Advancing Net Zero Snapshot: France

Context

France is aiming to reduce greenhouse gas emissions in the buildings sector by 87% by 2050, compared to 1990 levels. It has also set a goal for 32% of final energy consumption coming from renewables by 2030. L'Alliance HQE-GBC has been collaborating with the government to develop a methodology and building label called E+C- to encourage and recognise energy positive and low-carbon buildings, to forecast the future environmental regulation for new buildings.

Pathway: Certification

Launch date: November 2016

Certification can be achieved independently or through the established HQE certification program.

E+C- (Bâtiment à Énergie Positive & Réduction Carbone) is currently voluntary and available for new residential and commercial buildings.

Tools for awareness and professional learning have been developed to support delivery.

Performance requirements for Energy levels shown here:

	Minimum energy reduction	Renewable energy
Energy 1	Residential 5%, Commercial 15%	No specific requirement
Energy 2	Residential 10% Commercial 30%	No specific requirement
Energy 3	Residential 20% Commercial 40%	Residential 20kWh/m² Commercial 40kWh/m²
Energy 4	No specific requirement	>100% energy demand

Certification E+C-

7 Certified*

130 Registered*

*as of November 2017

GBC Definition

A net zero carbon building is a cost effective positive energy building (E+) with low GHG emissions on life cycle approach included embodied carbon (C-)

1. Measure and Disclose Carbon

New buildings aiming for certification must undertake a full lifecycle carbon analysis (LCA), with two levels of performance recognised: "Carbon 1" and "Carbon 2"

E+C- certified buildings are expected to achieve target levels of performance, and may choose to undertake HQE In Operation certification to verify

2. Reduce Energy Demand

Buildings must achieve prescribed minimum energy reductions and onsite renewable energy generation respective to "Energy 1-4" levels

For all levels, building performance must be better than TR 2012 (thermal regulations) as demonstrated with Bbio* modelling, and energy demand is <50 kwh/m²/yr for all regulated energy uses

3. Generate Balance from Renewables

Renewable energy must be generated onsite as shown to achieve respective "Energy 1-4" levels

Offsite renewable energy may be used to reduce carbon impacts associated with lifecycle analysis (LCA), as required for "Carbon 1" and "Carbon 2"

4. Improve Verification and Rigour

Certification is based on LCA covering manufacture of construction materials and construction phase processes, in addition to building water and energy consumption, in accordance with EN15978**

Methodology and Verification

- Carbon level is determined by LCA based on INIES database (Environmental Product Declaration and Environmental Services data)
- Energy level determined by BEPOS rating^, calculated using approved software tools

Additional Information

- *Bbio: A tool to encourage bioclimatism and high energy performance building envelope
- **EN15978: Sustainability of construction works, environmental performance of buildings
- ^BEPOS rating: a new indicator referring to the energy consumed by all uses associated with the building, after accounting for renewable energy production
- An economic valuation is required for the impact of technical choices made in order to attain various performance levels
- A database of project information, including levels achieved, is contributing towards establishing future benchmarks

Find out more

- Bâtiment à Énergie Positive & Réduction Carbone
- WorldGBC's global Advancing Net Zero project

Advancing Net Zero

WorldGBC's global project to accelerate uptake of net zero carbon buildings to 100% by 2050. These snapshots outline specific GBC action, and how it relates to the project framework, including the four key principles shown left.

Advancing Net Zero Snapshot: South Africa

GREEN BUILDING COUNCIL SOUTH AFRICA

WORLD GREEN BUILDING COUNCIL

Context

South Africa's National Development Plan Vision 2030 details the plan to *"Progressively strengthen the energy efficiency criteria set out in the South African National Standard 204 to achieve a zero carbon building standard by 2030."* Green Building Council South Africa's (GBCSA) Net Zero/Net Positive certification program will accelerate complete market transformation towards this end goal. The scheme awards projects that have taken the initiative to completely neutralising or positively redressing their impacts.

Pathway: Certification

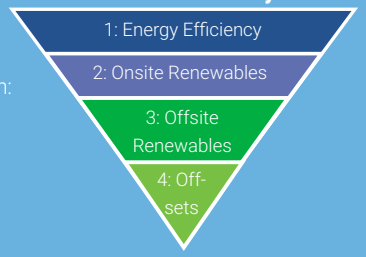
Launch date: October 2017

The GBCSA Net Zero/Net Positive certification program is available for new buildings, fit out projects and existing buildings in operation.

Projects are able to achieve Net Zero/Net Positive Ratings in carbon, water, waste and/or ecology.

Compliance is demonstrated by following the preferred Pathways shown:

Preferred Pathways



Pilot Projects

6 Certified*

4 Registered*

**as of March 2018*

GBC Definition

A building that is highly energy efficient, and the remaining energy use is from renewable energy, preferably onsite but also offsite where absolutely necessary, so that there are zero net carbon emissions on an annual basis (Net Zero Carbon), or more renewable energy is produced than what is used on site (Net Positive Carbon)

1. Measure and Disclose Carbon

New Buildings and major refurbishments may achieve certification based on modelled calculations.

Existing Buildings achieve certification based on annual consumption data.

Re-certification every three years

2. Reduce Energy Demand

A minimum 80% energy demand reduction over code requirements must be achieved through energy efficiency (Pathway 1) and onsite renewables (Pathway 2)

OR projects meet 75% of the Onsite Energy Checklist*

3. Generate Balance From Renewables

Offsite renewables (Pathway 3) and offsets (Pathway 4) are "open" only when above requirements are met

Offsets: Permissable through verified African projects only

4. Improve verification and rigour

Other impacts: Scope already goes beyond carbon, with labels recognising net zero and positive water, waste & ecological impacts

Further levels of the net zero program will be introduced in future, targeting life cycle analysis of materials

Methodology and Verification

- Projects can apply for Net Zero/Net Positive certification as a part of a Green Star, EDGE (Excellence in Design for Greater Efficiencies) or EWP (Energy Water Performance) project **OR** as a stand-alone submission
- Report demonstrating compliance with criteria by detailing methodology and calculations, and proof of purchase for offsite or offset contributions for the three year certification period

Additional Information

- Certification available for **Base Building Emissions** (new build/major refurbishment only, regulated emissions from fixed building services) and/or **Occupant Emissions** (all buildings, regulated and unregulated emissions, i.e. appliances and equipment)
- *Onsite Energy Checklist: A list of building level measures to ensure sufficient consideration is taken to reduce energy demand before pursuing offsite renewables

Find out more

- GBCSA Net Zero/Net Positive Certification
- WorldGBC's Advancing Net Zero global project

Advancing Net Zero

WorldGBC's global project to accelerate uptake of net zero carbon buildings to 100% by 2050. These snapshots outline specific GBC action, and how it relates to the project framework, including the four key principles shown left.

Advancing Net Zero Snapshot: Australia

green building council australia

WORLD GREEN BUILDING COUNCIL

Context

Australia has set a goal of reducing emissions 26-28% on 2005 levels by 2030. To achieve this goal, the federal government, with the assistance of the Green Building Council Australia (GBCA) and others, expanded their National Carbon Offset Standard (NCOS) to include buildings and precincts in operation. GBCA's Green Star - Performance, along with ultra high-performance Innovation Challenges*, assists developments towards carbon neutrality and is recognised as certification against this standard. Additionally, GBCA's Carbon Positive Roadmap outlines steps to ensure all Green Star certified new buildings or building in operations emit no carbon emissions by 2030.

Pathway: Certification

Launch date: October 2017

GBCA's Green Star - Performance is a holistic rating tool for building operations, with over 14.5 million m^2 of commercial, retail and industrial space certified. It assesses the operational performance of buildings across nine impact categories: Management, Indoor Environment Quality, Energy, Transport, Water, Materials, Land Use & Ecology.

Green Star's new Carbon Positive Innovation Challenges* aim to provide a best practice pathway to eliminating all major emissions sources from new and existing buildings - not just energy related. The credits promote using 100% renewable energy, reducing and offsetting embodied carbon, and reducing and offsetting other emissions, including water consumption, waste in operations, refrigerant leakage, and (in the future) transport emissions.

GBC Definition

Carbon neutral means reducing emissions where possible and compensating for the remainder by investing in carbon offset projects to achieve zero carbon emissions annually

1. Measure and Disclose Carbon

Certification is based on on annual consumption data. Performance is verified annually using the National Greenhouse Accounts (NGA) Factors and is made publicly available

2. Reduce Energy Demand

Building must be 30% more energy efficient than a typical building of the same kind, measured by comparing the building's actual energy consumption against commercial energy baselines as defined by the Australian Government in 2012

3. Generate Balance From Renewables

Onsite & offsite: Encouraged in the 'Powered by Renewables' Innovation Challenge* in Green Star, and permitted to account for emissions from the consumption of purchased electricity or other sources of energy

Offset: Any remaining emissions, such as from water consumption, waste, refrigerants, and gas use (but not electricity) must be compensated each year through cancelling (also known as retiring) an equivalent number of eligible offset units

4. Improve Verification and Rigour

Scope includes emissions from energy generation, consumption, refrigerants, waste to landfill, and water consumption

Embodied carbon: 'Responsible carbon impacts' Innovation Challenge* encourages reduced or zero embodied carbon emissions

Methodology and Verification

- Certification under the National Carbon Offset Standard for Buildings can be achieved through GBCA's Green Star - Performance **OR** New South Wales Office of Environment and Heritage's NABERS (National Australian Built Environment Rating System) energy program for existing buildings

Additional Information

- * Innovation Challenges: Additional credits recognising innovative solutions across a range of impact areas
- Certification available for **Base Building Emissions** (regulated emissions from fixed building services) and/or **Whole Building Emissions** (regulated and unregulated emissions, i.e. appliances & equipment)
- Both GBCA and NABERS assisted in the development of the National Carbon Offset Standard for Buildings, owned by the Australian Government's Department of Environment and Energy

Find out more

- GBCA Green Star - Performance
- National Carbon Offset Standard for Buildings
- WorldGBC's Advancing Net Zero global project

Advancing Net Zero

WorldGBC's global project to accelerate uptake of net zero carbon buildings to 100% by 2050. These snapshots outline specific GBC action, and how it relates to the project framework, including the four key principles shown left.

Advancing Net Zero Snapshot: Brazil

Context

The Brazilian government is driving action on climate change through the INDCs (Intended Nationally Determined Contributions): Government Programs and Policies; and has committed to reduce greenhouse gas emissions 37% below 2005 levels by 2025, and 43% by 2030. The creation of the new Zero Energy Standard by GBC Brasil supports the delivery of the country's climate change goals through promoting the construction, renovation and operations of low carbon buildings and renewable energy generation.

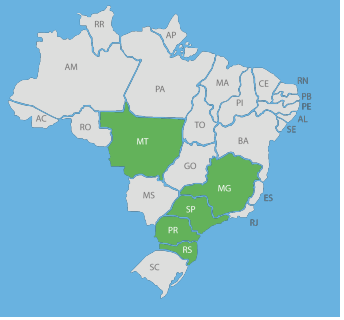
Pathway: Certification

Launch date: August 2017

The Standard is designed to complement existing certification schemes, such as LEED, BREEAM and local rating tools.

GBC Brasil's Net Zero Energy Precertification is an optional pathway available to those presenting strategies committed to reach annual onsite net zero energy consumption through high energy efficiency and renewable energy generation, demonstrated via modelling.

Certified and registered projects are located across five states as shown here:



Pilot Projects

2 Certified*

10 Registered*

*as of March 2018

GBC Definition

A building which demonstrates that the site energy consumption on an annual basis is zero due to a combination of high energy efficiency and energy generation by renewable sources

1. Measure and Disclose Carbon

Demonstrate a net zero energy balance over a period of at least one year

Verification of net zero energy balance undetaken annually

Full re-submission required after five years

2. Reduce Energy Demand

Where all energy use generated onsite, no specific energy efficiency requirements

Where offsite renewable energy procured, minimum energy efficiency requirements based on improvements over ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) dependent on certification route such as LEED, CASA etc or local code levels

3. Generate Balance from Renewables

Purchase of Renewable Energy Certificates (RECs) through Power Purchase Agreements (PPAs) are limited to 10% total annual energy consumption of commercial buildings, unless being used to offset emissions from onsite fossil fuel sources

No limitation for purchase of RECs for residential buildings

4. Improve Verification and Rigour

Future revision to include embodied carbon

Methodology and Verification

- The GBC Brasil Zero Energy Standard can be applied to new construction projects, fit out projects and existing buildings in operation
- In order to maintain certification, the building must record total annual consumption and energy generation data, and submit to GBC Brazil annually, along with monthly energy bills and renewable energy supply contracts, to validate the results and prove an annual net zero balance

Additional Information

- Condominium certification: Only available where all buildings and common areas achieve Zero Energy Standard
- Criteria for the Zero Energy Standard, as developed by technical committee, provides options to demonstrate compliance for each element based on particular scenarios, to provide flexibility and encourage participation

Find out more

- GBC Brasil Zero Energy Standard
- WorldGBC's Advancing Net Zero global project

Advancing Net Zero

WorldGBC's global project to accelerate uptake of net zero carbon buildings to 100% by 2050. These snapshots outline specific GBC action, and how it relates to the project framework, including the four key principles shown left.

Advancing Net Zero Snapshot: Canada

Context

Canada Green Building Council's Zero Carbon Building Initiative was created to help achieve Canada's goal of 30% greenhouse gas emissions reductions by 2030, by championing low-carbon commercial, institutional and high-rise reisdential buildings. Since Canada's energy grid and climate vary considerably, the Zero Carbon Building (ZCB) standard reinforces the importance of energy efficiency while also driving careful choices about the types of energy used and encouraging more renewable energy generation both on the building site and offsite.

Pathway: Certification

Launch date: May 2017

New standard, can be achieved in conjunction with LEED or in isolation.

Developed as a result of extensive industry consultation, the standard also has a pilot program of 16 buildings spanning across Canada, from a mixture of typologies, new-build and existing, to evaluate the application of the standard in practice.

New Thermal Energy Demand Intensity (TEDI*) metric introduced, with targets for ZCB-Design certification shown below by climate zone, which results in greater resilience and occupant comfort, and ensures that building designers focus on minimizing a building's demand for energy prior to producing or procuring renewable energy.

Pilot Projects

16

Registered*

*as of March 2018

TEDI targets for ZCB-Design certification

Climate Zone	TEDI target (kWh/m2/year)
4	30
5	32
6	34
7	36
8	40

GBC Definition

A zero carbon building is highly energy efficient and produces onsite, or procures, carbon-free renewable energy in an amount sufficient to offset the annual carbon emissions associated with operations

1. Measure and Disclose Carbon

Projects must verify an annual zero carbon emissions balance

ZCB-Performance certification for existing buildings is awarded based on a twelve month period of operations

2. Reduce Energy Demand

There is no minimum energy efficiency standard however new buildings aiming for ZCB-Design certification must achieve TEDI* targets based on climate zone

Report Energy Use Intensity (EUI**)

Report Peak Demand

3. Generate Balance from Renewables

Onsite: At least 5% for ZCB-Design certification only

Offsite: Allowed, with specific eligibility requirements

Procured via Renewable Energy Certificates (RECs) or bundled green power products (green power purchased together with associated RECs)

4. Improve Verification and Rigour

Embodied carbon: All projects must report the embodied emissions of the building's structural and envelope materials using life-cycle assessment (LCA) software

Methodology and Verification

- Location based methodology within the Greenhouse Gas Protocol Corporate Standard, with average regional emissions intensities for natural gas and grid electricity
- Annually generate or procure enough zero-emissions renewable energy to offset 100% of the emissions associated with the building's total annual site energy consumption

Additional Information

- * TEDI = the amount of heating energy delivered to the project that is outputted from any and all types of heating equipment, divided by gross floor area (kwh/m^2/year)
- ** EUI = the sum of all energy consumed on site (e.g., electricity, natural gas, district heat), including all process energy, divided by the building gross floor area (kWh/m^2/year)
- Zero Carbon Transition Plan: Projects relying on onsite combustion of fuels other than zero emissions biofuels must demonstrate how the building will decarbonise in the future, to be updated every 5 years

Find out more

- CaGBC Zero Carbon Building Program
- WorldGBC's Advancing Net Zero global project

Advancing Net Zero

WorldGBC's global project to accelerate uptake of net zero carbon buildings to 100% by 2050. These snapshots outline specific GBC action, and how it relates to the project framework, including the four key principles shown left.