	141.4	155.5	716.7	358.8	394.7	1819.4
	(gas)	14.0	10.8	0.1	35.5	27.4	0.2
Clothes washers	227.8	224.4	751.4	455.7	448.9	1502.7	
Direct heaters ⁸	13.4	9.6	-12.2	0.03	19.1	-24.4	
External power supplies	81.0	89.1	410.6	81.0	89.1	410.6	
Furnaces (gas)	196.1	151.3	1.0	457.7	353.1	2.3	
Furnaces (oil)	4.0	3.1	0.02	9.4	7.3	0.05	
Furnace fans	288.2	317.0	1461.4	1078.5	1021.6	4709.1	
Microwave ovens	69.1	76.0	350.3	371.1	80.5	370.9	
Pool heaters	11.7	9.1	0.1	11.7	9.1	0.1	
Refrigerators	259.3	285.2	1314.5	658.1	723.9	3336.9	
Room AC	66.3	73.0	336.3	127.6	140.3	646.8	
Water heaters	491.5	479.7	1530.2	866.8	853.6	2856.2	
	(electricity)	301.6	331.8	1529.3	563.0	619.3	2854.7
	(gas)	189.8	146.5	0.9	303.8	234.4	1.5
Commercial							
Beverage vending machines	12.8	14.1	65.1	21.2	23.3	107.3	
Commercial boilers	21.3	16.4	0.1	49.7	38.4	0.2	
Clothes washers	28.7	27.2	78.0	36.0	34.1	98.0	
Fluorescent ballasts	90.4	99.5	458.5	223.1	245.4	1131.4	
Fluorescent lamps	992.1	1091.2	5030.2	992.1	1091.2	5030.2	
Incandescent reflector lamps	293.2	322.5	1486.6	293.2	322.5	1486.6	
BR \ exempted reflector lamps	133.0	146.3	674.5	133.0	146.3	674.5	
Liquid-immersed transformers	45.4	50.0	230.3	146.4	161.0	742.2	
Low-voltage dry type transformers	99.4	109.4	504.1	320.4	352.4	1624.4	
Metal halide lamp fixtures	178.2	196.0	903.5	502.2	552.4	2546.3	
Reach-in refrigerators and freezers	30.7	33.8	155.9	82.0	90.2	415.6	
Small electric motors	145.3	159.8	736.5	184.9	203.4	937.4	
Walk-in refrigerators and freezers	22.9	25.2	116.1	50.0	55.0	253.4	
Total	4,314	4,796	20,164	9,135	9,232	38,735	

Notes:

- ¹ For purposes of the analyses, incremental costs for residential and commercial 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.