Efficiency Factor Document

Version 1, 1 February 2016

Carbon Credits (Carbon Farming Initiative) Act 2011

Carbon Credits (Carbon Farming Initiative—High Efficiency Commercial Appliances) Methodology Determination 2015

Introduction

The *Efficiency Factor Document version 1* is prepared and published by the Department of the Environment for the purpose of section 16 of the *Carbon Credits (Carbon Farming Initiative—High Efficiency Commercial Appliances) Methodology Determination 2015* (the Determination). It was first published on 1 February 2016. It contains default efficiency factors for use in the calculations under the Determination. These factors include:

- baseline efficiency integrated part load values and high efficiency thresholds for liquid-chilling packages required by paragraph 16(2)(a) of the Determination (see Table 1);
- baseline annual energy efficiency ratios for cooling and annual coefficients of performance for heating, and high efficiency thresholds for air conditioners required by paragraph 16(2)(b) of the Determination (see Table 2);
- baseline sensible energy efficiency ratios and high efficiency thresholds for close control air conditioners required by paragraph 16(2)(c) of the Determination (see Table 3); and
- baseline efficiency values and high efficiency thresholds for refrigerated display cabinets required by paragraph 16(2)(d) of the Determination (see Table 4).

The Determination prescribes that the baseline emissions of an equipment unit are calculated using the default baseline energy efficiency levels set out in this document. These default efficiency levels have been determined using publicly available data on the Greenhouse and Energy Minimum Standards (GEMS) Registry under the *Greenhouse and Energy Minimum Standards Act 2012* (GEMS Act) for the relevant equipment class, extracted on 3 December 2015.

The Determination also prescribes that only equipment units with energy efficiency levels that are equal to or better than their corresponding high efficiency thresholds are eligible to be installed under a project. This is to ensure that eligible installations go beyond business as usual. The thresholds are set at a level such that the number of eligible products is 50 per cent of the number of products meeting the corresponding baseline energy efficiency level. Effectively, only installations of equipment units within the top quartile (i.e. top 25 per cent) of energy performance are credited under the Determination.

Subsection 16(5) of the Determination sets out that the applicable efficiency factor document is the one in force at the time the installation of the equipment unit was completed.

Subsection 16(6) provides an exception to 16(5) where if certain requirements are met, the proponent may choose to apply the version of the efficiency factor document that was in force on the day a contract or purchase order was entered into. These requirements include: the installed equipment unit was the subject of a contract or purchase order that specified that an equipment unit of that model was to be delivered to the location of the installation; and the

contract or purchase order was entered into and dated before the newer version of the efficiency factor document was published.

The Determination requires the Department to publish this document within three months of the commencement of the Determination and to consider revising the document in accordance with subsection 16(8) to ensure that the factors are updated to reflect changes of products on the GEMS Registry, and to maintain the integrity of the abatement calculations. Accordingly, this version 1 commenced on 1 February 2016 and may be replaced from the date when a subsequent version is published.

Definitions used in the Determination and this document are consistent with the relevant Australian Standards, to which the corresponding GEMS determinations directly refer. These definitions may vary from the definitions used in the GEMS data files. For example, AEER (annual energy efficiency ratio) and ACOP (annual coefficients of performance) are terms used in the Determination that align with the relevant Australian Standards and GEMS determinations, while the GEMS data files use the terms EERtestAvg and COPtestAvg.

Table 1—Liquid-chilling package default efficiency factors

Class	Condenser type	Cooling capacity (kW)	Baseline efficiency (integrated part load value)	High efficiency threshold (integrated part load value)
1	Air cooled	350 to <500	4.74	5.10
2	Air cooled	500 to <700	5.02	5.41
3	Air cooled	700 to <1,000	5.13	5.50
4	Air cooled	1,000 to <1,500	4.95	5.27
5	Air cooled	≥1,500	5.30	6.35
6	Water cooled	350 to <500	7.18	7.92
7	Water cooled	500 to <700	8.64	9.64
8	Water cooled	700 to <1,000	8.85	10.09
9	Water cooled	1,000 to <1,500	9.49	10.05
10	Water cooled	≥1,500	9.81	10.21

Table 2—Air conditioner default efficiency factors

Class	Product type	Capacity (kW)	*Cooling (annual energy efficiency ratio)*		*Heating (annual coefficients of performance)*	
			Baseline annual efficiency ratio	High efficiency threshold	Baseline annual efficiency ratio	High efficiency threshold
1	Non-ducted unitary	<10	3.31	3.35	3.41	3.50
2	Non-ducted unitary	10 to <19	3.04	3.04	3.10	3.10
3	Non-ducted split systems	< 4	4.00	4.39	4.05	4.53
4	Non-ducted split systems	4 to <10	3.38	3.52	3.59	3.88
5	Non-ducted split systems	10 to <19	3.30	3.61	3.62	3.86

Class	Product type	Capacity (kW)	*Cooling (annual energy efficiency ratio)*		*Heating (annual coefficients of performance)*	
			Baseline annual efficiency ratio	**High efficiency threshold**	**Baseline annual efficiency ratio**	**High efficiency threshold**
6	Ducted systems	<10	3.39	3.59	3.48	3.75
7	Ducted systems	10 to <19	3.27	3.49	3.63	3.78
8	Multi-split systems	<4	NA*	NA*	NA*	NA*
9	Multi-split systems	4 to <10	3.57	3.81	3.93	4.19
10	Multi-split systems	10 to <19	3.52	3.74	3.84	4.07
11	All configurations	19 to 39	3.37	3.62	3.62	3.87
12	All configurations	>39 to 65	3.26	3.54	3.61	3.79

*Based on the database extract undertaken on 3 December 2015, there were no registered products

Table 3—Close control air conditioner default efficiency factors

Class	Net sensible cooling capacity (kW)	Baseline efficiency (sensible energy efficiency ratio)	High efficiency threshold (sensible energy efficiency ratio)
1	<19.05	3.24	3.50
2	19.05 to <39.5	3.30	3.57
3	39.5 to <70.0	3.35	3.51
4	≥70.0	3.25	3.61

Table 4—Refrigerated display cabinet default efficiency factors

Class	Cabinet type	M-package temperature class	Baseline efficiency (kWh/day/m^2)	High efficiency threshold (kWh/day/m^2)
1	RS 1—Unlit shelves	All	9.46	8.55
2	RS 1—Lit shelves	All	11.71	11.35
3	RS 2—Unlit shelves	All	10.57	8.72
4	RS 2—Lit shelves	All	11.42	8.75
5	RS 3—Unlit shelves	All	11.24	8.62
6	RS 3—Lit shelves	All	13.95	12.28
7	RS 4—Glass door	All	5.73	4.45
8	RS 6—Gravity coil	All	8.20	7.18
9	RS 6—Fan coil	All	7.80	5.78
10	RS 7—Fan coil	All	10.91	10.91
11	RS 8—Gravity coil	All	9.19	7.32
12	RS 8—Fan coil	All	7.13	6.22

Class	Cabinet type	M-package temperature class	Baseline efficiency (kWh/day/m^2)	High efficiency threshold (kWh/day/m^2)
13	RS 9—Fan coil	All	7.50	5.51
14	RS 10—Low	All	11.39	7.62
15	RS 11	All	35.05	35.05
16	RS 12	All	N/A*	N/A*
17	RS 13—Solid sided	All	13.45	12.95
18	RS 13—Glass sided	All	8.86	5.95
19	RS14—Solid sided	All	13.41	11.57
20	RS 14—Glass sided	All	11.44	9.98
21	RS 15—Glass door	All	20.28	17.73
22	RS 16—Glass door	All	20.17	15.36
23	RS 18	All	22.67	20.11
24	RS 19	All	N/A*	N/A*
25	HC1	M1	7.23	4.85
26	HC1	M2	9.01	6.80
27	HC2	M2	8.91	6.99
28	HC3	M1	25.55	25.55
29	HC4	M1	12.18	9.39
30	HC4	M2	11.29	5.95
31	HC6	M2	28.35	23.47
32	VC1	M1	20.02	15.06
33	VC1	M2	14.99	10.43
34	VC2	M1	17.36	14.44
35	VC2	M2	12.72	3.92
36	VC4 (solid door)	M1	8.44	3.76
37	VC4 (solid door)	M2	10.14	9.73
38	VC4 (glass door)	M1	8.19	5.75
39	VC4 (glass door)	M2	9.53	7.02
40	HF4	L1	14.51	12.27
41	HF4	L2	22.85	19.25
42	HF6	L1	6.07	4.84
43	HF6	L2	5.46	4.99
44	VF4 (solid door)	L1	5.25	5.25
45	VF4 (solid door)	L2	N/A*	N/A*
46	VF4 (glass door)	L1	24.57	19.80
47	VF4 (glass door)	L2	30.91	27.37

*Based on the database extract undertaken on 3 December 2015, there were no registered products