Green Star – Design & As Built Submission Template

Ensure all prompts shown in **Blue text** have been responded to.

Design Review / As Built Submission [Delete as appropriate]

Credit: ENE Greenhouse Gas Emissions

Project Name: [name]

Project Number: GS- [####]

Points available: **20** Points claimed: [ ]

2.3 NCC Classes 2 to 9 - Reference Building Pathway

The project is claiming [X Points] by complying with the requirements of the Reference Building Pathway.

[Summarise the projects systems and initiatives that have been included to reduce greenhouse gas emissions compared to the reference building.]

2.3.1 Analysis Software Description

Software name and version	
Software developer	
Software validation standard (evidence of developer's compliance to be provided)	
Simulator's name (include description of training and experience with software)	

Table 1: Building energy simulation analysis software reporting requirements

2.3.2 Building Description

	Proposed Building	Reference Building
Climate zone		
Weather data (location and data format)		
Number of building storeys (below ground/above ground)		
Total modelled building gross floor area (GFA) (m²)		
Heating fuel(s)		
Cooling fuel(s)		

Table 2: Building general parameters reporting requirements

2.3.3 Building Space Summary

Space Type	Building Level	Gross Floor Area (m²)		
		Conditioned	Unconditioned	Total

Table 3: Building area summary reporting requirements

Space Type	Operating Profile(s) Applied	Temperature Control Range (°C)	Occupancy Density (m²/person)	Equipment Load (W/m²)

Table 4: Building simulation input summary reporting requirements

2.4 Building Fabric Description

2.4.1 Opaque Fabric Components

Values must be reported for all wall and roof system types used in the building.

Parameter	Proposed Building	Reference Building
External above-grade envelope wall construction and R value		
External below-grade envelope wall construction and R value		
Internal envelope wall construction and R value		
Roof construction, solar absorptance and R value		
Floor construction and R value		
Cool, cold or hot room construction and R value		

Table 5: Building opaque fabric parameters reporting requirements

2.4.2 Transparent Fabric Components

Provide completed NCC Glazing Calculator for both Proposed and Reference Buildings incorporating glazing system performance values used in simulation analyses.

2.5 HVAC Services Description

2.5.1 Air Conditioning and Air Handling Systems

Project teams must provide details for each system present in the building.

Parameter	Proposed Building	Reference Building
Primary air conditioning system type		
Other air conditioning system type(s)		
Space served		
Design supply air temperature difference (K)		
Supply air temperature control		
Outside air design volume flow rate (L/s)		
Fan design supply air volume flow rate (L/s)		
Fan design absorbed power (kWe)		
Minimum flow rate turndown (%)		
Economy cycle control		
Demand-controlled ventilation		
Heat recovery type		
Heat recovery effectiveness		
Heat recovery parasitic power (kWe)		

Table 6: Air conditioning system parameters reporting requirements

Parameter	Proposed Building	Reference Building
Ventilation system type		
Fan design supply air volume (L/s)		
Fan design absorbed power (kWe)		

Table 7: Air conditioning system parameters reporting requirements

2.5.2 Unitary Plant

Project teams must provide details for each system present in the building.

Parameter	Proposed Building	Reference Building
Packaged equipment cooling performance (EER)		
Packaged equipment heating performance (COP)		

Table 8: Unitary plant parameters reporting requirements

2.5.3 Cooling and Heat Rejection Plant

Project teams must provide details for each system present in the building. Note that chiller part-load performance should be stated in terms of net part-load value (NPLV, calculated at the design operating conditions), not integrated part-load value (IPLV, calculated at the reference operating conditions).

Parameter	Proposed Building	Reference Building
Chiller type		
Chiller capacity (kWr)		
Design CHW flow temperature (°C)		
Design CHW temperature difference (K)		
Design CCW entering temperature (°C)		
Design CCW temperature difference (K)		
Chiller full-load performance (EER)		
Chiller part-load performance (NPLV)		
CHW flow temperature control		
Chiller sequencing and staging control		
System distribution losses (kW)		
Primary pump absorbed power (kWe)		
Primary pump control		
Primary pump minimum flow (if variable flow) (%)		
Secondary pump number and absorbed power (kWe)		
Secondary pump control		
CCW heat rejection type		
CCW heat rejection capacity (kW)		
Fan absorbed power (kWe)		
Leaving CCW temperature set point (°C)		
Fan speed control		

Heat rejection equipment drift loss (%)		
Heat rejection equipment cycles of concentration		

Table 9: Cooling and heat rejection plant parameters reporting requirements

2.5.4 Heating Plant

Project teams must provide details for each system present in the building.

Parameter	Proposed Building	Reference Building
Heat source type		
Heat source capacity (kWr)		
Design HHW flow temperature (°C)		
Design HHW temperature difference (K)		
Heat source full-load performance (gross efficiency)		
HHW flow temperature control		
Heat source sequencing and staging control		
System distribution losses (kW)		
System thermal inertia (kW)		
Primary pump absorbed power (kWe)		
Secondary pump absorbed power (kWe)		
Primary pump control		
Secondary pump control		

Table 10: Heating plant parameters reporting requirements

2.6 Co- and Tri-generation Systems Description

Project teams must provide details for each system present in the building. Unit output should be stated for at least three (3) operating points (e.g. 100%, 75% and 50% of rated output).

Parameter	Proposed Building
Cogeneration unit type	
Electrical output (kWe)	
Useful thermal output (kWth)	
Waste thermal output (kWth)	
Total fuel input (gross) (kW)	
Minimum turndown (%)	
Minimum import threshold (kWe)	
Installation altitude (m)	
Derating threshold temperature (°C)	
Demand control method	
Absorption chiller minimum operating load (kWr)	
Absorption chiller hydraulic configuration	
Heating or cooling priority control	
Preventative maintenance regime	

Table 11: Co- and tri-generation plant parameters reporting requirements

2.7 Lighting Description

Provide description of each space usage for both internal and external lighting. Project teams must provide details for each system present in the building.

Parameter	Proposed Building	Reference Building
Lighting type		
Design illuminance (lux)		
Nominal lighting power density (W/m²)		
Occupant sensor controls		NA
Daylight controls		NA
Other lighting controls		NA
Adjustment factor applied		NA
Modelled lighting power density (W/m²)		

Table 12: Internal lighting parameters reporting requirements

Parameter	Proposed Building	Reference Building
Lighting type		
Lighting category		
Category minimum illuminance (lux)		
Design illuminance (lux)		
Design lighting power density (W/m²)		
Modelled lighting power density (W/m²)		
Controls		

Table 13: External lighting parameters reporting requirements

2.8 Domestic Hot Water Services Description

Project teams must provide details for each system present in the building. Hot water usage profiles must be documented where the system uses either indirect heating hot water and/or solar thermal heating.

Parameter	Proposed Building	Reference Building
System description		
System heat source		
Hot water usage (L/day)		
Hot water usage profile		
System storage capacity (L)		
System heating efficiency (gross) (%)		
System distribution losses (kW)		
System design supply temperature (°C)		
System minimum storage temperature (°C)		

Table 14: Domestic hot water services parameters reporting requirements

2.9 Appliances Description

For Class 2 buildings only, provide details of the appliances provided as part of the fitout.

Parameter	Proposed Building	Reference Building
Refrigerator/freezer manufacturer and model		NA
Refrigerator/freezer energy consumption (kWh/annum)		
Dish washer manufacturer and model		NA
Dish washer energy consumption (kWh/annum)		
Clothes washer manufacturer and model		NA
Clothes washer energy consumption (kWh/annum)		
Clothes dryer manufacturer and model		NA
Clothes dryer energy consumption (kWh/annum)		

Table 15: Appliance parameters reporting requirements

2.10 Photovoltaic Analysis and System Description

Project teams must provide details for each system present in the building.

Software name and version	
Software developer	

Table 16: Photovoltaic analysis software reporting requirements

If software other than that recognised by the GBCA has been used, provide documentation demonstrating that it satisfies the compliance framework criteria.

Parameter	Proposed Building
PV technology type	
PV module manufacturer and model	
PV rated output at STC (We)	
PV DC conversion efficiency at STC at full-load	
PV DC conversion efficiency at part-load	
Total PV array area (m^2)	
Performance degradation	
PV array mounting system	
Inverter rating (kWe)	
Inverter efficiency at full-load and part-load	
System shading description	
PV array azimuth angle (°)	
PV array inclination angle (°)	
PV array losses	
PV cell temperature losses	

Table 17: Photovoltaic array parameters reporting requirements

2.11 Solar Thermal System Description

Project teams must provide details for each system present in the building.

Parameter	Proposed Building
Solar collector type	
Collector absorber area (total) (m²)	
Collector efficiency coefficients (a_1 (-), a_2 (W/m² K) and a_3 (W/m² K²))	
Collector azimuth angle (°)	
Collector inclination angle (°)	
Circulation pump absorbed power (kWe)	
Preheat storage tank volume (L)	

Table 18: Solar thermal array parameters reporting requirements

2.12 Wind Turbine Description

Project teams must provide details for each system present in the building.

Parameter	Proposed Building
Wind turbine type	
Wind turbine rated output (kWe)	
Wind turbine swept area (m²)	
Wind turbine cut in wind speed (m/s)	
Wind turbine cut out wind speed (m/s)	
Wind turbine part-load aerodynamic efficiency	
Wind speed adjustments applied	
Wind turbine spacing (if more than one)	
Method of adjustment of turbine generated output for proximity effects of other wind turbines	

Table 19: Wind turbine parameters reporting requirements

2.13 Manual Calculations

The project team shall provide a summary of all manual calculations used in the assessment of the building total energy consumption. This shall include a description of the methodology applied, comments on the limitations of the method, the data sources used in the calculation (including software outputs as applicable) and a summary of the calculation results.

2.14 Output Data

Provide software output reports documenting the energy end uses applicable to each of the building models (i.e. Reference, Intermediate and Proposed). This information shall be readily reconcilable against the inputs in the Green Star calculator. Where software output is supplemented with manual calculations, the manual calculation descriptions shall be cross referenced.

For shared utility services, the heating and cooling supplied to the building must be stated (as applicable). These, and the total electricity consumption, must be compared to the contractual agreements to demonstrate that they are within the specified limits. If no limits are specified, then demonstrate that they are within the available output based on the details of the utility and any existing buildings' demands.

2.15 Discussion

[Insert any issues you would like to highlight and clarify to the Assessment Panel.]

Author Details:

[Insert name, position and contact details of author]

[Date]

—— Report end ——