

Catering for a Sustainable Future Group

Benchmarks for Catering in Office Buildings **Using Energy Consumption Guide 19 ~ Energy use in Offices**

The facility occupies 23,240m² and is the national head office for a major international company employing 1400 staff on the site. This is a prestige air conditioned building that operates for up to 12 hours on 250 days each year and includes catering and leisure facilities.

Meals served per year

The catering facility will provide a breakfast service for 22% and a lunch time service for 56% of the staff while providing hospitality for the Clients guests. The total number of meals produced over the year is as follows:

- Breakfast 308 x 250 = 77,000
- Lunch 784 x 250 = 196,000
- Hospitality 20 x 250 = 5,000

Total number of meals 278,000 per yr.

Space allocation for catering

The catering facility comprises of private dining for 40 guests, a staff dining room, servery, and kitchen with the necessary support areas.

Total area occupied by Catering 850m²

TYPICAL:

The planned energy consumption using guide 19 is as follows:

Environmental - annual energy consumption for Catering

Annual Fossil Fuel consumption 201 Kwh/m² x 850m² = 170,850 Kwh

Annual Electricity consumption 343 Kwh/m² x 850m² = 291,550 Kwh

Total environmental energy consumption 544 Kwh/m² x 850m² = 462,400 Kwh per yr

Operational – annual energy consumption for Catering

Annual Fossil Fuel consumption 9 Kwh/m² x 23,240m² = 209,160 Kwh

Annual Electricity consumption 15 Kwh/m² x 23,240m² = 348,600 Kwh

Total operational energy consumption 24 Kwh/m² x 23,240m² = 557,760 Kwh per yr

(Benchmark 2 Kw/meal)

Using the above consumption the annual CO₂ emissions are as follows

Environmental – Fossil fuel consumption 170,850 x 0.19 = 32,461 kg CO₂/Kwh

Environmental – Electricity consumption 291,550 x 0.43 = 125,366 kg CO₂/Kwh

Operational – Fossil fuel consumption 209,160 x 0.19 = 39,740 kg CO₂/Kwh

Operational – Electricity consumption 348,600 x 0.43 = 149,898 kg CO₂/Kwh

Total annual CO₂ emissions = 347,465 kg CO₂ /Kwh (94,358 kg Carbon)

GOOD PRACTICE

The planned energy consumption using guide 19 is as follows:

Environmental - annual energy consumption for Catering (37%)
Annual Fossil Fuel consumption $107 \text{ Kwh/m}^2 \times 850\text{m}^2 = 90,950 \text{ Kwh}$
Annual Electricity consumption $221 \text{ Kwh/m}^2 \times 850\text{m}^2 = 187,850 \text{ Kwh}$
Total environmental energy consumption $328 \text{ Kwh/m}^2 \times 850\text{m}^2 = 278,800 \text{ Kwh per yr}$

Operational – annual energy consumption for Catering (63%)
Annual Fossil Fuel consumption $7 \text{ Kwh/m}^2 \times 23,240\text{m}^2 = 162,680 \text{ Kwh}$
Annual Electricity consumption $13 \text{ Kwh/m}^2 \times 23,240\text{m}^2 = 302,120 \text{ Kwh}$
Total operational energy consumption $20 \text{ Kwh/m}^2 \times 23,240\text{m}^2 = 464,800 \text{ Kwh per yr}$

(Benchmark 1.7Kw/meal)

Using the above consumption the annual CO₂ emissions are as follows

Environmental – Fossil fuel consumption	$90,950 \times 0.19 = 17,280 \text{ kg CO}_2/\text{Kwh}$
Environmental – Electricity consumption	$187,850 \times 0.43 = 80,775 \text{ kg CO}_2/\text{Kwh}$
Operational – Fossil fuel consumption	$162,680 \times 0.19 = 30,909 \text{ kg CO}_2/\text{Kwh}$
Operational – Electricity consumption	$302,120 \times 0.43 = 129,912 \text{ kg CO}_2/\text{Kwh}$

Total annual CO₂ emissions = 258,876 kg CO₂/Kwh (70,673 kg Carbon)

By using good practice to design the facility the carbon emission are reduced from 94,358 to 70,673 a saving of 23,685 kg Carbon (25%)

DESIGN PROPOSAL USING THE PROPOSED NEW CATERING GUIDE:

Energy consumption reversing the operational usage of fossil fuel & electricity as per the restaurant and military benchmarks is as follows:

Environmental - annual energy consumption for Catering
Annual Fossil Fuel consumption $107 \text{ kWh/m}^2 \times 850\text{m}^2 = 90,950 \text{ kWh}$
Annual Electricity consumption $221 \text{ kWh/m}^2 \times 850\text{m}^2 = 187,850 \text{ kWh}$
Total environmental energy consumption $328 \text{ kWh/m}^2 \times 850\text{m}^2 = 278,800 \text{ kWh per yr}$

Operational – annual energy consumption for Catering
Annual Fossil Fuel consumption $13 \text{ kWh/m}^2 \times 23,240\text{m}^2 = 302,120 \text{ kWh}$
Annual Electricity consumption $7 \text{ kWh/m}^2 \times 23,240\text{m}^2 = 162,680 \text{ kWh}$
Total operational energy consumption $20 \text{ kWh/m}^2 \times 23,240\text{m}^2 = 464,800 \text{ kWh per yr}$

(Benchmark 1.7Kw/meal)

Using the above consumption the annual CO₂ emissions are as follows

Environmental – Fossil fuel consumption	$90,950 \times 0.19 = 17,280 \text{ kg CO}_2/\text{kWh}$
Environmental – Electricity consumption	$187,850 \times 0.43 = 80,775 \text{ kg CO}_2/\text{kWh}$
Operational – Fossil fuel consumption	$302,120 \times 0.19 = 57,403 \text{ kg CO}_2/\text{kWh}$
Operational – Electricity consumption	$162,680 \times 0.43 = 69,952 \text{ kg CO}_2/\text{kWh}$

Total annual CO₂ emissions = 225,410 kg CO₂/kWh (61,537 kg Carbon)

By changing the energy mix from the typical guidelines to design the facility the carbon emission are reduced from 94,358 to 61,537 a saving of 32,821 kg Carbon (35%)

By changing the energy mix from the good practice guidelines to design the facility the carbon emission are reduced from 70,653 to 61,537 a saving of 9,116 kg Carbon (13%)

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21st November 2006

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