



CARBON FOOTPRINT REPORT

FOR

PROPOSED COLD STORE EXTENSION

AT

WHITBY SEAFOODS LIMITED  
FAIRFIELD WAY  
WHITBY BUSINESS PARK  
WHITBY

NYMNPA  
09 MAR 2011

## COLD STORE CARBON FOOTPRINT

Referring to Appendix 3 Energy Benchmarks p.64 of Renewable Energy Supplementary Planning Document - April 2010 and assuming Storage & Distribution warehouses factor (worst case) CO<sub>2</sub> emissions are identified as 48 kgCO<sub>2</sub>/m<sup>2</sup>/year.

As per our Planning and Economic Statement the Cold Store development is for 1260 sq.m.

Hence CO <sub>2</sub> emissions	=	48 x 1260
	=	60,480 kg CO <sub>2</sub>
	=	<u>60.48</u> tonne CO <sub>2</sub>

The above is for interest only as the true footprint is well in excess of this as we demonstrate below.

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**LOADING DOCK (Common to both schemes)**

Condensing Unit

One LH135-4H-25-2Y absorbs 19.47 kw (COP 2.18) Operating for 11 hours average/day/year

Therefore	19.47 x 11 x 365	=	78,172	kwh/yr	
From NEF, factor for CO <sub>2</sub> from kw		=	0.43		
Therefore	CO <sub>2</sub> emissions	≡	33,614 kg		*

Evaporators

Three H & C 406, one fan at 0.75kw

Therefore	0.75 x 3 x 11 x 365	=	9,033.75		
Therefore	CO <sub>2</sub> emissions	≡	3,884.5 kg		*

Evaporator Defrost 7.2 kw 4 times daily for 30 minutes

Therefore	3 x 7.2 x 4 x 0.5 x 365	=	15,768 kw		
Therefore	CO <sub>2</sub> emissions	≡	6,780 kg		*

Heater Mat - none proposed - NIL

Loading Dock Equivalent CO<sub>2</sub> emissions

$$33.6 + 3.88 + 6.78 = \underline{\underline{44.26}} \text{ tonne}$$

Converting plant to heat pump version would save evaporator defrost load.

$$\text{Saving percentage} = \frac{6.78}{44.26} \times 100 = 15.32\%$$





**COLD STORE**

**ORIGINAL**

Condensing Units

Six off LH135/6H-25-2Y absorb 16.04 kw each	=	96.24 kw
Operate for 11 hours average per day/year		
Therefore 96.24 x 11 x 365	=	386,404 kw/h/an.
From NEF factor CO <sub>2</sub> from kw	=	0.43
Therefore CO <sub>2</sub> emissions	=	166,153.7 kg *

Evaporators

Fans - Six off x 0.55 x 2 x 11 x 365	=	26,499 kwh
	=	11,394.6 kg *
Evaporators defrost (18.48 kw) 4 times daily for 45 mins		
Therefore 6 x 4 x 18.48 x 0.75 x 365	=	121,413.6 kwh
x 0.43	=	<u>52,207.85 kg *</u>
Heater Mat: 9360 ft <sup>2</sup> @ 0.75 w/ft <sup>2</sup>	=	7078.2 w
Operational 24 hours per day	=	168 kw
per year x 365	=	61,477 kwh
x 0.43	=	26,435 kg CO <sub>2</sub> *

\*  $\Sigma$  CO<sub>2</sub> emissions = 166.15 + 11.39 + 52.21 + 26.44

= **256.19 tonne**





## WHITBY SEA FOODS

### REVISED SCHEME - HEAT PUMP MODIFICATION

**CO<sub>2</sub> emissions**

Four off	6F-40.2Y compressor units @ 22.6 kw x 4 x 11 x 365 (0.43 factor)	=	362,956 kwh
		=	<u>156,071 kg</u> *
Condenser	3 fans @ 2.2 kw		
Therefore	3 x 2.2 x 11 x 365 (0.43 factor)	=	26,499 kwh
		=	<u>11,394.6 kg</u> *
Evaporators (as previous)			<u>11,394.6 kg</u> *
Evaporator Defrost (as previous)			<u>52,207.85 kg</u> *
Heater Mat Requirement - as previous (28,178 kw)			12,116.6 kg *



**Saving** is evaporator defrost + heater mat  
 = 52.21 + 12.12 = 64.33 tonne

as percentage of original  $\frac{64.33}{256.19} \times 100 = 25.11\%$

as percentage of alternative  $\frac{64.33}{257.5} \times 100 = 24.98\%$

As percentage of alternative including Loading Dock

$\frac{(64.33 + 6.78)}{(257.5 + 44.26)} \times 100 = 23.56\%$

\* \* \* \* \*

Common to both is saving of 66 tonne by vehicle reductions.