

# LOTUS Buildings in Operation V1

Summary of changes from Pilot Version

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## 1. Introduction

LOTUS BIO V1 is the latest version of LOTUS Buildings in Operation (LOTUS BIO) superseding LOTUS BIO Pilot Version which was released in July 2013.

This document aims to highlight all the changes that have been brought from LOTUS BIO Pilot to LOTUS BIO V1.

In general, LOTUS BIO V1 has been developed with the idea to better reward the improvements made by projects and the good operational management practices.

The main changes brought in LOTUS BIO V1 include:

- the introduction of the Platinum Certification level (in line with all the other LOTUS rating systems)
- the introduction of a Certification renewal stage for projects to maintain their LOTUS Certification every 5 years
- the introduction of a new category named Sustainable Purchasing including 2 credits: Low-carbon purchasing and Healthy purchasing.
- the removal of the H-PR-3 Hazardous Substances prerequisite and the addition of a new prerequisite: Facility Audit
- the addition of 2 new credits: Green Cleaning and Public Awareness Campaign
- the removal of few credits: W-2 Water Use Intensity, H-3 Hazardous Substances, CY-1 Public Space and CY-2 Local Jobs.
- the introduction of new strategies in some credits to offer more compliant paths to projects
- the readjustment of some credit requirements (a number of requirements in LOTUS BIO Pilot were equivalent or very close to the requirements in LOTUS NR whereas it is a lot more challenging for an existing building to be compliant)
- the correction of a few mistakes

## 2. General changes


The table below highlights the general changes from LOTUS BIO Pilot to LOTUS BIO V1.


Section	Description of the changes
LOTUS Eligibility	<ul style="list-style-type: none"> <li>▪ Eligibility rule 2 - Multi-tenant Buildings is now removed. Details on how multi-tenant buildings should apply LOTUS BIO are provided in section LOTUS BIO for Multi-tenant Buildings.</li> <li>▪ Eligibility rule 4 - Building Age has been modified. To be eligible, a building must have already been fully operational for a minimum of 2 years at the time of Certification and not at the time of Registration.</li> </ul>
LOTUS BIO Categories	<ul style="list-style-type: none"> <li>▪ A new Category: Sustainable Purchasing, has been introduced to encourage the use of greener, healthier, and more sustainable products.</li> </ul>
LOTUS BIO Prerequisites	<ul style="list-style-type: none"> <li>▪ The number of prerequisites has been reduced to 8.</li> </ul>
LOTUS BIO Credits	<ul style="list-style-type: none"> <li>▪ Some LOTUS credits now have requirements encompassing different options or different strategies: A project can only select one of the proposed options to comply with a credit but it can implement any of the proposed strategies and cumulate points for the credit (while being restricted by the maximum number of points available for the credit).</li> </ul>
LOTUS Certification Levels	<ul style="list-style-type: none"> <li>▪ LOTUS BIO V1, in line with the other LOTUS rating systems, introduces a new certification level to recognize more effectively the higher performance reached by some projects. Following the LOTUS Certified, Silver and Gold levels, a LOTUS Platinum certificate is available for LOTUS projects.</li> </ul>
LOTUS BIO for Multi-tenant Buildings	<ul style="list-style-type: none"> <li>▪ Specific information for multi-tenant buildings is provided in this section.</li> <li>▪ For credits and prerequisites involving tenants, the project should involve a minimum of 90% of the occupied GFA in order to be considered compliant</li> </ul>
LOTUS BIO Certification Process	<ul style="list-style-type: none"> <li>▪ At the end of the validity of the LOTUS BIO Full Certification, projects can maintain their certifications by following a Certification Renewal stage.</li> </ul>
Performance Period	<ul style="list-style-type: none"> <li>▪ 2 different Performance Periods are now defined: <ul style="list-style-type: none"> <li>- the Initial Performance Period used to assess the performance of the building at the Full Certification stage</li> <li>- the Renewal Performance Period used to assess the performance of the building at the Certification Renewal stage</li> </ul> </li> </ul>
LOTUS Provisional Certification	<ul style="list-style-type: none"> <li>▪ The LOTUS Provisional Certification stage is optional and no more certification levels will be awarded at this stage.</li> </ul>
LOTUS Submissions	<ul style="list-style-type: none"> <li>▪ 4 types of submissions are now described: <ul style="list-style-type: none"> <li>- Provisional Certification Submissions</li> <li>- Full Certification Submissions</li> <li>- Operational stage Submissions</li> <li>- Certification Renewal Submissions</li> </ul> </li> </ul>

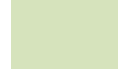
### 3. Changes in the Categories

The tables below highlights all the changes on credits and prerequisites.

Color code legend:

 Prerequisite or Credit removed from LOTUS BIO Pilot

 New credit, result of the merging of former credits

 New credit, created for LOTUS BIO V1

Energy		
BIO Pilot	BIO V1	Description of the changes
E-PR-1 Energy Audit	E-PR-1 Energy Audit	<ul style="list-style-type: none"> <li>The energy auditor conducting the audit should be qualified with either a certificate of energy auditor or at least 2 years of experience in energy auditing.</li> </ul>
E-1 Energy Audit (1 point)	E-1 Energy Audit (2 points)	<ul style="list-style-type: none"> <li>An additional step has been included. Projects performing a detailed investment-grade energy audit of the building can now earn 2 points in the credit.</li> </ul>
E-2 Energy Use Intensity (15 points)	E-2 Energy Use Intensity (15 points)	<ul style="list-style-type: none"> <li>The credit is split in 2 strategies: Strategy A: Benchmarking and Strategy B: Self-improvement.</li> <li>In Strategy A, the increment between points has been reduced from 2.5% to 1.5% of energy use intensity reduction compared to the benchmark.</li> <li>In Strategy A, an alternative method to set benchmark energy use intensity is added: peer group of comparable buildings</li> <li>In Strategy B, points will be allocated depending on how the building energy use intensity compares to the benchmark set in Strategy A. In BIO Pilot, points were awarded every 5% of energy use intensity reduction. In BIO V1, the percentage of energy use intensity reduction required to earn a point ranges from 1% to 3%.</li> </ul>
E-3 Natural Ventilation (2 points)	E-3 Natural Ventilation and Air-conditioning (5 points)	<ul style="list-style-type: none"> <li>New credit result of the merging of previous Natural Ventilation and HVAC credits.</li> <li>4 strategies are included : Strategy A: Natural Ventilation and Strategy B: COP of air-conditioning system, Strategy C: Variable controls and Strategy D: Optimization of HVAC systems</li> <li>Strategy D aims to reward the efforts to optimize the efficiency existing systems through proper operations and maintenance.</li> </ul>
E-4 HVAC (4 points)		

E-5 Artificial Lighting (2 points)	E-4 Artificial Lighting (4 points)	<ul style="list-style-type: none"> <li>▪ Credit now offers 4 points through 3 strategies: Strategy A: Reduction of Light Power Density, Strategy B: Space lighting controls and Strategy C: Daylighting lighting controls</li> <li>▪ In Strategy A, maximum LPD values have been updated in line with QCVN 09:2013/BXD and now use building type instead of space type.</li> <li>▪ Also, in Strategy A, one additional threshold for LPD reduction have been added and the method to calculate LPD has been modified to include the influence of ballasts.</li> </ul>
E-6 Hot Water (1 point)	E-6 Sustainable energy solutions (4 points)	<ul style="list-style-type: none"> <li>▪ All 3 credits are gathered in one credit with 3 strategies (Strategy A: Renewable Energy, Strategy B: Peak Electricity Demand and Strategy C: Service water heating)</li> <li>▪ Under Strategy C, fuel water heating systems cannot earn points anymore but the use of heat pump water heating systems is rewarded.</li> <li>▪ Strategy C has 2 points available.</li> </ul>
E-7 Renewable Energy (3 points)		
E-8 Peak Electricity Demand (2 points)		
E-9 Energy Management (3 points)	E-5 Energy Management (3 points)	<ul style="list-style-type: none"> <li>▪ No changes.</li> </ul>
<b>33 points</b>	<b>33 points</b>	

Water		
BIO Pilot	BIO V1	Description of the changes
W-1 Water Audit (1 point)	W-1 Water Audit (1 point)	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
W-2 Water use intensity (4 points)	/	<ul style="list-style-type: none"> <li>Credit is removed</li> </ul>
W-3 Water Fixtures (3 points)	W-3 Water Efficient Fixtures (3 points)	<ul style="list-style-type: none"> <li>Requirements have been simplified: 1 point is awarded for every additional 5% reduction of water consumption through fixtures instead of every additional 10% reduction.</li> </ul>
W-4 Water recycling, reuse and rainwater harvesting (2 points)	W-5 Sustainable Water Use Solutions (4 points)	<ul style="list-style-type: none"> <li>New credit result of the merging of previous Water recycling, reuse and rainwater harvesting and Water Efficient Landscaping credits</li> <li>An additional strategy is added: Strategy C: Cooling Tower Water Use. This strategy aims to reduce the water used in the heat rejection process with cooling towers.</li> <li>Up to 3 points are available in Strategy A: Water recycling/reuse/harvest (compared to 2 points available in former W-4 credit)</li> <li>A new calculation method is included for Rainwater Harvesting in Strategy A.</li> </ul>
W-5 Water Efficient Landscaping (2 points)		
W-6 Water Monitoring (2 points)	W-4 Water Metering and Leak Detection (2 points)	<ul style="list-style-type: none"> <li>The credit has a new name and is split in 2 strategies: Strategy A: Water metering and Strategy B: Water Leak Prevention.</li> </ul>
<b>14 points</b>	<b>10 points</b>	

Sustainable Purchasing		
BIO Pilot	BIO V1	Description of the changes
/	SP-1 Low-carbon purchasing (3 points)	<ul style="list-style-type: none"> <li>▪ Credit to encourage the purchase of low-carbon products that have less environmental impacts during the operations of the building.</li> </ul>
/	Eco-2 Healthy purchasing (2 points)	<ul style="list-style-type: none"> <li>▪ Credit to encourage the purchase of healthy products that have less harmful impacts to occupants during the operations of the building.</li> </ul>
0 points	4 points	

Ecology		
BIO Pilot	BIO V1	Description of the changes
Eco-PR-1 Vegetation	Eco-PR-1 Vegetation	<ul style="list-style-type: none"> <li>▪ No changes.</li> </ul>
Eco-1 Vegetation (3 points)	Eco-1 Vegetation (3 points)	<ul style="list-style-type: none"> <li>▪ The credit is split in 2 strategies: Strategy A: Vegetated Area and Strategy B: Quality of the Vegetation</li> <li>▪ Strategy B has been introduced to reward projects that improve the quality of the vegetation on site (type and number of species)</li> </ul>
Eco-2 Sustainable Landscape Management (2 points)	Eco-2 Sustainable Landscape Management (2 points)	<ul style="list-style-type: none"> <li>▪ No changes.</li> </ul>
/	Eco-3 Pest Management (1 point)	<ul style="list-style-type: none"> <li>▪ Credit moved from Management Category to Ecology Category</li> </ul>
5 points	6 points	



Waste & Pollution		
BIO Pilot	BIO V1	Description of the changes
WP-1 Wastewater treatment (2 points)	WP-1 Wastewater treatment (2 points)	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
WP-PR-1 Solid waste management	WP-PR-1 Solid waste management	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
WP-2 Solid waste management (2 points)	WP-2 Solid waste management (3 points)	<ul style="list-style-type: none"> <li>Points available have been increased up to 3 points.</li> <li>The credit is split in 3 strategies: Strategy A: Environmentally friendly solid waste management system, Strategy B: Dedicated recycling storage area and Strategy C: Waste diversion performance.</li> <li>Requirements for the Strategy A have been updated</li> <li>Strategy C award 1 point for diverting 50% of the amount of solid waste produced from landfill.</li> </ul>
WP-3 Refrigerants (2 points)	WP-3 Refrigerants (2 points)	<ul style="list-style-type: none"> <li>The credit is split in 2 strategies: Strategy A: Refrigerant Atmospheric Impact of Air-conditioning systems and strategy B: Refrigerant management</li> <li>Strategy B aims to reward the efforts to minimize refrigerant leakage in existing systems through proper operations and maintenance.</li> </ul>
WP-4 Light Pollution Minimization (1 point)	WP-4 Light Pollution Minimization (1 point)	<ul style="list-style-type: none"> <li>An additional option has been included in the credit: Projects implementing automatic lighting shutoff strategies can get awarded 1 point.</li> </ul>
<b>7 points</b>	<b>8 points</b>	

Health & Comfort		
BIO Pilot	BIO V1	Description of the changes
H-PR-1 Occupant comfort	H-PR-1 Occupant comfort	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
H-1 Occupant comfort (4 points)	H-1 Occupant comfort (3 points)	<ul style="list-style-type: none"> <li>Points available have been reduced to 3 points.</li> </ul>
H-PR-2 Indoor smoking	H-PR-2 Indoor smoking	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
H-2 Indoor smoking (1 point)	H-2 Indoor smoking (1 point)	<ul style="list-style-type: none"> <li>The following requirement is added: <i>“Outdoor designated smoking areas should be located at least 10 meters away from entries, outdoor air intakes and operable windows.”</i></li> </ul>
H-PR-3 Hazardous Substances	/	<ul style="list-style-type: none"> <li>Prerequisite removed.</li> </ul>
H-3 Hazardous Substances (2 points)	/	<ul style="list-style-type: none"> <li>Credit is removed but its content is included in the new credit SP-2 Healthy Purchasing.</li> </ul>
H-4 Fresh air supply (2 points)	H-3 Fresh air supply (2 points)	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
H-5 CO <sub>2</sub> Monitoring (1 point)	H-4 CO <sub>2</sub> Monitoring (1 point)	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
H-6 Daylighting (2 points)	H-5 Daylighting (2 points)	<ul style="list-style-type: none"> <li>Calculation section has been reworded</li> </ul>
H-7 External Views (2 points)	H-6 External Views (2 points)	<ul style="list-style-type: none"> <li>Sections Approach &amp; Implementation and Calculation have been reworded.</li> <li>Example in Calculation has been corrected.</li> </ul>
/	H-7 Green Cleaning (1 point)	<ul style="list-style-type: none"> <li>New credit to promote the use of safer cleaning products and practices to protect building occupants from the adverse impacts of cleaning chemicals and toxic substances.</li> </ul>
<b>14 points</b>	<b>12 points</b>	

## Adaptation & Mitigation

BIO Pilot	BIO V1	Description of the changes
A-1 Disaster Resilience (3 points)	A-1 Disaster Resilience (3 points)	<ul style="list-style-type: none"> <li>▪ The credit is split in 3 strategies:                             <ul style="list-style-type: none"> <li>- Strategy A: Disaster risk report</li> <li>- Strategy B: Disaster response plan</li> <li>- Strategy C: Disaster resilience</li> </ul> </li> </ul>
A-2 Storm Water Runoff (2 points)	A-2 Storm Water Runoff (2 points)	<ul style="list-style-type: none"> <li>▪ A new strategy is included: Strategy B: Self-improvement with the aim to reward projects that succeed to increase the average perviousness of the site.</li> </ul>
A-3 Heat Island Effect (2 points)	A-3 Heat Island Effect (2 points)	<ul style="list-style-type: none"> <li>▪ The Approach &amp; Implementation section of the credit has been updated.</li> </ul>
A-PR-2 Green Transport	A-PR-2 Green Transportation	<ul style="list-style-type: none"> <li>▪ No changes.</li> </ul>
A-4 Green Transport (2 points)	A-4 Green Transportation (4 points)	<ul style="list-style-type: none"> <li>▪ Points available have been increased up to 4 points.</li> <li>▪ The credit is split in 3 strategies:                             <ul style="list-style-type: none"> <li>- Strategy A: Green transportation policy</li> <li>- Strategy B: Green transport facilities</li> <li>- Strategy C: Green Commuting</li> </ul> </li> </ul>
<b>9 points</b>	<b>11 points</b>	

Community		
BIO Pilot	BIO V1	Description of the changes
CY-1 Public Space (2 points)	/	<ul style="list-style-type: none"> <li>▪ Credit removed</li> </ul>
CY-2 Local Jobs (2 points)	/	<ul style="list-style-type: none"> <li>▪ Credit removed</li> </ul>
/	CY-PR-1 Occupant Behavior	<ul style="list-style-type: none"> <li>▪ Prerequisite moved from Management Category to Community Category.</li> </ul>
CY-3 Access for People with Disabilities (2 points)	CY-1 Access for People with Disabilities (2 points)	<ul style="list-style-type: none"> <li>▪ Only one criterion is kept: the whole building needs to comply with the requirements of QCVN 10:2014/BXD</li> </ul>
/	CY-2 Occupant Behavior (2 points)	<ul style="list-style-type: none"> <li>▪ Credit moved from Management Category to Community Category.</li> <li>▪ No changes on the content but credit is split in 2 strategies: Strategy A : Ongoing environmental-awareness campaign and Strategy B: Occupant training</li> </ul>
/	CY-3 Public Awareness Campaign (2 points)	<ul style="list-style-type: none"> <li>▪ New credit to promote general public awareness on sustainability and green buildings. Projects to hold events, create a website, write press releases, etc.</li> </ul>
<b>6 points</b>	<b>6 points</b>	

## Management

BIO Pilot	BIO V1	Description of the changes
Man-1 LOTUS certified building (1 point)	Man-1 LOTUS certified building (1 point)	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
Man-2 LOTUS AP (1 point)	Man-2 LOTUS AP (1 point)	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
Man-3 Commissioning (3 points)	Man-3 Commissioning (4 points)	<ul style="list-style-type: none"> <li>Credit is split in 2 strategies: Strategy A: Commissioning and Strategy B: On-going Commissioning</li> <li>In Strategy A, points are awarded depending on the scope of the systems commissioned.</li> <li>Approach &amp; Implementation for Strategy A has been updated</li> <li>Strategy B is a new strategy to reward projects which focus on continuous performance improvement over time</li> </ul>
Man-PR-1 Maintenance	Man-PR-1 Maintenance	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
Man-4 Maintenance (2 points)	Man-4 Maintenance (2 points)	<ul style="list-style-type: none"> <li>No changes.</li> </ul>
Man-PR-2 Occupant Behavior	/	<ul style="list-style-type: none"> <li>Moved to Community Category</li> </ul>
Man-5 Occupant Behavior (2 points)	/	<ul style="list-style-type: none"> <li>Moved to Community Category</li> </ul>
Man-6 Green Management Practice (2 points)	Man-5 Green Management (2 points)	<ul style="list-style-type: none"> <li>No changes on the content but credit is split in 2 strategies: Strategy A: Green management system and Strategy B: Green leases</li> </ul>
Man-7 Pest Management (1 point)	/	<ul style="list-style-type: none"> <li>Moved to Ecology Category.</li> </ul>
<b>12 points</b>	<b>10 points</b>	

Innovation		
BIO Pilot	BIO V1	Description of the changes
Inn-1 Exceptional Performance Enhancement	Inn-1 Exceptional Performance Enhancement	<ul style="list-style-type: none"> <li>▪ Exceptional Performance Enhancement points can be awarded in a new situation: when, in a credit with different strategies available, the building performance reaches a higher number of points than what is available in the credit.</li> </ul>
Inn-2 Innovative techniques / initiatives	Inn-2 Innovative techniques / initiatives	<ul style="list-style-type: none"> <li>▪ No changes.</li> </ul>
8 bonus points	8 bonus points	