



**REQUIREMENTS FOR REPORTING,
GREENHOUSE GAS EMISSIONS,
ENERGY CONSUMPTION and
ENERGY EFFICIENCY OPPORTUNITIES.**

**National Greenhouse and Energy Reporting Act 2007
Energy Efficiency Opportunities Act 2006**

ISECO Consulting Services Interpretation

Compliance Duties that Affect Refrigeration Energy Users

As most food processing and distribution companies are large refrigeration and energy users this legislation will have an effect on your business. To simplify these new requirements we have prepared an interpretation of the two Acts and supporting regulations. This document is intended to provide a simple overview of the current situation and what may be expected in the near future by way of compliance requirements and carbon offset costs.

1. National Greenhouse and Energy Reporting Act 2007.

- 1.1 The purpose of this act is to introduce a single national reporting framework related to greenhouse gas emissions and energy consumption.
- 1.2 The Act relates to Australian registered Controlling Corporations including their subsidiaries in total, therefore the reported emissions and energy usage rates are an aggregate of the corporation's activities.
- 1.3 The two key reporting requirements are for corporations that,
 - 1.3.1 the total amount of greenhouse gases emitted having a carbon dioxide equivalent of,
 - a. FY 2008/09 – more than 125 kilotonnes or more
 - b. FY 2009/10 – more than 87.5 kilotonnes or more
 - c. FY 2010 > – more than 50 kilotonnes or more
 - 1.3.2 the total amount of energy consumed from the operation of facilities is,
 - d. FY 2008/09 – more than 500 terajoules or more
 - e. FY 2009/10 – more than 350 terajoules or more
 - f. FY 2010 > – more than 200 terajoules or more
- 1.4 The Act also includes any single facility that emits 25kt CO₂ or more, or consumes 100TJ or more of energy.
- 1.5 This means that as time passes the emitting and energy usage reporting thresholds reduce and the number of corporations captured by the reporting regulations increase.
- 1.6 In simple terms, if your corporation does not emit any greenhouse gases directly (no refrigerant losses) and the annual power bill is around \$12M then you will fall into the FY 2008/09 requirement, Note this threshold reduces by 60% over the successive two years so those corporations with power bills of about \$5M will then be captured under this scheme.
- 1.7 An annual power bill of \$12M converted into tonnes of CO₂ equates to about 170,000 tonnes PA. This is based on a power cost of \$0.09/kwh and will vary slightly between users and from state to state.
- 1.8 The "National Greenhouse Accounts (NGA) Factors – October 2008, Table 5 (following) shows the emission factors on an area basis for purchased electricity from the grid. This factor includes the proportion of renewable (Green) energy supplied via the grid system in the respective state or territory.

State-Territory	NSW	VIC	QLD	SA	WA	TAS	NT
kg CO ₂ -e/kWh	0.89	1.22	0.91	0.84	0.87	0.12	0.69

1.9 However if the activities of your corporation also include greenhouse gas emissions for example refrigerant losses, then the CO₂ equivalent of these refrigerant losses will be entered into the equation.

1.10 As an example, if a large corporation was to have a total refrigerant leakage rate equivalent to 45 tonnes of R404a PA. The greenhouse effect of this would be equivalent to 170, 000 tonnes of CO₂ PA, this being equal to the power usage emissions.

2 Register and Obligations

2.1 The register is called the National Greenhouse and Energy Register; corporations shall apply for and be registered in accordance with the Act.

2.2 Corporations have until 31st August 2009 to register and until 31st October 2009 to submit the first (2208/09 FY) report.

2.3 The regulations state that registered corporations shall provide an annual report containing data, listing greenhouse gas emissions and energy consumption.

2.4 A Civil penalty of 2,000 penalty units, \$220,000.00 will apply to those corporations who fail to comply.

2.5 Corporations may implement greenhouse gas projects for the reduction of emissions or removal of greenhouse gases. The outcomes reported from these projects will be pro-rated and off set against the reporting thresholds.

2.6 A registered corporation must keep records of the activities of members of its groups; penalties apply to those who fail to comply.

2.7 The Act includes provision for external auditors to be appointed by the regulator to audit a registered entity's compliance.

3 National Greenhouse and Energy Reporting Regulations 2008

3.1 HFC refrigerant emissions are calculated by multiplying the refrigerant loss by the global warming potential factor (GWP) to obtain the CO₂ equivalent greenhouse gas emission. A list of these refrigerants and GWP factors is given in the National Greenhouse and Energy Reporting Regulations 2008.

3.2 It should be noted that the list in the regulations does not contain all HFC refrigerants that are in common use. The regulations are equally applicable to HFC refrigerant blends not specifically listed.

3.3 HCFC - R22 refrigerant (having a high ODP) does not fall under this category as HCFC's are to be phased out by a declining import cap by 90% before 2015 and to 99.5% by 2020, this is for HCFC's as predetermined in the Montreal Protocol.

3.4 In the reporting regulations annual default leakage rate, an emission factor has been established for HFC applications. These are listed as follows and will be applied to the system refrigerant charge if proof of actual leakage rates cannot be established or if not reported.

- Commercial air conditioning – chillers 9%
- Commercial refrigeration – supermarket systems 23%
- Industrial refrigeration including food processing and storage 16%

3.5 Example: calculation of emissions generated from the operation of a commercial air conditioning chiller containing 160kg of HFC134a with a leakage rate of 9%.

- Annual loss = .09 x 160kg = 14.4kg/HFC134a x GWP 1300 = 19 tonnes of CO₂ -e

3.6 Energy usage as reported along with refrigerant leakage will be converted and compared to determine the total facility CO₂ emissions rate.

3.7 An example of common refrigerants and their Global Warming Potential (GWP) and Ozone Depleting Potential (ODP) is shown in the following table.

3.8 Common Refrigerants Table

Item	Greenhouse Gas	GWP	ODP
1	Carbon dioxide – CO ₂	1	0
2	HFC-134a	1300	0
3	HFC-R417A	2200	0
4	HFC-404a (Blend)	3800	0
5	HCFC-R22	1700	0.055
6	Ammonia – NH ₃	0	0

4. Energy Efficiency Opportunities Act 2006

4.1 The object of this Act is to improve the identification and evaluation of energy efficiency opportunities by large energy using businesses and, as a result, to encourage implementation of cost effective energy efficiency initiatives.

4.2 In order to achieve its objectives, this Act requires large energy using businesses to:

- to undertake an assessment of their energy efficiency opportunities to a minimum standard in order to improve the way in which those opportunities are identified and evaluated: and
- to report publicly on the outcomes of that assessment in order to demonstrate to the community that those businesses are effectively managing their energy usage.

4.3 The energy use threshold is set at 0.5 petajoules, this is the same as 500 terajoules as stated in the National Greenhouse and Energy Reporting Act 2007.

4.4 As at August 2008, approximately 220 corporations had registered for the energy efficiency opportunities program.

4.5 The cost implications to be imposed under the National Greenhouse and Energy Reporting Act 2007 should provide an incentive to initiate the energy saving opportunities identified during these audits.

5. Possible Cost Implications to Your Business

5.1 The energy usage example given in 4.3 equates to a CO₂ emission rate of 170,000 tonnes per year. At this time the Government hasn't released the carbon cost rate for emissions, it is our understanding this will be linked to the CO₂ emission rate on a \$/tonne basis. In Europe the rate is around \$40/tonne however we believe the initial rate in Australia will be less but expect this will progressively increase over time to match the European price of carbon.

5.2 This table shows the annual cost based on the energy duty equivalence of CO₂ 170,000 tonnes example at various cost / tonne rates

Emission Rate PA	Cost \$/tonne CO ₂	Carbon Tax \$PA
170,000 tonnes	\$5.00	\$850,000
170,000 tonnes	\$10.00	\$1,700,000
170,000 tonnes	\$20.00	\$3,400,000
170,000 tonnes	\$30.00	\$5,100,000
170,000 tonnes	\$40.00	\$6,800,000

5.3 The refrigerants release calculation has a more dramatic effect on CO₂ emissions than the energy example provided as the GWP of refrigerants has a heightened relationship to carbon dioxide.

- 5.4 Due to this factor we believe the carbon tax will be applied to the refrigerant purchase cost and include the actual refrigerant GWP factor. On this basis the GWP of different price refrigerants would then be appropriately reflected in the actual refrigerant purchase cost on a per kg basis.
- 5.5 An example of this can be expressed as follows; choosing HFC-R404a at the current retail price of \$47.30/kg.
- 5.6 Future cost calculation $\$47.30 + (3800 \text{ GWP} \times \text{say } \$10.00/\text{tonne CO}_2 / 1000) = \$85.30/\text{kg}$
- 5.7 If the carbon tax rate is \$40/ tonne the cost of HFC-R404a would be \$199.30/kg
- 5.8 If an emission permit system is introduced; the permit cost will be derived from the refrigerant GWP factor, the leakage rate emissions factor as shown above (3.4) and the base cost of the refrigerant. We believe there will be an imposed cap on the number of permits issued and market demand for permits will set the price. On this basis, businesses will have to compete in the market to acquire the number of permits they require and surrender a permit to the Government at the end of each year for each tonne of carbon pollution produced in that year.
- 5.9 The desired outcome for society and firms is obviously to reduce emissions rather than to trade in permits. The trade off will come by assessing the permit costs as opposed to refrigeration systems modification costs to reduce emissions.
- 5.10 As stated the current timetable is that corporations have until 31st August 2009 to register and until 31st October 2009 to submit the first report. To comply with this requirement the assembly of data needs to be started now. This should include a compilation of power usage rates derived from energy accounts, preparation of a refrigeration data base to include calculated refrigerant charges, types of refrigerants in use and a review of service and maintenance records to establish the purchase and leakage rate history of refrigerants.
- 5.11 If the refrigerant leakage rate cannot be established or is not reported the default percentage rates listed in the reporting regulations will apply (refer to 3.4).
- 5.12 Given the refrigerant cost including a carbon tax will be significantly increased, the value of refrigerant contained in any existing system will increase proportionately. As an example a system that has a charge of 1000kg of R404a now valued at \$47,300.00 will increase to \$85,300.00 if a \$10.00 tax is introduced or to \$199,300.00 if a \$40.00 tax is introduced.
- 5.13 If a carbon tax is applied to the base refrigerant purchase price this will capture all plants regardless of size.
- 5.14 If the carbon tax is applied to both the base refrigerant purchase price as well as being factored into the plant leakage rate then the tax paid will be increased respectively.
- 5.15 We realise in most facilities there are many more processes and energy sources accordingly to be added to the refrigeration component to establish the true emissions rate for any facility. However the amount of energy used for refrigeration and emissions from lost refrigerants will be a significant portion of the total.

As our expertise is in refrigeration we have only attempted to cover this topic in this review.

We trust this brief overview is of value to your business, however if you feel our service can be of further assistance to you, please do not hesitate to contact the undersigned.

Yours truly,



Ray Clarke.

For further details contact ISECO Consulting Services 03-9882 7340
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