STATE OF NEW YORK DEPARTMENT OF PUBLIC SERVICE

THREE EMPIRE STATE PLAZA, ALBANY, NY 12223-1350

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September 27, 2013

Ms. Kathleen Burgess Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, NY 12223-1350

Re: Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard.

Dear Secretary Burgess:

On June 20, 2011, the Commission issued an order in Case 07-M-0548[1] that organized all approved Energy Efficiency Portfolio Standard (EEPS) programs into specific Classification Groups, and established a specific list of approved energy efficiency measures for each Classification Group. The order also authorized the Director of the Office of Energy Efficiency and the Environment (OEEE) to make consensus additions of measures to the list of measures established for a Classification Group. In addition, the order authorized the Director of the OEEE to make minor changes to the New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs, "Technical Manual" used to guide savings calculations. Minor changes are limited to updating data and calculations to reflect changes to factors such as energy codes and standards, product specifications, and evaluation results. Finally, the order allowed the Director of the OEEE to make substantive consensus modifications to the Technical Manual.

The Commission outlined the following process to effect consensus changes:

1. The exact text of the intended modifications shall be presented in writing to the members of the Implementation Advisory Group (IAG) consisting of designated representatives of all program administrators. A copy shall be provided to members of the Evaluation Advisory Group (EAG).

[1] Case 07-M-0548, Energy Efficiency Portfolio Standard (EEPS), Order Approving Modifications to the Energy Efficiency Portfolio Standard (EEPS) Program to Streamline and Increase Flexibility in Administration (issued June 20, 2011).

2. The IAG and EAG shall be afforded a reasonable opportunity to review the intended modifications and to advise the OEEE Director as to the proposal.

3. If any member of the IAG objects to the intended modifications by making a written objection to the OEEE Director within a reasonable period of time established by the OEEE Director for the receipt of objections, the intended modifications may not be implemented without referral to and approval by the Commission.

4. If no member of the IAG makes a written objection to the intended modifications within a reasonable period of time established by the OEEE Director for the receipt of objections, the intended modifications may be implemented by the OEEE Director, without referral to and approval by the Commission, by filing the exact text of the modifications with the Secretary to the Commission in Case 07-M-0548 and by posting an update or supplement to either the Table of Classification Groups or the Technical Manual on the Commission's website.

On September 17, 2013 Staff proposed energy savings calculations for new energy efficient primary refrigerators and the recycling of primary refrigerators. Also on September 17, 2013 Staff proposed revisions to a table in Appendix B of the Technical Manual, "Weighting Factors for Commercial Building Calculations." The proposals were provided to the members of the IAG and the EAG by electronic mail. No written objections to the proposals were received within the time frame agreed to with members of both groups.

In accordance with the authority granted in the Commission's June 20, 2011 order, I find that the proposed changes to the Technical Manual described above have the consensus support of the IAG. Accordingly, I approve these changes to the Technical Manual. The enclosed Attachment reflects the changes to the Technical Manual and an updated Technical Manual reflecting these changes is available on the Department's website.

Sincerely,

Colleen L. Gerwitz

Colleen L. Gerwitz
Director, Office of Energy Efficiency
and the Environment

cc: Anthony Belsito
Debra LaBelle
Robert Roby
Pete Sheehan

RECORD OF REVISION					
Revision Number	**Issue Date**	**Effective Date Range**	**Measure**	**Heading/Subsection of Tech Manual Change or Addition and Brief Description of Change/Addition**	**Location/Page in Tech Manual (October 15, 2010)**
9-13-1	9/27/13	10/1/13-12/31/13	Primary Refrigerators	**Refrigerator Rebates**	N/A – New Section
9-13-2	9/27/13	10/1/13-12/31/13	Refrigerators and Freezers	**Refrigerator and Freezer Recycling**	Pgs. 22-23
9-13-3	9/27/13	10/1/13-12/31/13	Weighting Factors for Commercial Building Calculations (Appendix B)	**Weighting Factors for Commercial Building Calculations (Appendix B)**	Pg. 253

Refrigerator[1] Rebates

This section pertains to the calculation of energy savings for refrigerator retail rebate programs. The savings are calculated by taking the difference between the energy consumption of the Tier 2 or Tier 3[2] model purchased and the consumption of the Department of Energy (DOE) minimally compliant model most closely associated with the new refrigerator in features/design (e.g., top freezer.) The energy savings are computed for the entire Effective Useful Life (EUL) of the new refrigerator which is currently set at 17 years.[3] The calculations are shown below:

Annual Energy and Peak Demand Savings

$$\Delta kWh = (kWh_{DOE\ min} - kWh_{ee}) \times (1 + HVAC_c) \times F_{occ}$$

$$\Delta kW_S = \left\{ \frac{kWh_{DOE\ min}}{8{,}760} - \frac{kWh_{ee}}{8{,}760} \right\} \times CF \times (1 + HVAC_d)$$

$$\Delta therm = \Delta kWh \times HVAC_g$$

where:

ΔkWh	= gross annual energy savings
ΔkWs	= gross coincident demand savings
$\Delta therm$	= gross annual gas impacts from heating system interactions
$kWh_{DOE\ min}$	= annual energy consumption of DOE minimally-compliant model most closely associated with the new refrigerator[4]
kWh_{ee}	= annual energy consumption/nameplate rating for the new CEE Tier 2 or Tier 3 model
CF	= coincidence factor (1.0)
$HVAC_c$	= HVAC system interaction factor for annual energy consumption
$HVAC_d$	= HVAC system interaction factor at utility peak hour
$HVAC_g$	= HVAC system interaction factor for annual gas consumption
8760	= conversion factor (hr/yr)
F_{occ}	= occupant adjustment factor

[1] This section applies to refrigerators with and without freezers

[2] Tiers 2 and 3 are efficiency rating established by the Consortium for Energy Efficiency (CEE.) The ratings are located at: http://library.cee1.org/content/qualifying-product-lists-residential-refrigerators

[3] Order Approving Modifications to the Technical Manual, Issued July 18, 2011, Appendix, page 2.

[4] The Energy Star website referenced here lists the energy consumption of the Energy Star model compared with the energy consumption of the DOE minimally-compliant model which is the number used in this calculation. http://www.energystar.gov/productfinder/product/certified-residential-refrigerators/results?scrollTo=2373&search_text=&sort_by=less_energy_than_us_federal_standard&brand_name_isopen=&page_number=3&lastpage=1

Occupant Adjustment Factor

The occupant adjustment factor[5] is used to adjust the energy savings according to the number of occupants in the apartment (if applicable), as shown in the following table:

Number of Occupants	F_{occ}
0 occupants	1.00
1 occupant	1.05
2 occupants	1.10
3 occupants	1.13
4 occupants	1.15
5 or more	1.16

Operating Hours

The equations above assume the refrigerator is operating year-round. The cycling of the compressor is considered in the annual energy consumption and compressor duty cycle run time.

HVAC Interactions

Efficient refrigerators reject less heat into the conditioned space, which must be made up by the space heating system, but can also provide savings on cooling loads. Calculations must include space heating interactions with efficient refrigerators. The HVAC interaction factors calculated from the prototypical building DOE-2 models as a function of the building and HVAC system type are shown in Appendix D.

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[5] The occupant adjustment factor is taken from National Energy Audit Tool (NEAT). Oak Ridge National Laboratory, Oak Ridge, TN.

Refrigerator and Freezer Recycling

Description of Measure

The savings calculations apply to recycling of a functioning primary[6] or secondary refrigerator or freezer.

Annual Energy and Summer Peak Demand Savings

The following deemed energy impact estimates shall be used in New York for refrigerator and freezer recycling programs[7].

Energy savings per unit:

Primary Refrigerators:	670 kWh[8]
Secondary Refrigerators:	1,655 kWh
Freezers:	1,257 kWhs

Peak demand savings per unit:

$\Delta kW_S = \Delta kWh / 8760 \times TAF \times LSAF$

TAF = Temperature Adjustment Factor
= 1.22 Upstate
= 1.26 NYC

LSAF = Load Shape Adjustment Factor
= 1.06

Notes & References

1. Evaluation Study of the 2004-2005 Statewide Residential Appliance Recycling Program, April 2008, ADM Associates.
2. TAF and LSAF taken from Blasnik, Michael, "Measurement and Verification of Residential Refrigerator Energy Use, Final Report, 2003-2004 Metering Study", July 29, 2004. It assumes 58% of New York homes have central air conditioning.

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[6] Savings can be claimed for recycling a primary refrigerator as long as savings for that replacement were not claimed by another energy efficiency program.

[7] See table 2-6 in the Evaluation Study of the 2004-2005 Statewide Residential Appliance Recycling Program, April 2008, ADM Associates.

[8] Primary Refrigerators: An Examination of Appliance Recycling Program Design; Kate Bushman and Joshua Keeling – Cadmus Group, Inc. and Karen Kansfield, Ameren Illinois, April, 2013.

Weighting Factors for Commercial Building Calculations

The Tech Manual currently lists energy savings estimates for small commercial buildings for a single vintage and HVAC system type, with the exception of HVAC interactive effects multipliers. Use the weights in the table below for HVAC interactive effects: (Note: Some types do not add up to exactly 1.00 due to rounding.)

System Type Weights Small Commercial Building HVAC Systems from CBECS

Building Type	AC with gas heat	Heat Pump	AC with elec heat	Electric heat only	Gas heat only
Assembly	0.63	0.08	0.12	0.03	0.14
Auto Repair	0.54	0.08	0.10	0.04	0.24
Big Box	0.66	0.07	0.18	0.02	0.07
Elementary School	0.68	0.11	0.11	0.01	0.08
Fast Food	0.67	0.09	0.18	0.01	0.06
Full Service	0.67	0.09	0.18	0.01	0.06
Grocery	0.66	0.07	0.18	0.02	0.07
Light Industrial	0.46	0.06	0.00	0.10	0.37
Motel	0.46	0.23	0.26	0.02	0.03
Religious	0.57	0.11	0.13	0.03	0.15
Small Office	0.69	0.10	0.19	0.00	0.02
Small Retail	0.66	0.07	0.18	0.02	0.07
Warehouse	0.46	0.06	0.00	0.10	0.37
Other	0.60	0.10	0.14	0.03	0.13

Savings estimates for large commercial buildings are developed for several HVAC system and chiller type combinations. The CBECS data were analyzed to develop system type weights for these building types. The weighting factors for each of the two HVAC system types (constant volume reheat (CV) and variable air volume (VAV)) are shown below.

System Type Weights for Built-Up HVAC Systems from CBECS

	Building					
System Type	Hospital	Office	Education	Lodging	Retail	Other
CV	0.16	0.14	0.31	1.00	0.16	0.35
VAV	0.84	0.86	0.69	0.00	0.84	0.65

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