Appliance Standards Awareness Project
American Council for an Energy-Efficient Economy
Alliance to Save Energy
Natural Resources Defense Council
Northwest Energy Efficiency Alliance
Northwest Power and Conservation Council

November 12, 2013

Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program
1000 Independence Avenue, SW
Mailstop EE-2J
Washington, DC 20585

RE: Docket Number EERE–2010–BT–STD–0003/ RIN 1904–AC19: Notice of Proposed Rulemaking for Commercial Refrigeration Equipment

Dear Ms. Edwards:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), Alliance to Save Energy (ASE), Natural Resources Defense Council (NRDC), Northwest Energy Efficiency Alliance (NEEA), and Northwest Power and Conservation Council (NPCC) on the notice of proposed rulemaking (NOPR) for commercial refrigeration equipment. 78 Fed. Reg. 55890 (September 11, 2013). We appreciate the opportunity to provide input to the Department.

We strongly support adopting standards that represent the maximum cost-effective efficiency levels. DOE estimates that the proposed standards would save 1 quad of energy from 30 years of purchases and would yield a net present value for customers of $1.6-$4.1 billion. The median payback periods for all but one of the primary equipment classes are less than 5 years.[1] In the NOPR, DOE appears to have placed significant emphasis on NPV at 7% as an indication of cost-effectiveness. DOE has proposed to adopt TSL 4, which represents the maximum energy savings with a positive NPV at 7%.[2] At a minimum, we urge DOE to consider NPV at both 3% and 7% as directed in Office of Management and Budget (OMB) guidance to Federal agencies.[3] However, we note that in this specific instance, the Trial Standard Level (TSL) that represents the maximum energy savings with a positive NPV is the same at both 3% and 7%.

We strongly support DOE's approach for the engineering analysis of modeling the impact of design options on energy consumption. At the DOE public meeting on October 3, manufacturers raised concerns with DOE's engineering model for estimating efficiency improvements that could be achieved by the design options considered in the analysis. Some

[1] 78 Fed. Reg. 55892.
[2] *Ibid*. 55948.
[3] http://www.whitehouse.gov/omb/Circulars_a004_a-4#e.

manufacturers also suggested that it would not be technologically feasible to meet some of the proposed standards. We strongly support DOE's approach of modeling the impact of design options on energy consumption. While available data suggests that there are high-efficiency models available today for at least some equipment classes, we understand that these models may not have been on the market at the time the analysis for the NOPR was conducted, even though the technology existed to significantly improve efficiency. In addition, we understand that currently-available models likely do not incorporate all the design options that DOE identified in the NOPR. Therefore, DOE's modeling approach was appropriate and necessary in order to evaluate the maximum efficiency levels that are technologically feasible.

DOE utilized a similar approach of modeling efficiency levels in the 2011 final rule for residential refrigerators. In the residential refrigerator rulemaking, the "max-tech" levels were higher than the maximum-available efficiency levels for most product classes, and in some cases the "max-tech" levels were significantly higher than the efficiency levels of commercially-available products. For example, for compact refrigerators, the "max-tech" level represented a reduction in energy use of 59%, while the energy consumption of the maximum-available efficiency level was only 27% below the current standard.[4] For the 2011 final rule, DOE used an energy model to determine the "max-tech" efficiency levels, where the "max-tech" levels represented the most-efficient design option combinations applicable for the analyzed products.[5]

It is important to note that many of the comments made at the DOE public meeting on October 3 regarding the technological feasibility of the proposed standards were specifically related to the proposed standards for "pull-down" beverage merchandisers (PD.SC.M), which represent only one of twenty-five primary equipment classes analyzed in the NOPR. We do not have sufficient information to evaluate whether the concerns raised by commenters about the proposed levels for "pull-down" equipment are valid. However, even if DOE determines that the analysis does need to be revised for "pull-down" equipment, this does not by itself imply that the proposed standards for the other equipment classes are not appropriate. As we describe below, available data indicate that there are currently-available models that already meet the proposed efficiency levels for many of the major equipment classes.

There is huge potential for improving the efficiency of commercial refrigeration equipment, and available data indicate that there are currently-available models that already meet the proposed efficiency levels for many of the major equipment classes. The current standards for self-contained, closed-door equipment were established by EPACT 2005. Unlike residential refrigerators and freezers, which have become much more energy-efficient as a result of a series of state and national standards over more than three decades, the EPACT 2005 standards were the first efficiency standards for commercial refrigeration equipment. (The EPACT 2005 standards essentially copied first-ever state standards for commercial refrigerators and freezers adopted in California and other states.) We understand that the EPACT 2005 standards were intended to be a modest first step to improve efficiency. We also understand that in the commercial refrigeration market, first cost often dominates purchasing decisions, which means that the market may not drive major efficiency improvements. However, for the analysis

[4] 76 Fed. Reg. 57530-31.
[5] *Ibid*.

for the NOPR, DOE found that there are numerous commercially-available design options that, in combination, can dramatically reduce the energy use of commercial refrigeration equipment.

Table 1 below shows the allowable energy consumption at TSL 4 as a percentage below the current standards along with the maximum-available efficiency levels for eight self-contained, closed-door equipment classes based on models in the ENERGY STAR Qualified Products List (QPL). These eight equipment classes represent 45% of the estimated cumulative shipments from 2017-2046.[6] As can be seen in Table 1, for these eight equipment classes, the maximum-available efficiency levels represent energy consumption levels from 67% to 91% below the current standards. For five of the eight equipment classes in Table 1, the maximum-available efficiency levels exceed the efficiency levels proposed in the NOPR. For example, for self-contained, solid-door vertical refrigerators (VCS.SC.M), the proposed standard in the NOPR represents a reduction in energy consumption of 71% relative to the current standard, while the maximum-available efficiency level represents an 84% reduction in energy consumption compared to the current standard.

Table 1. Comparison of TSL 4 and Maximum-Available Efficiency Levels for Self-Contained, Solid-Door Equipment Classes.

Equipment Class	TSL 4 as % Below Current Standard[7]	Maximum-Available % Below Current Standard[8]
VCS.SC.M	71%	84%
VCS.SC.L	68%	67%
VCT.SC.M	67%	76%
VCT.SC.L	71%	62%
HCS.SC.M	81%	73%
HCS.SC.L	70%	86%
HCT.SC.M	84%	86%
HCT.SC.L	85%	91%

It is important to note that the absence of products available today that meet the proposed standards for some equipment classes does not imply that the proposed levels are not technologically feasible. As mentioned above, DOE found that there are many commercially-available design options for improving the efficiency of commercial refrigeration equipment. However, these technologies may not be bundled together in products available today. DOE found this situation to be the case in the 2011 final rule for residential refrigerators, where DOE noted that the available products at that time generally did not use all of the design options considered in the analysis.[9]

It is also important to consider that the current test procedure does not capture energy savings from night curtains or lighting sensors. The new test procedure that will take effect with the new

[6] Technical Support Document. p. 9-11.
[7] Based on the baseline specifications for refrigerated volume in Table 5A.2.2 in the Technical Support Document.
[8] ENERGY STAR QPL accessed October 22, 2013.
[9] 76 Fed. Reg. 57531.

standards, however, does capture these energy-saving technologies, and the analysis conducted for the NOPR includes night curtains and lighting sensors as design options. For the equipment classes for vertical display cases with glass doors in Table 1 (VCT.SC.M and VCT.SC.L), the energy consumption of the maximum-available efficiency levels could be further reduced through the use of lighting sensors.

Alternative refrigerants provide an additional pathway for improving efficiency for many commercial refrigeration products. In the analysis for the NOPR, DOE did not consider alternative refrigerants as a technology option for improving efficiency. At the DOE public meeting on the preliminary technical support document on April 19, 2011, True stated that for small, self-contained commercial refrigeration equipment (up to two-door freezers and three-door refrigerators), switching to propane as the refrigerant improves efficiency by 7-11%.[10] True further stated that 85% of their products could be converted to alternative refrigerants with marginal cost increases and efficiency gains.[11] Even though DOE did not consider alternative refrigerants as a technology option in the analysis for the NOPR, manufacturers will have the option of utilizing alternative refrigerants, such as propane, to help meet the new standards for many types of self-contained commercial refrigeration equipment.

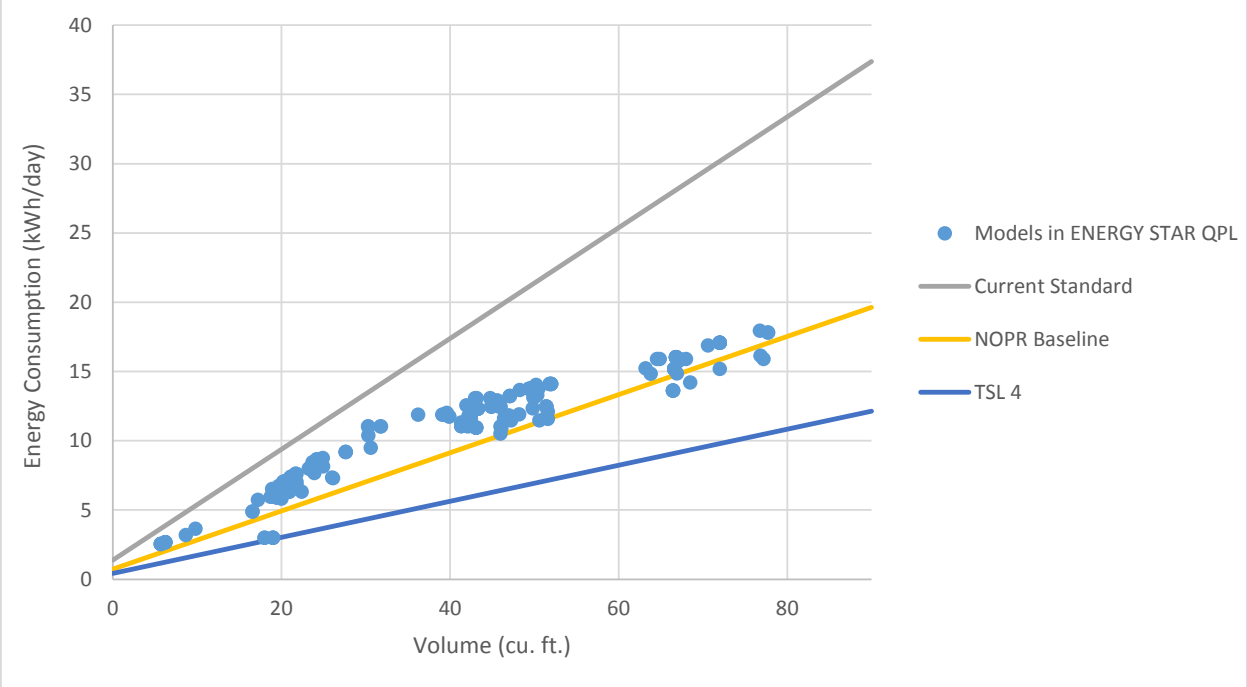
If DOE determines that triple-pane low-e doors for medium-temperature units would affect consumer utility, DOE should evaluate an increase in lighting levels to offset the reduction in visible light transmittance. For equipment classes with transparent doors, DOE evaluated "high-performance doors" as a design option. For medium-temperature units, the "high-performance door" design option includes an additional pane of glass and a low-e coating.[12] At the DOE public meeting on October 3, manufacturers stated that triple-pane low-e doors would make it harder for customers to see the products in the display cases, which could lead some stores to opt for open cases rather than closed cases. DOE noted that triple-pane low-e doors are already used with low-temperature cases.[13] In addition, the California IOUs note in their comments on the NOPR that it appears that there are medium-temperature beverage merchandisers available today with triple-pane low-e doors. However, if DOE determines that triple-pane low-e doors would affect consumer utility, we encourage DOE to evaluate an increase in lighting levels to offset the reduction in visible light transmittance. In the TSD, DOE notes that improved transparent doors reduce energy consumption both by reducing the U-factor of the door and by reducing the required anti-sweat heater power.[14] For transparent doors for medium-temperature units, the "high-performance door" design option assumes the complete elimination of anti-sweat heater power.[15] We expect that the increase in energy use due to higher lighting levels would be small relative to the energy savings due to the improved thermal performance of the "high performance doors" and the elimination of anti-sweat heater operation.

We encourage DOE to re-evaluate the baseline levels for the equipment classes for which the current standards were established by EPACT 2005. For seven of the self-contained,

[10] Preliminary Technical Support Document Public Meeting Transcript. p. 152.
[11] *Ibid*. p. 155.
[12] Technical Support Document. p. 5-27.
[13] DOE NOPR Public Meeting Transcript. p. 99.
[14] Technical Support Document. p. 5-26.
[15] *Ibid*. p. 5-27.

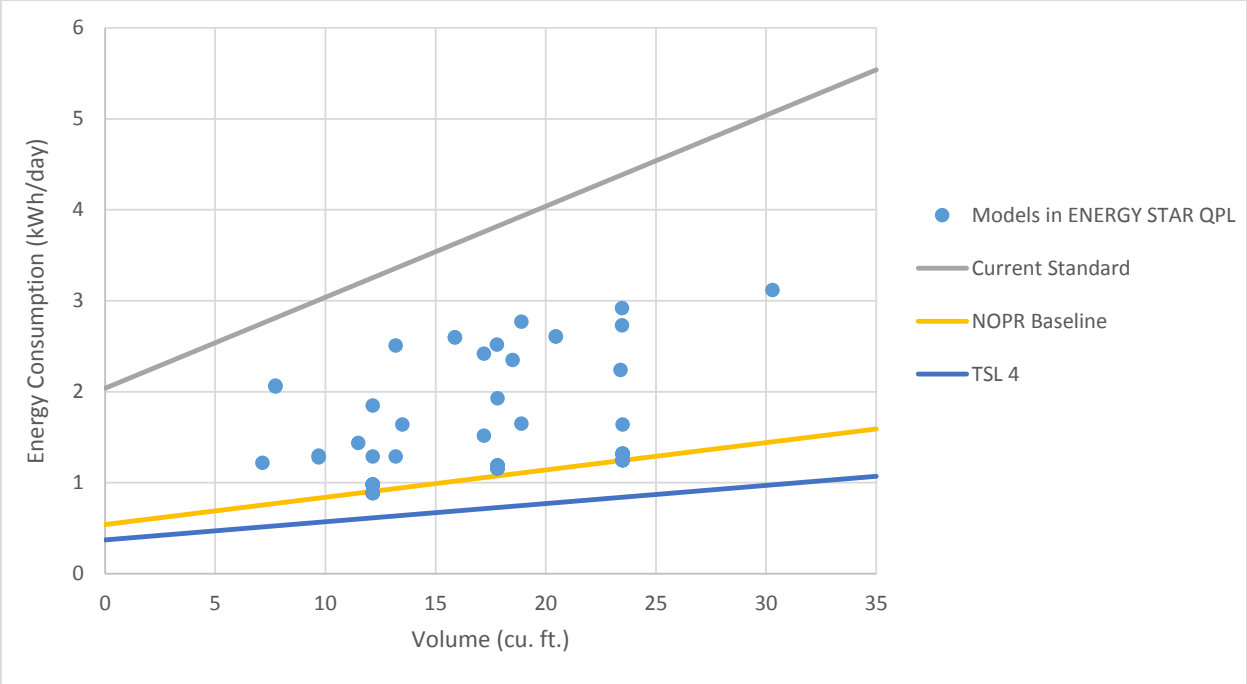
closed-door equipment classes for which the current standards were established by EPACT 2005 (VCS.SC.M, VCS.SC.L, VCT.SC.L, HCS.SC.M, HCS.SC.L, HCT.SC.M, HCT.SC.L), the "baseline" levels assumed in the NOPR are significantly more stringent than the current standards. We understand that the "baseline" levels are intended to reflect the energy consumption of the least-efficient models that are currently available. Data from the ENERGY STAR QPL indicate that for at least some of these seven equipment classes, many of the ENERGY STAR-qualified products have energy consumption levels that are higher than the "baseline" levels in the NOPR. Figures 1 and 2 below show the models in the ENERGY STAR QPL for self-contained, solid-door vertical freezers (VCS.SC.L), and self-contained, solid-door horizontal refrigerators (HCS.SC.M), respectively, along with the current standards, the "baseline" levels assumed in the NOPR, and the proposed standards (TSL 4).[16] For these two equipment classes, the majority of the ENERGY STAR-qualified products have energy consumption levels higher than the "baseline" levels in the NOPR, and in the case of the HCS.SC.M class, there are ENERGY STAR-qualified products with energy consumption levels more than twice as high as the "baseline" levels.

Figure 1. VCS.SC.L Models in ENERGY STAR QPL Compared to the Current Standard, the NOPR "Baseline," and TSL 4.



[16] ENERGY STAR QPL accessed October 22, 2013.

Figure 2. HCS.SC.M Models in ENERGY STAR QPL Compared to the Current Standard, the NOPR "Baseline," and TSL 4.

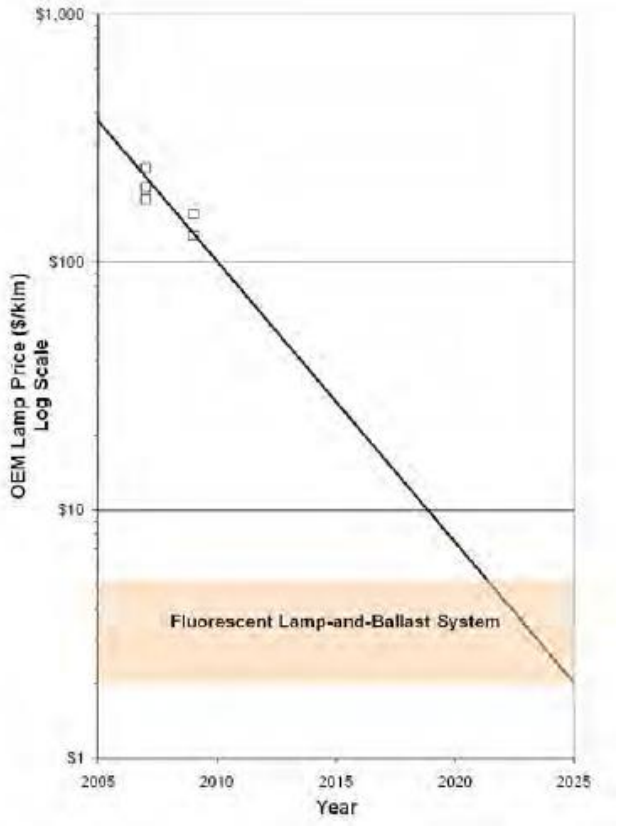


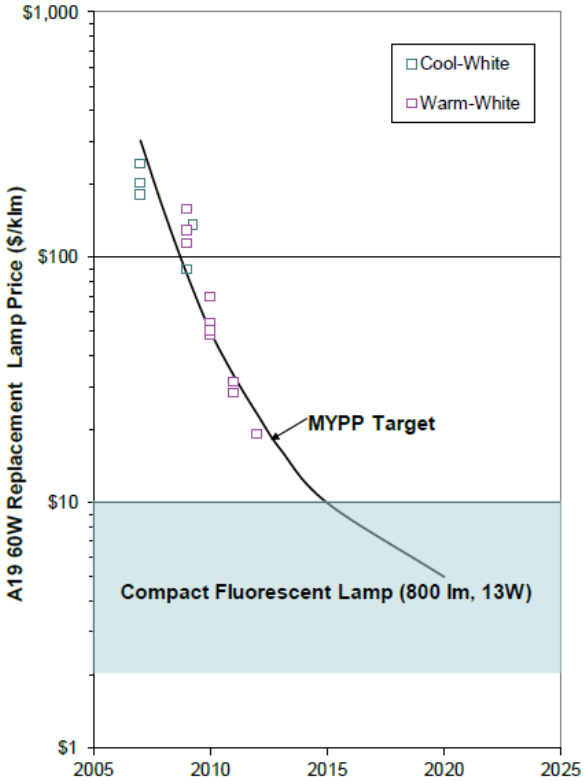
We strongly support the incorporation of LED price projections. In the analysis for the NOPR, DOE incorporated price projections from its Solid-State Lighting Program into the estimates of manufacturing production cost (MPC) for the representative units.[17] DOE shows in the NOPR that LED prices are projected to decrease by more than a factor of 5 between 2010 and 2017, and are projected to decrease by almost another factor of 5 between 2017 and 2030.[18] The incorporation of LED price projections significantly improves the analysis by better reflecting a realistic estimate of LED costs.

As part of the Solid-State Lighting Program, DOE has tracked both the prices of LED luminaires and how they compare to the Multi-Year Program Plan (MYPP) projections of LED luminaire prices. Figure 3 below shows DOE's price projections in the 2010 MYPP (left) and the 2013 MYPP (right). As can be seen in Figure 3, prices have dropped at a faster rate than DOE's 2010 MYPP projected. In the 2011 MYPP, DOE updated the MYPP price targets due to this rapid decrease in prices—DOE found that normalized prices in 2010 had dropped to about $50/klm some two years ahead of the original schedule.[19] In the 2013 MYPP, DOE noted that 2012 prices of about $19/klm are slightly ahead of the MYPP projection (as can be seen in Figure 3).[20] These data suggest that DOE's price projections for LED lamps have actually been somewhat conservative.

[17] 78 Fed. Reg. 55921-22.
[18] *Ibid*. 55922.
[19] http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2011_web.pdf. p. 39.
[20] http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2013_web.pdf. p. 12.

Figure 3. DOE Price Projections of LED Lamps ($/klm) in the 2010 MYPP (left) and the 2013 MYPP (right).[21]





We support the use of the updated social cost of carbon values. The benefits of the proposed standards outweigh the costs even before accounting for the benefits from reduced power sector emissions. As in prior standards rulemakings, DOE also quantifies the economic benefits of pollutant reductions, including carbon dioxide. DOE states in the NOPR that it plans to consider the monetary value of reduced carbon dioxide emissions from the standard using the most recent interagency social cost of carbon (SCC) values.[22] We support the use of these updated SCC values which are based on the interagency working group's most recent review of peer-reviewed models on the subject.[23] Indeed, these SCC values are still likely to be an underestimate of the costs associated with carbon dioxide emissions, as many of the damages from climate change are not accounted for in models, such as forests fires, drought, smog, and increasing food prices.[24]

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[21] http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2010_web.pdf. p. 71; http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2013_web.pdf. p. 13.

[22] 78 Fed. Reg. 55944-47.

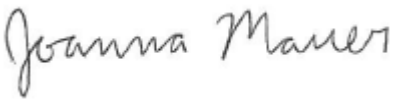
[23] http://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf.

[24] See: http://www.epa.gov/otaq/climate/regulations/420r10012a.pdf, Roberto Roson & Dominique Van der Mensbrugghe, *Climate change and economic growth: Impacts and interactions*, 4 INTERNATIONAL JOURNAL OF SUSTAINABLE ECONOMY, 270 (2012), and INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE. CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY. CONTRIBUTION OF WORKING GROUP II TO THE FOURTH

We urge DOE to adopt a compliance date that is 3 years after publication of the final rule. In the NOPR, DOE proposes to provide 3 years for compliance with new standards, but also seeks comment on whether the Department should consider a longer compliance date.[25] The statutory deadline for publication of a final rule for new standards for commercial refrigeration equipment was January 1, 2013. DOE has committed to publishing a final rule by February 2014,[26] which means that manufacturers will have an additional year beyond the time period contemplated by the statute between the compliance date of the 2009 rulemaking and the compliance date of the current rulemaking. In addition, the TSD noted that many of the design options do not incur capital expenditures for new tooling or equipment and can be considered to be component swaps.[27] We urge DOE to adopt a 3-year compliance date since 3 years appears to be feasible for manufacturers and a longer compliance date would result in lost energy savings.

Thank you for considering these comments.

Sincerely,



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ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf.

[25] 78 Fed. Reg. 55989.

[26] http://www.ct.gov/ag/lib/ag/press_releases/2013/20130809_doe_efficiency_standards.pdf.

[27] Technical Support Document. p. 12-20, 12-21.