

Buildings Sector Working Group

AEO2015 Model Updates



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Overview

- Shorter *AEO* this year
- Federal standards
- End-use technology characterizations
- Historical updates
- Discussion

Federal standards

- Residential

- furnace fans: effective 2019
- external power supplies: effective 2016
- set-top boxes (de-facto standard): effective 2014 (tier 1), 2017 (tier 2)

- Commercial

- metal halide lamp fixtures: effective 2017
- commercial reach-in refrigerators & freezers and refrigerated display cases: effective 2017
- commercial walk-in coolers & freezers: effective 2017

End-use technology characterization update

- Commercial space heating equipment, space cooling equipment, water heaters
- Residential space heating equipment, space cooling equipment, water heaters, refrigerators, freezers, dishwashers, clothes washers, clothes dryers
- Contract report from Leidos/Navigant will be available online

Tech. update example: commercial rooftop heat pumps

DATA	2003	2012	2013				2020		2030		2040	
	Installed Base		Current Standard	Typical	ENERGY STAR**	High	Typical	High	Typical	High	Typical	High
Typical Capacity (kBtu/h)	90	90	90	90	90	90	90	90	90	90	90	90
Efficiency (EER)*	9.3	10.2	11.0	11.0	11.3	12.0	11.0	12.0	11.0	12.0	11.0	12.0
Part Load Efficiency (IEER)	-	12.0	-	12.0	11.4	20.2	12.0	20.2	12.0	20.2	12.0	20.2
COP (Heating)	3.1	3.25	3.3	3.3	3.35	3.4	3.3	3.4	3.3	3.4	3.3	3.4
Average Life (yrs)	15	15	15	15	15	15	15	15	15	15	15	15
Retail Equipment Cost (\$)	3,700	5,300	5,300	5,300	5,500	5,850	5,300	5,850	5,300	5,850	5,300	5,850
	4,800	6,400	6,400	6,400	6,600	6,900	6,400	6,900	6,400	6,900	6,400	6,900
Total Installed Cost (\$)	5,300	6,900	6,900	6,900	7,100	8,400	6,900	8,400	6,900	8,400	6,900	8,400
	6,900	7,750	7,750	7,750	7,950	10,100	7,750	10,100	7,750	10,100	7,750	10,100
Annual Maintenance Cost (\$)	105	105	105	105	105	105	105	105	105	105	105	105
	160	160	160	160	160	160	160	160	160	160	160	160

** ENERGY STAR qualified products must also have IEER of 11.4 or greater.

Tech. update example: residential top-loading clothes washers

DATA	2009	2013				2020		2030		2040	
	Installed Base	Current Standard	Typical	ENERGY STAR	High	Typical	High	Typical	High	Typical	High
Typical Capacity (ft ³)	3.0	3.2	3.5	3.6	4.8	3.6	4.8	3.6	4.8	3.6	4.8
Modified Energy Factor (ft ³ /kWh/cycle)	1.20	1.26	1.40	2.00	2.87	2.00	2.87	2.00	2.87	2.00	2.87
Water Factor (gal/cycle/ft ³)	12.0	9.5	8.5	6.0	3.65	6.0	3.65	6.0	3.65	6.0	3.65
Average Life (yrs)	7	7	7	7	7	7	7	7	7	7	7
	14	14	14	14	14	14	14	14	14	14	14
Water Consumption (gal/cycle)	36	30	30	22	18	22	18	22	18	22	18
Hot Water Energy (kWh/cycle)	0.91	0.87	0.64	0.51	0.39	0.51	0.39	0.51	0.39	0.51	0.39
Machine Energy (kWh/cycle)	0.28	0.28	0.28	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Dryer Energy (kWh/cycle)	1.31	1.39	1.58	1.21	1.20	1.21	1.20	1.21	1.20	1.21	1.20
Retail Equipment Cost (\$)	550	350	450	550	850	550	850	550	850	550	850
	700	450	550	650	950	650	950	650	950	650	950
Total Installed Cost (\$)	650	450	550	650	950	650	950	650	950	650	950
	800	550	650	750	1,050	750	1,050	750	1,050	750	1,050
Annual Maintenance Cost (\$)*	-	-	-	-	-	-	-	-	-	-	-

* Maintenance costs are negligible.

Historical updates

- Sectoral energy consumption by fuel
 - Monthly Energy Review
 - STEO
- Usual annual updates
 - weather data and projections
 - distributed generation capacity
 - annual “look” at photovoltaic costs

Comments/Discussion

- Pressing suggestions for *AEO2015*
- Comments or suggestions for *AEO2016*
 - thoughts on growth of “other” electricity use (high, low, approach?)
 - references/research on approaches to incorporating water heating interactions for residential clothes washers and dishwashers
 - references/research – comprehensive look at energy impacts and costs of energy efficiency programs

Discussion/questions

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