The Cost of Overdue Energy Efficiency Standards – Analysis Methodology

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This document explains the analysis methodology underlying the fact sheet entitled, "The Cost of Overdue Energy Efficiency Standards."

Table 1 below shows the required statutory or judicial deadline for publication of a final rule for each overdue standard, or, in the case of exempt IRLs and microwave ovens, DOE self-imposed deadlines. For self-imposed deadlines, we used those published in the fall 2010 regulatory agenda. Table 1 also shows the required effective date of each standard if it had been issued on time; the earliest possible effective date for each standard as of August 1, 2013 (assuming DOE preserves statutorily-anticipated lead times); and the number of months each standard is delayed as of August 1, 2013.

Table 1. Status of DOE overdue rules as of August 1, 2013

DOE Rulemaking	Required Final Rule Date	Required Effective Date	Earliest Possible Effective Date[1]	Months Delayed
Microwave ovens	6/1/2011	6/1/2014	6/1/2016	24
External power supplies	7/1/2011	7/1/2013	8/1/2015	25
ER, BR and small diameter reflector lamps	8/1/2011	8/1/2014	11/1/2016	27
Walk-in coolers and freezers	1/1/2012	1/1/2015	11/1/2016	22
Metal halide lamp fixtures	1/1/2012	1/1/2015	1/1/2015	22
Distribution transformers	10/1/2012	1/1/2016	1/1/2016	6
Electric motors	12/19/2012	1/1/2016	1/1/2016	10
Commercial refrigeration equipment	1/1/2013	1/1/2016	11/1/2016	10

For most rules, the effective date of the standard is three years after publication of the final rule.[2] In some instances, the statute specifies a firm effective date (e.g. January 1, 2015), while in others it specifies a period of time (e.g. 3 years). For rules for which the statute specifies a firm effective date, we assume that DOE will maintain those effective dates. For rules for which the statute instead specifies a period of time, we assume that DOE will maintain the gap anticipated by the statute between final rule publication and effective date, so every delay in the final rule translates into an equivalent delay in the effective date and the resulting efficiency gains. External power supplies are a special case: the effective date specified in statute has already passed, so we assume DOE will provide the lead time (2 years) contemplated by the statute.

[1] For microwave ovens and distribution transformers, the dates listed are the actual effective dates since DOE has published the final rules. For metal halide lamp fixtures and electric motors, the dates listed are the dates specified in the statute. For electric motors, for simplicity we assume a required effective date of 1/1/16 rather than 12/19/15.

[2] For external power supplies, the statutory lead time is two years. For distribution transformers, the rulemaking was required by a settlement agreement rather than by statute, and DOE both assumed throughout the rulemaking and ultimately established an effective date of January 1, 2016.

As of August 1, 2013, DOE has published final rules for two of the eight overdue standards: microwave ovens and distribution transformers. For microwaves, DOE issued the final rule in June 2013, and the effective date is June 2016. As of June 2013, the lost savings from the delayed microwave standard are no longer accumulating. For distribution transformers, DOE published the final rule in April 2013. In this case, DOE maintained the effective date that had been assumed throughout the rulemaking (January 1, 2016). Therefore, while publication of the distribution transformer standard was delayed by 6 months, in this case the delay did not result in lost savings.

For external power supplies,[3] DOE has already issued a proposed rule and the next expected rulemaking stage is final rule publication. For this rule, the earliest possible effective date listed in Table 1 is based on the lead time between publication of the final rule and the effective date. For example, if the final rule were published in August 2013, the standards would take effect two years later, in August 2015. DOE has also issued a proposed rule for metal halide lamp fixtures. In this case, the statute specifies an effective date of January 1, 2015, and DOE has proposed to maintain this date. Therefore, we assume that the delay of the metal halide lamp fixture standard will not result in lost savings.

For the remaining five rules, DOE has not yet published a proposed rule. For electric motors, the statute specifies an effective date of December 19, 2015. We assume that DOE will maintain this effective, which would mean that the delay will not result in lost savings. For the other four rules, the statute does not specify a firm effective date, and we assume that the earliest possible effective date is based on the lead time between publication of the final rule and the effective date, accounting for the required 90 days between publication of the proposed rule and the final rule. For example, if the proposed rule for commercial refrigeration equipment were published in August 2013, the earliest that the final rule could be issued would be in November 2013, and the standards would take effect three years later, in November 2016. (DOE has almost always taken at least six months and often longer to publish a final rule after issuing a NOPR, so adding just three months makes the estimate of delays conservative. Most likely, each will be longer.)

We estimate lost energy and economic savings and additional CO_2 emissions from DOE delays based on estimates of energy savings and investment costs of assumed standard levels in ASAP and ACEEE's previous major study on the potential savings from new efficiency standards, *The Efficiency Boom: Cashing in on the Savings from Appliance Standards* (Lowenberger et. al. 2012).

To calculate lost savings as a result of the delays, we first calculate the annual electricity savings from products sold in one year based on annual shipments and per-unit energy savings, accounting for the portion of products that already meet the standard. We divide the one sales-year savings by 12 to calculate the annual electricity savings from products sold in a single month (one sales-month savings),

[3] We have not included battery charger standards in this analysis even though DOE has missed statutory deadlines for completing this final rule, which is the same as the deadline for external power supplies. In the case of battery chargers, existing California standards are generally stronger than proposed standards published by DOE in 2012. Manufacturers have stated that they anticipate complying with the California standards on a national basis. As a result, there is no cost to DOE delay in this case, unless DOE ultimately chooses to set a national standard more stringent than the California standards.

and then divide the one sales-month savings by 12 to arrive at the monthly electricity savings from products sold in a single month.

We calculate cumulative lost electricity savings from one month of sales for each product by multiplying the monthly savings from one month of sales by the lifetime of the product in months. We calculate cumulative lost electricity savings from the delays for each standard by multiplying the cumulative lost electricity savings from one month of sales by the number of months the standard is delayed.

To calculate cumulative additional CO_2 emissions as a result of the delays, we use an average CO_2 emissions factor for the electric power sector for the period 2015-2044, conservatively based on the lifetime of distribution transformers, which have the longest lifetime of the eight products. We calculate the emissions factor (MMT CO_2/TWh) by dividing projected electric power sector CO_2 emissions by projected electric power sector generation (EIA 2012a). The average emissions factor over the period 2015-2044 is 0.49 MMT CO_2/TWh. To apply this CO_2 emissions factor, which is based on electricity generation, we take into account estimated transmission and distribution losses of 7 percent between the point of generation and the point of use (EIA 2012c).

We calculate cumulative additional CO_2 emissions from the delays for each standard by multiplying the cumulative additional CO_2 emissions from one month of sales by the number of months the standard is delayed.

To calculate lost net present value savings from the delays, we first calculate the total incremental cost of products sold in one year based on annual shipments and the per-unit incremental cost, accounting for the portion of products that already meet the standard. We divide the one sales-year investment by 12 to calculate the investment from a single month of sales. We then calculate the present value of the deferred investment for each standard based on the investment from one month of sales and the number of months the standard is delayed using a real discount rate of 5 percent.

To calculate the present value of lost electricity bill savings, we first calculate the monthly electricity bill savings from one month of sales for each product by multiplying the monthly electricity savings from one month of sales by the appropriate electricity price shown in Table 2 below (EIA 2012b).

Table 2. Electricity prices

Sector	Electricity Price (2011$/kWh)
Residential	$0.1172
Commercial	$0.1023
Industrial	$0.0682

We calculate the present value of the lost electricity bill savings for each standard based on the monthly electricity bill savings from one month of sales and the number of months the standard is delayed using a real discount rate of 5 percent.

The lost net present value savings as a result of the delays for each standard is then equal to the difference between the present value of the lost electricity bill savings and the present value of the deferred investment.

References

[EIA] U.S. Energy Information Administration. 2012a. Annual Energy Outlook 2013. Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

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