Planon Building Circularity Insights

Planon Software Suite

Version: L111

Planon
Building Connections

About this Document

Intended Audience

This document is intended for *Planon Software Suite* users.

Contacting us

If you have any comments or questions regarding this document, please send them to: support@planonsoftware.com.

Document Conventions

Bold
Names of menus, options, tabs, fields and buttons are displayed in bold type.

Italic text
Application names are displayed in italics.

CAPITALS
Names of keys are displayed in upper case.

Special symbols

	Text preceded by this symbol references additional information or a tip.
	Text preceded by this symbol is intended to alert users about consequences if they carry out a particular action in Planon.

Table of Contents

About Planon Building Circularity Insights

The Planon Building Circularity Insights solution allows you to perform circularity calculations for your existing assets and buildings. Planon uses the standard product set from BCI Building (available exclusively in the Dutch market) for these calculations.

Key features include:

- **Building circularity score**: aggregate all asset calculations to produce an overall circularity score for the building, providing a comprehensive view of its sustainability performance.
- **Property-level reporting**: generate reports on property-level circularity, providing a clear overview of environmental performance.
- **Informed replacement decisions**: evaluate the optimal timing for replacing parts or entire assets based on circularity indices and environmental impact, rather than solely on cost considerations.
- **Maintenance guidance**: regularly assess the condition of assets to make informed maintenance decisions, ensuring the longevity and sustainability of your assets.

The circularity calculations provide the following indices:

- Environmental Performance Buildings
- Construction-stored carbon
- Disassembly potential
- Environmental Cost Indicator (ECI)
- Global Warming Potential (GWP)
- Material Circularity Index (MCI)
- Paris proof indicator
- Product Circularity Index (PCI)
- Virgin raw materials
- Building Circularity Index (BCI) - only at property scenario level

The solution is designed to work seamlessly in conjunction with Platform Apps. Without the presence of Platform Apps, the circularity calculations cannot be performed. Platform Apps are an essential component for performing building circularity calculations and serve as the interface for accessing building parts data.

For more information on working with (standard) assets in Planon, see Assets.

Concepts

The following topics describe the concepts that are key to understanding the functionality.

Assets

Assets can be all kinds of corporate items of value, from furniture to mechanical installations, or from company clothing to company cars. They always belong to a specific property and asset group.

Assets are hierarchical elements. That means that they can be subdivided into different levels. The maximum number of levels is 10. Using a hierarchical structure for assets, enables you to specify any subassets of which an asset may consist. For example, you can register a pump via the components it consists of.

The data you can register for an asset include purchase data, location data and replacement data. You can also specify whether the asset is a simple or a multiple asset. For each asset, you can define a service plan that includes all the activities needed for the asset’s preventative maintenance.

Building circularity criteria

Building circularity criteria refer to the general principles and standards that promote sustainability throughout the entire lifecycle of a building. These criteria encompass aspects such as material use, energy efficiency, waste reduction, and social considerations, aiming to develop buildings that align with the principles of a circular economy.

You can use established standards such as BREEAM or create your own specific standard. At the **Building circularity criteria** step, you can configure a custom set of criteria that define the expected standard for a scenario. When linked to the scenario, these criteria indicate whether each index meets the standard.

Building Circularity Index (BCI)

The Building Circularity Index (BCI) is a metric used to assess the level of circularity and sustainability of a building or construction project. It quantifies the extent to which materials, resources, and components within the building's lifecycle are reused, recycled, or repurposed, minimizing waste and environmental impact. BCI provides a quantifiable score that indicates the extent to which a building follows circular principles. A higher BCI score implies a greater level of circularity and sustainability.

BCI aims to promote more sustainable construction practices by encouraging the design, construction, and operation of buildings that prioritize circular economy principles, such as reducing resource consumption and extending the lifespan of materials.

Building part

A building part is an item in a project or building object with specific characteristics that help measure how circular (sustainable) a building is. These items can be individual parts or elements of the building and are linked to a specific scenario.

Every building part is linked to a standard building part. Standard building parts can be used when composing a calculation object and provide parameters for the calculations.

Building standard

A set of predefined criteria, guidelines, or principles that focus on promoting environmentally responsible and resource-efficient construction and operations. These standards provide guidelines and benchmarks for sustainable building practices, promoting resource conservation, energy efficiency, and the reduction of environmental impacts in the construction and operation of buildings. Different standards may focus on various aspects of sustainability, but they all share the goal of creating more environmentally responsible and circular buildings.

Examples of building standards that promote sustainability and building circularity:

- **WELL Building Standard:** This standard focuses on improving the health and well-being of building occupants by addressing factors like air quality, water quality, nutrition, and fitness amenities.
- **LEED (Leadership in Energy and Environmental Design):** LEED is a widely recognized green building certification system that evaluates the environmental performance of buildings and encourages sustainable design and construction practices.
- **BREEAM (Building Research Establishment Environmental Assessment Method):** BREEAM is a similar certification system to LEED, primarily used in the United Kingdom and Europe, which assesses the environmental performance of buildings and infrastructure.
- **Cradle to Cradle (C2C):** C2C is a design framework that promotes the idea that products and buildings should be designed to have a positive impact on the environment. It emphasizes the use of materials that can be endlessly recycled or biodegraded.
- **Passive House:** This standard focuses on designing ultra-energy-efficient buildings that require very little energy for heating or cooling, emphasizing insulation, airtightness, and efficient ventilation.
- **The Living Building Challenge:** This standard is one of the most rigorous in terms of sustainability. It requires buildings to meet strict

criteria in seven performance areas, including energy, water, and materials.

Circular property scenario

A circular property scenario refers to a specific assessment of a property's sustainability at a given point in time, based on the assets linked to the property. You can calculate circularity indexes for a property by analyzing the assets linked to building parts. These indexes measure how well the property aligns with circular economy principles, such as resource efficiency, reusability, and recyclability.

Each property can have multiple circular scenarios, reflecting different combinations of assets and building parts at distinct moments. These scenarios provide insight into the building's overall circularity and how it changes over time as new assets or materials are introduced.

Connection accessibility

Connection accessibility refers to the ease of accessing and disconnecting the connections or fasteners between building elements or components during disassembly or deconstruction processes. It focuses on the design and placement of connections, such as bolts, screws, or clips, that hold different parts of a building together.

Connection accessibility is an important consideration for building circularity as it directly affects the efficiency and effectiveness of disassembly and material recovery. When connections are easily accessible, it becomes simpler to disconnect and separate building components without causing damage or generating waste.

By designing buildings with connection accessibility in mind, such as using visible, standard, and accessible fasteners, it becomes easier to disassemble and recover materials for reuse or recycling. This promotes circularity by facilitating efficient and sustainable dismantling practices and supporting the recovery of valuable resources from buildings at the end of their life cycles.

Connection type

Connection type refers to the specific method or mechanism used to join building elements or components together. It impacts the ease of disassembly, material separation, and recyclability. Choosing connection types that facilitate efficient dismantling and material recovery supports circularity by reducing waste and promoting material reuse.

Construction Stored Carbon (CSC)

Construction Stored Carbon (CSC) refers to the amount of carbon dioxide (CO_2) that is captured, stored, or sequestered within building materials during the construction or renovation process. It represents the carbon that is removed from the atmosphere

and stored within the built environment. CSC takes into account the carbon stored in materials such as wood, timber, bamboo, or other carbon-intensive materials used in construction.

The concept of CSC recognizes that certain building materials have the ability to absorb and store carbon dioxide, thus helping to mitigate climate change by reducing greenhouse gas emissions. By incorporating carbon-storing materials into construction projects, the industry can actively contribute to carbon sequestration efforts. CSC is an important consideration for sustainable construction practices, as it helps to offset the carbon footprint associated with building activities and contributes to a more environmentally friendly built environment.

Disassembly

Disassembly refers to the process of systematically taking apart a building or structure in order to recover and reuse its components, materials, and systems. It involves carefully separating and salvaging elements such as doors, windows, fixtures, fittings, flooring, structural components, and more. Disassembly is carried out with the goal of maximizing the value and lifespan of these building materials, reducing waste, and enabling their reintroduction into the construction or manufacturing processes.

Disassembly potential

Disassembly potential refers to the design characteristics and considerations that facilitate the efficient and effective disassembly of a building. It assesses how well a building is designed to allow for the systematic and safe separation of its components, minimizing damage and maximizing the potential for reuse. Factors that contribute to high disassembly potential include modular construction, use of standard connections and fasteners, clear labeling or marking of components, and detailed disassembly guidelines or instructions. By incorporating disassembly potential into the design and construction of buildings, it becomes easier to recover and reuse materials, thereby promoting circularity and reducing environmental impacts.

Environmental Cost Indicator (ECI)

The Environmental Cost Indicator (ECI) is a metric that quantifies the environmental impact of a product or process in monetary terms. It assesses factors like energy use, emissions, water consumption, and waste generation throughout the product's lifecycle. ECI aids in comparing environmental performance and identifying areas for improvement.

Environmental Performance Buildings

'Environmental Performance Buildings' refers to the assessment and measurement of the environmental impact of a building throughout its life cycle. This assessment includes the evaluation of various factors related to resource use, energy consumption,

and emissions, with the goal of understanding and minimizing the building's overall environmental footprint. The assessment typically considers factors such as:

- Energy efficiency: The energy consumption of the building, including both operational energy (energy used during the building's day-to-day operations) and embodied energy (energy used in the production of building materials, construction, and demolition).
- Resource use: The utilization of materials and resources in the construction and maintenance of the building, considering factors such as material extraction, transportation, and end-of-life disposal.
- Emissions: The release of pollutants and greenhouse gases associated with the building's construction, operation, and eventual decommissioning. This may include carbon dioxide (CO2) emissions, which contribute to climate change.
- Water usage: The building's impact on water resources, including both direct water consumption and the environmental effects of water use throughout the building's life cycle.
- Waste generation: The amount of waste produced during the construction, renovation, and demolition of the building, as well as waste generated during its operational phase.

Functional lifespan

Functional lifespan in the context of building parts refers to the duration during which a component or element of a building remains operational and performs its intended function before requiring replacement or significant maintenance.

Geometry of Product Edge

The 'Geometry of Product Edge' refers to the design and shape characteristics of building products' edges that influence their disassembly and recyclability potential in the context of Building circularity. It considers factors such as the shape, connections, and interfaces of the edges, which impact the ease of disassembly and material recovery for reuse or recycling. Designing building products with favorable Geometry of Product Edge facilitates efficient material recovery and promotes circularity in the construction industry.

Global Warming Potential (GWP)

Global Warming Potential (GWP) is a measure of the potential impact of a greenhouse gas (GHG) on global warming over a specific timeframe, usually 100 years. It quantifies the ability of a GHG, such as carbon dioxide (CO2) or methane (CH4), to trap heat in the Earth's atmosphere relative to that of carbon dioxide. GWP values are used to compare the warming effects of different GHGs and to estimate their contributions to climate change.

The GWP of a greenhouse gas is expressed as a factor relative to carbon dioxide, which has a GWP of 1. For example, methane has a higher GWP than carbon dioxide, indicating that it has a greater warming effect per unit of mass. GWP values are typically used to calculate the carbon footprint or greenhouse gas emissions of various activities, products, or processes. By considering the GWP of different gases, policymakers and researchers can prioritize efforts to reduce emissions of gases with higher GWPs and mitigate their impact on global warming and climate change.

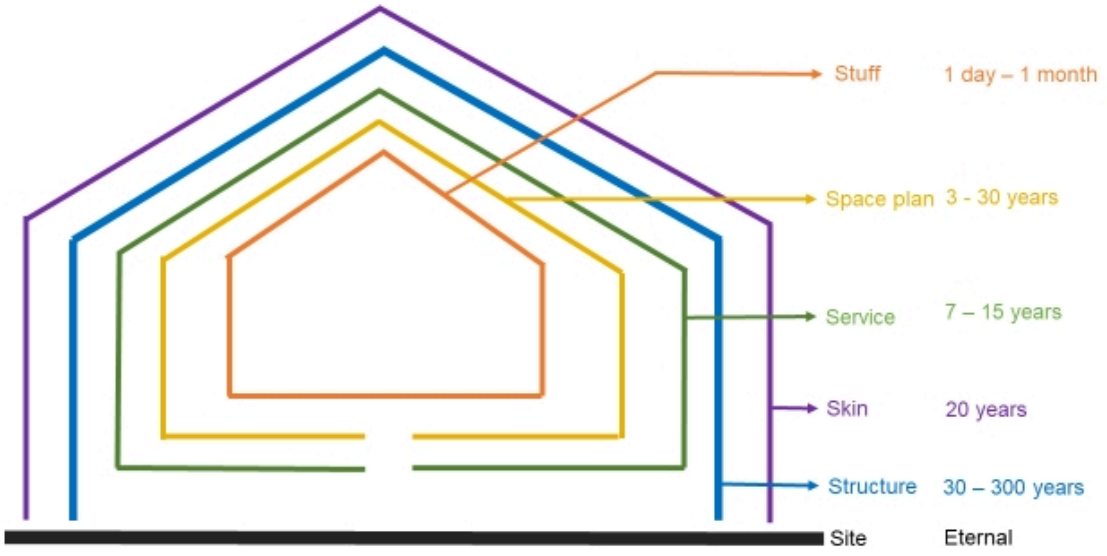
Independency

Independency refers to the ability of building components to be disassembled without relying heavily on the removal or destruction of connected elements. It enables efficient and selective disassembly, promoting resource efficiency and material reuse within the circular economy.

Layers of Brand

The Layers of Brand are used to differentiate between different types of products in the construction sector:

- Site (location)
- Structure (construction)
- Skin (facade, roof, and ground floor)
- Services (installations)
- Space Plan (interior finishing)
- Stuff (fixed and loose furniture)



In the BCI calculation, the average circular potential of all products within the same Layer of Brand is represented. This allows for the identification of which types of products have a positive or negative impact on the BCI. All types of products are equally important in the Building Circularity Index. Therefore, no weighting factor is assigned to the different Layers of Brand.

Material Circularity Index (MCI)

The Material Circularity Index (MCI) is a metric used to measure the circularity of materials in a product or system. It quantifies the extent to which materials are reused, recycled, or recovered at the end of their life cycle, rather than being discarded as waste. The MCI provides a numerical value that reflects the percentage of recycled or reused materials in relation to the total materials used. A higher MCI indicates a higher level of circularity and a more sustainable approach to material use.

Paris Proof indicator

The 'Paris Proof indicator' refers to a metric used to assess whether a building or project aligns with the goals of the Paris Agreement, an international treaty aimed at limiting global warming to well below 2 degrees Celsius above pre-industrial levels, with efforts to limit it to 1.5 degrees Celsius.

The Paris Proof indicator evaluates the environmental performance of buildings or projects based on their greenhouse gas emissions, energy efficiency, and overall sustainability practices. It aims to ensure that buildings and projects are designed, constructed, and operated in a way that contributes to global efforts to mitigate climate change and reduce carbon emissions.

Meeting the Paris Proof standard typically involves implementing energy-efficient building design, utilizing renewable energy sources, reducing energy consumption, optimizing material usage, and minimizing carbon emissions throughout the building's lifecycle. Buildings or projects that meet the Paris Proof criteria are considered to be aligned with the goals of the Paris Agreement and are contributing to global climate action.

Product

A product refers to any physical item or material used in constructing, operating, or maintaining buildings. It includes building materials, fixtures, equipment, and furniture. Building circularity aims to maximize resource efficiency, minimize waste, and promote the reuse and recycling of products throughout their life cycle.

Product classes

Product classes refer to categories or groups of building products that share similar characteristics, functions, or applications. These categories are defined based on the

type of product and its role within the building construction or renovation process. Every country can have its own standardized set of classes.

Product classes are used in the BCI to organize and assess the circularity performance of different building products. Each product class may have specific criteria or indicators associated with it to evaluate aspects such as resource efficiency, recyclability, reuse potential, and environmental impact. By grouping products into classes, it becomes easier to compare and benchmark their circularity performance within a specific context, such as a building project or industry sector.

The establishment of product classes in the BCI allows for a more systematic approach to evaluating and improving the circularity of building materials and products. It enables you to identify areas for improvement, set targets, and make informed decisions towards more sustainable and circular building practices.

Product Circularity Index (PCI)

The Product Circularity Index (PCI) is a metric used to assess and measure the circularity or recyclability of a product. It quantifies the extent to which a product is designed and manufactured with principles of circular economy in mind, focusing on its ability to be reused, recycled, or recovered at the end of its life cycle. The PCI provides a numerical value or rating that indicates the level of circularity of a product, with higher values indicating greater circularity and lower environmental impact. It takes into account factors such as the use of recycled materials, design for disassembly, ease of recycling, and potential for extended product life through repair or refurbishment. The PCI helps guide product designers, manufacturers, and consumers towards more sustainable and circular product choices.

Product database

A product database refers to a centralized collection of information about building materials, products, and components. It provides details on their environmental characteristics, circularity aspects, and life cycle information. The product database assists stakeholders in making informed decisions regarding material selection and promotes the use of sustainable and circular materials in building design and construction. It enhances transparency, supports the transition to a circular economy, and contributes to a more sustainable built environment.

Example: the EPiC Database (Environmental Product Information Center). The EPiC database is an initiative that aims to provide standardized and transparent environmental product information for construction products across Europe. It is part of the European EPD (Environmental Product Declaration) System.

Features:

- Offers Environmental Product Declarations (EPDs) for a wide range of construction products, providing information on their environmental impacts throughout their life cycle.

- Supports the comparability of environmental information across products and helps architects, builders, and other stakeholders make informed decisions based on sustainability criteria.

Technical lifespan

Technical lifespan refers to the period during which a building component remains capable of functioning at its intended level of performance, adhering to technical specifications and standards. It is the duration before the component becomes obsolete, requires significant repairs, or necessitates replacement due to wear and tear, technological advancements, or changes in building codes and regulations.

Virgin raw materials

Virgin raw materials refer to natural resources or materials that are in their original, unprocessed state and have not been used or altered in any way. These materials are extracted directly from natural sources, such as oil, minerals, or wood, and are used to produce new products. Unlike recycled materials, virgin raw materials are sourced fresh from nature and usually undergo industrial processing to create products such as plastics, metals, or paper. The use of virgin materials can impact the environment due to the extraction processes, but they often have more consistent quality compared to recycled alternatives.

Working with Planon Building Circularity Insights

To calculate circularity, follow these steps:

- create a circular property scenario (see Creating a circular property scenario)
- link assets to (standard) building parts (see Linking (standard) assets to building parts)
- calculate circularity scores for assets (see Calculating circularity scores for assets)
- calculate circularity scores for a property (see Calculating circularity scores for a property)

Creating a circular property scenario

Before you can link building parts to assets, you must first create a circular property scenario.

Procedure

1. In the **Circular property management** TSI, go to Property scenarios > Circular property scenarios.
2. On the **Circular property scenarios** action panel, click **Add** to create a new scenario for your property.
3. On the data panel, enter the relevant data.
4. Click **Save**.

   You can proceed with linking assets to building parts. See Linking (standard) assets to building parts.

Linking (standard) assets to building parts

To calculate the circularity score of an asset, you must first link the asset to a building part. The building part contains BCI information, so by linking it, you enrich your asset with this information. When linking an asset to a building part, you have the following options:

- **Manually select and link:** select an asset and manually search for a standard building part, then link it to the asset.

- **Automatic configuration:** link the asset to a standard asset and automatically inherit a configuration based on this standard asset. This means you don't have to manually search for building parts; instead, Planon will automatically link all building parts associated with the standard asset.

Procedure

1. In the **Circular property management** TSI, go to the **Assets** selection level.
2. Select the asset for which you want to calculate the circularity score.
3. To manually link building parts: on the action panel, click **Link building part**.

   A dialog box appears, allowing you to select the building part(s) you want to link to the asset. You can link multiple building parts to an asset.
4. To automatically link building parts: on the action panel, click **Autoconnect building parts**.

   This will automatically link building parts. If you are using standard assets that are correctly mapped to standard building parts, Planon will automatically link each asset to the corresponding building part.

After linking all the assets for which you want to calculate the circularity to building parts, you can proceed with actually calculating the circularity scores. See Calculating circularity scores for assets.

Calculating circularity scores for assets

Now that the assets are linked to their respective building parts, you can proceed with calculating the circularity scores for the assets.

An asset can consist of multiple building parts. However, the results are calculated at asset level: the total of the linked building parts.

Procedure

1. In the **Circular property management** TSI, go to the **Assets** selection level.
2. Select the asset(s) for which you want to calculate the circularity score.
3. On the action panel, click **Calculate circularity**.

   Planon will now calculate the circularity score for the selected asset(s).
4. Go to the **Asset circularity scores** selection step to view the scores.

After calculating circularity for assets, the next step is to derive circularity results for properties. By analyzing a property and all its associated assets,

valuable circularity insights can be obtained (see Calculating circularity scores for a property).

Calculating circularity scores for a property

After calculating circularity for the assets in your property, the next step is to derive circularity scores for the property.

The circularity scores for a property are compiled into a scenario (Circular property scenario). Scores can be calculated at various points in time; the scenario's calculation date determines the BCI indexes for all assets. Comparing results from different scenarios reveals changes over time. Each scenario captures a specific moment, so changes like additions, removals, or replacements of building parts due to maintenance won't affect past scenarios.

Procedure

1. In the **Circular property management** TSI, go to the **Assets** selection level.
2. Calculate circularity scores - per asset - for all the assets linked to the property. See Calculating circularity scores for assets
3. Go to Property scenarios > Circular property scenarios.
4. Calculate the scenario for the property, based on the related assets.
5. Run the **Building Circularity Insights** system report to show the calculated results for the property.

Defining circularity criteria

You can configure your own set of criteria to set the expected standard for a scenario. Linking the criteria to a scenario allows you to determine whether the calculated scenario meets the standard.

Procedure

1. In the **Circular property management** TSI, go to Filters > Circularity criteria.
2. On the **Building circularity criteria** action panel, click **Add** to add a new circularity criterion.
3. On the data panel, enter the relevant data.
4. Click **Save**.
5. Go to Property scenarios > Circularity criteria indicators.
6. On the **Building circularity criteria - indicators** action panel, click **Add** to add indicators (index fields) to your circularity criteria.
7. On the data panel, enter the relevant data.

8. Click **Save**.

Reporting

The **Building Circularity Insights** system report is available in Planon Building Circularity Insights . This report provides a structured overview of the property scenarios and their outcomes.

The report can be generated for properties with a circular property scenario. You can link one or more scenarios. Planon calculates the impact based on the assets and building parts specific to those scenarios.

Index