

GREENHOUSE GAS EMISSIONS

INDUSTRIAL PROJECTS

Credit 15

Points available: 15

AIM OF CREDIT

To encourage reduction of greenhouse gas (GHG) emissions associated through energy efficiency measures and to drive uptake of renewable energy.

CREDIT CRITERIA

This credit includes two alternative pathways to demonstrate reductions in building GHG emissions for Class 7b and 8 buildings and class 5 portions within the building as defined in the NCC.

15.0	Conditional Requirement	<p>For each pathway a Conditional Requirement must be met in order for the project to be eligible for Green Star – Design & As Built rating. Additional requirements must be met to receive a 5 star or 6 star rating.</p> <p>Compliance with the Conditional Requirement is to be demonstrated as outlined within each of the five pathways described in this credit.</p>
15H	GHG Emissions Reduction – Industrial Prescriptive Pathway	<p>Up to 15 points are available where the project's GHG emissions have been reduced by employing 'best practice' building attributes.</p>
15I	GHG Emissions Reduction – On-site Renewable Pathway	<p>Up to 15 points are available where project's predicted GHG emissions have been reduced towards 'net zero' and beyond by employing the use of on-site renewable energy.</p>

COMPLIANCE REQUIREMENTS

Where the National Construction Code (NCC) is referenced, the earliest applicable version is the 2019 code or any later version which is current at the time of the project's registration.

15.0 CONDITIONAL REQUIREMENT

The thresholds must be met through energy efficiency solutions, or the provision of on-site renewable energy systems. District or near-site solutions are acceptable only if they are zero carbon. Low-carbon, or off-site solutions will not count towards meeting the thresholds.

Table 15.1: Minimum Points Thresholds

Rating targeted	Minimum points' threshold
4 Star	Conditional Requirement for chosen pathway
5 Star	3
6 Star	6

|| R2.15.01

15H PRESCRIPTIVE PATHWAY

This pathway is applicable to Class 7b and 8 buildings and class 5 portions within the building as defined in the NCC.

15H.0 CONDITIONAL REQUIREMENT

Project teams must demonstrate that the minimum Deemed-to-Satisfy performance requirements stipulated within Part J1 of the NCC have been exceeded by at least 5%. Compliance with all of the other applicable DTS requirements of Section J of the NCC must be achieved by the project.

Project teams targeting a 5 rating must meet the Conditional Requirement minimum point threshold as per Table 15.1 as outlined in 15.0.

15H COMPLIANCE REQUIREMENTS

Up to 15 points can be awarded where a building exceed the minimum Section J requirements in accordance with the following requirements. Thirteen (13) points are presented for energy efficiency measures, and an additional five (5) for procuring renewable energy off-site, however a maximum of ten (10) points can be awarded.

Credit Element	Requirement
15H.1 Building Envelope	<p>1 point is awarded where the installed roofs and ceilings, floors and roof lights comply with all the following conditions:</p> <ul style="list-style-type: none"> • 10% increase on the minimum required total R-values specified for roofs and ceilings in Part J1.3, and floors in Part J1.6, including compliance with J0.4 where applicable; and • For roofs, have an upper surface solar absorptance of at least 0.05 less than the maximum allowable value in Part J1.3; and • For roof lights, achieve a total system U-value of less than or equal to 3.3 W/m².K; and • For roof lights, achieve a total system SHGC of less than or equal to 85% of the maximum allowable value in Part J1.4. <p>The criteria applies to all conditioned spaces of the building.</p>

Credit Element	Requirement
15H.2 Wall-Glazing Construction	<p>1 point is awarded where all installed wall-glazing constructions and retail display glazing comply with all the following conditions:</p> <ul style="list-style-type: none"> • Wall-glazing constructions achieve an area-weighted total system U-value, across all facades (Specification J1.5a U-Value – Method 2), at least 10% less than the maximum allowable total system U-value for wall-glazing constructions as per the requirements of Part J1.5, including compliance with Part J0.5 where applicable; and • Wall-glazing constructions have a combination of solar heat gain coefficients, across all facades (Specification J1.5a Solar admittance – Method 2), that achieve a calculated proposed representative air-conditioning energy value of not more than 90% of the calculated reference representative air-conditioning energy value as per the requirements of Part J1.5; and • Where the wall component is 80% or more of the area of the wall-glazing construction, it achieves a 10% increase on the minimum total R-value specified in Table J1.5a.
15H.3 Lighting	<p>Internal Lighting</p> <p>3 points are awarded where the internal artificial lighting complies with the following conditions:</p> <ul style="list-style-type: none"> • The average installed aggregate illumination power is not more than 80% of the maximum illumination power based on the maximum allowable lighting power densities defined in Table J6.2a; R3.15.08 and • Automated lighting control systems, such as occupant detection and daylight adjustment, are provided to 95% of the gross lettable warehouse area. • For Class 5 components only, the size of individually switched lighting zones does not exceed 150 m² for 95% of the office area. <p>External Lighting</p> <p>1 point is awarded where the external artificial lighting for external loading docks complies with the following conditions</p> <ul style="list-style-type: none"> • All external lighting must be weatherproof, impact resistant and meet the control requirements of Part J6.5, b and comply with the Light Pollution Credit (27). • All lighting to external loading docks with awnings must be a maximum 4W/m² illumination power density.

Credit Element	Requirement
<p>15H.4 Ventilation and Air Conditioning</p>	<p>1 point is awarded where all installed HVAC equipment complies with the following conditions:</p> <ul style="list-style-type: none"> • Each installed fan must achieve a fan motor input power per unit of flow rate 15% lower than the reference fan motor input power per unit flow rate calculated from the deemed-to-satisfy requirements of Part J5.4 (b), (c), (d) and (e); and • Each installed pump must achieve a pump motor input power per unit of flow rate 10% lower than the reference pump motor input power per unit flow rate calculated from the deemed-to-satisfy requirements of Part J5.7 (b), (c) and (d); and • The thermal efficiency of all installed gas water heaters is at least 4 percentage points more than the minimum value required by Part J5.9(d); and • The minimum energy efficiency ratio (EER) (cooling) for all unitary air conditioning equipment is at least 5% higher than the required minimum EER (cooling) as per Part J5.11; and • The minimum energy efficiency ratio (EER) and integrated part-load value (IPLV) for all refrigerant chillers are at least 15% higher than the minimum values specified in Table J5.10a/b for the relevant chiller type and capacity. <p>Naturally ventilated spaces (including naturally ventilated mode of mixed-mode systems and primary unconditioned warehouse space), must also comply with the requirements of 'Provision of Outdoor Air' criterion (9.2C).</p> <p>Where HVAC is only provided to office component of the building,</p> <ul style="list-style-type: none"> • The minimum Energy Rating Labelling for unitary air-conditioning equipment must be at least 4-star as per AS/NZS 3823.2:2013; and • The rated cooling or heating capacity of the unit does not exceed the design cooling or heating load, whichever is greater, by more than 15%. <p>Where gas water boilers are not present, the requirements are considered 'not applicable.'</p>
<p>15H.5 Domestic Hot Water</p>	<p>1 point is awarded where domestic hot water systems are powered by one of the following heat sources:</p> <ul style="list-style-type: none"> • Renewable Energy; • Electric heat pump (minimum COP 3.5 under design conditions); • Electric boilers with solar PV installed on site; or • Waste heat or heat recovered from another process.

Credit Element	Requirement
15H.6 Transition Plan	<p>1 point is awarded where project teams reduce their fossil fuel use and develop a transition plan to phase them out. The following conditions apply;</p> <ul style="list-style-type: none"> • A transition plan has been developed showing how the building will transition away from the use of fossil fuels by 2030; • The commitment to this transition by 2030 is public; and • It is demonstrated the transition plan has been integrated into the design and operation of the building, including considerations within to accommodate any replacements or changes required for delivery of new services during the operational phase. <p>Refer to the Guidance section of this credit for further information on the requirements of the transition plan and its interaction with other credits within the Submission Guidelines.</p>
15H.7 Fuel Switching	<p>1 point is awarded where no fossil fuels are burned on site to generate electricity, heating, or cooling; and either:</p> <ul style="list-style-type: none"> • at least 15% of energy required by the building annually is generated by on site renewable solutions; or • two points have been achieved from 15I.1 – 15I.5 <p>Where a minor amount of fossil fuel (less than 1% of total energy consumption) is used on site for purposes where it can be demonstrated that there are no commercially viable alternatives available (e.g. cooking or emergency generators), Renewable Energy Certificates equal to these emissions for the period of ten years following practical completion must be purchased and retired upfront, or through a contractual agreement with the utility. The RECs purchased must be recognised as directly supporting renewable energy generation in Australia. Refer to the <i>Renewables and Offsets in Green Star Guide</i> for more details.</p>
15H.8 On-site Storage	<p>2 points are awarded where the on-site energy storage complies with the following conditions:</p> <ul style="list-style-type: none"> • A renewable energy storage procurement and use strategy has been developed and demonstrates that the storage is sized to match the requirements of the building and that value will be provided to the project; • The stored renewable energy is used to reduce the peak electricity demand; and • A project installs and uses electricity storage such that on-site or off-site renewable energy not instantaneously used by the building is able to be stored and used by the building at a later time <p>Refer Guidance section of this credit for information on calculating building energy use.</p>

Credit Element	Requirement
15H.9 Provision of structure for PV	<p>1 point is awarded where a building's structure has been designed with:</p> <ul style="list-style-type: none"> • Appropriate support for future installation of PV panels; • Clear and easily accessible roof space; and • Supporting infrastructure such as meters, inverters and schematic design for batteries; <p>to accommodate the future installation of solar PV for at least 50% of the viable roof space.</p> <p>For the purpose of this credit, the viable roof space is defined as that which is not used for roof lights, mechanical plant or other essential services.</p> <p>Projects with a viable roof space of less than 20% of the total roof space cannot target this point.</p>
15H.10 Off-site Renewables	<p><u>Projects which have committed to procure Off-site Renewable electricity</u> are rewarded additional points for supporting grid-connected renewable energy supply infrastructure.</p> <ul style="list-style-type: none"> • 2 points are awarded where at least three points in this pathway have been achieved, and a supply contract is in place to procure at least 50% of the building's electricity consumption through Off-site Renewable electricity solutions. • 5 points are awarded where at least five points in this pathway have been achieved, and a supply contract is in place to procure 100% of the building's electricity consumption through Off-site Renewable electricity solutions. <p>The length of time of the commitment is for a minimum period of ten years immediately after Practical Completion. R1.15.02 Points awarded under this credit element cannot count towards meeting the Conditional Requirement for 5 and 6 star ratings. R2.15.01</p> <p>Refer to the <i>Fact Sheet: Renewables and Offsets in Green Star</i> for additional details on acceptable Off-site renewable electricity procurement.</p>

Points are calculated using the *Green Star – Design & As Built: Greenhouse Gas Emissions Calculator*.

R-values and U-values (building fabric and glazing)

R-values and U-values for building fabric and glazing must be for the full façade or glazing panel and take into account thermal bridging. U-values for glazing must be for the full glazing system, including framing, determined in accordance with Australian Fenestration Rating Council methods. Centre panel/pane values are not acceptable.

Solar heat gain/solar shading coefficients (glazing)

Solar heat gain and solar shading coefficients must be for the full glazing system, including framing, determined in accordance with Australian Fenestration Rating Council methods. Centre pane values are not acceptable.

15I ON-SITE RENEWABLES PATHWAY

This pathway is applicable to unconditioned Class 7b and 8 buildings with conditioned class 5 portions within the building, as defined in the NCC.

All systems serving the Class 5 space must be electrified.

This pathway is not available for use where either:

- The Class 5 component of building is greater than either 20% of the gross lettable area; or
- The Class 5 area exceeds 1000m².

15I.0 CONDITIONAL REQUIREMENT

Project teams must demonstrate that the minimum Deemed-to-Satisfy performance requirements stipulated within Part J1 of the NCC, and lighting must exceed by at least 10%. Compliance with all other applicable DTS requirements of Section J of the NCC must be achieved by the project.

Project teams targeting a 5 or 6 star rating must meet the Conditional Requirement minimum point threshold as per Table 15.1 as outlined in 15.0.

15I.1 ON-SITE RENEWABLE ENERGY

Up to **15 points** are available under this pathway. Points are awarded on a continuous scale, on the calculated reduction in the building's total energy demand kWh/m² per annum through the quantity of on-site renewables generated.

The Building Energy Demand is the annual kWh used and established by the *Green Star – Design & As Built: Greenhouse Gas Emissions Calculator* and based on:

- The lighting demand of the internal warehouse space and external loading dock with awnings, calculated as kWh per annum; and
- The energy demand of the office space based on an energy density of 110 kWh/m² per annum.

Points are calculated using the *Green Star – Design & As Built: Greenhouse Gas Emissions Calculator*. Final rounding to a whole number occurs in the Green Star total score calculation.

Credit Element	Supply	Points Awarded
On-site Renewable energy generation (based on Building Energy Demand)	50%	3.75
	100%	7.5
	150%	11.25
	200%	15

DOCUMENTATION REQUIREMENTS

Please refer to the 'How Documentation is Described in the Submission Guidelines' section within the *Introduction* for further guidance on Documentation Requirements for project submissions.

Design Review submissions are optional.

Project teams must submit documentation supporting credit compliance. A list of recommended supporting evidence is provided in the following section, which can be used to demonstrate compliance. Alternate documentation to that listed below can also be used by project teams to demonstrate compliance.

The key requirement is that evidence is provided to support each claim made within the Submission Template.

SUBMISSION CONTENT

Project teams must submit the following documentation:

- **Submission Template** (for the selected compliance pathway)
- Completed *Green Star – Design & As Built: GHG Emissions Calculator*

Recommended Supporting Evidence

15H Industrial Prescriptive Pathway

- **Documentation** showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*.
- **Documentation** showing the performance of applicable components (building envelope, wall-glazing constructions and display glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements, including but not limited to:
 - Window Energy Rating Scheme (WERS) certificates; and
 - Calculations of wall, roof and floor R-values.
- **Drawing(s)** identifying the control zone sizes and the luminaire switch and control sensor locations.
- **Extract(s) from the Commissioning Report** demonstrating (through supporting evidence) that the lighting system has been commissioned and operates as intended by the design.
- **Power Purchase Agreement (PPA)** identifying the duration of the power supply contract, supply availability (including proportion of off-site renewable electricity) and guaranteed GHG emission factor. ||R1.15.02
- **Transition plan**
 - **Transition plan** demonstrating how the building will transition away from the use of fossil fuels by 2030;
 - **Documentation** outlining public commitment and leadership endorsement
 - **Evidence of credits** that support Australian Renewable Energy (eg RECs) have been purchased and retired equal to the predicted greenhouse gas emissions from on-site fossil fuel for three years.

- **Fuel Switching**
 - **Confirmation** that no fossil fuels are used on site.
 - **Justification** for any fossil fuel use that is required to be used on site and evidence of credits purchased and retired to match these emissions for three years.
 - **Evidence of credits** that support Australian Renewable Energy (eg RECs) have been purchased and retired equal to the predicted greenhouse gas emissions from on-site fossil fuel for three years.
- **On-site Storage**
 - **Evidence of the strategy** being updated to As Built requirements and communicated to Building operations
 - **Schedule** identifying all on-site storage systems installed in the building, and the manufacturer and model of each.
 - **Extract(s) from the commissioning report** demonstrating (through supporting evidence) that the on-site storage systems have been commissioned and operates as intended by the design.

15I On-Site Renewable Pathway

- **Documentation** showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*.
- **Documentation** showing the performance of applicable components (building envelope, wall-glazing constructions and display glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements, including but not limited to:
 - Window Energy Rating Scheme (WERS) certificates; and
 - Calculations of wall, roof and floor R-values.
- **Lighting**
 - **Schedule** showing the actual lighting power density of each area being rated and the applicable NCC minimum requirement.
 - **Extract(s) from the commissioning report** demonstrating (through supporting evidence) that the lighting system has been commissioned and operates as intended by the design.
- **Renewable Energy System**
- **Supporting documentation**
 - Specification extracts containing information and data used to produce the modelled annual energy generation of the system
- Extract(s) from the Commissioning Report demonstrating (through supporting evidence) that the renewable energy system has been commissioned and operates as intended by the system