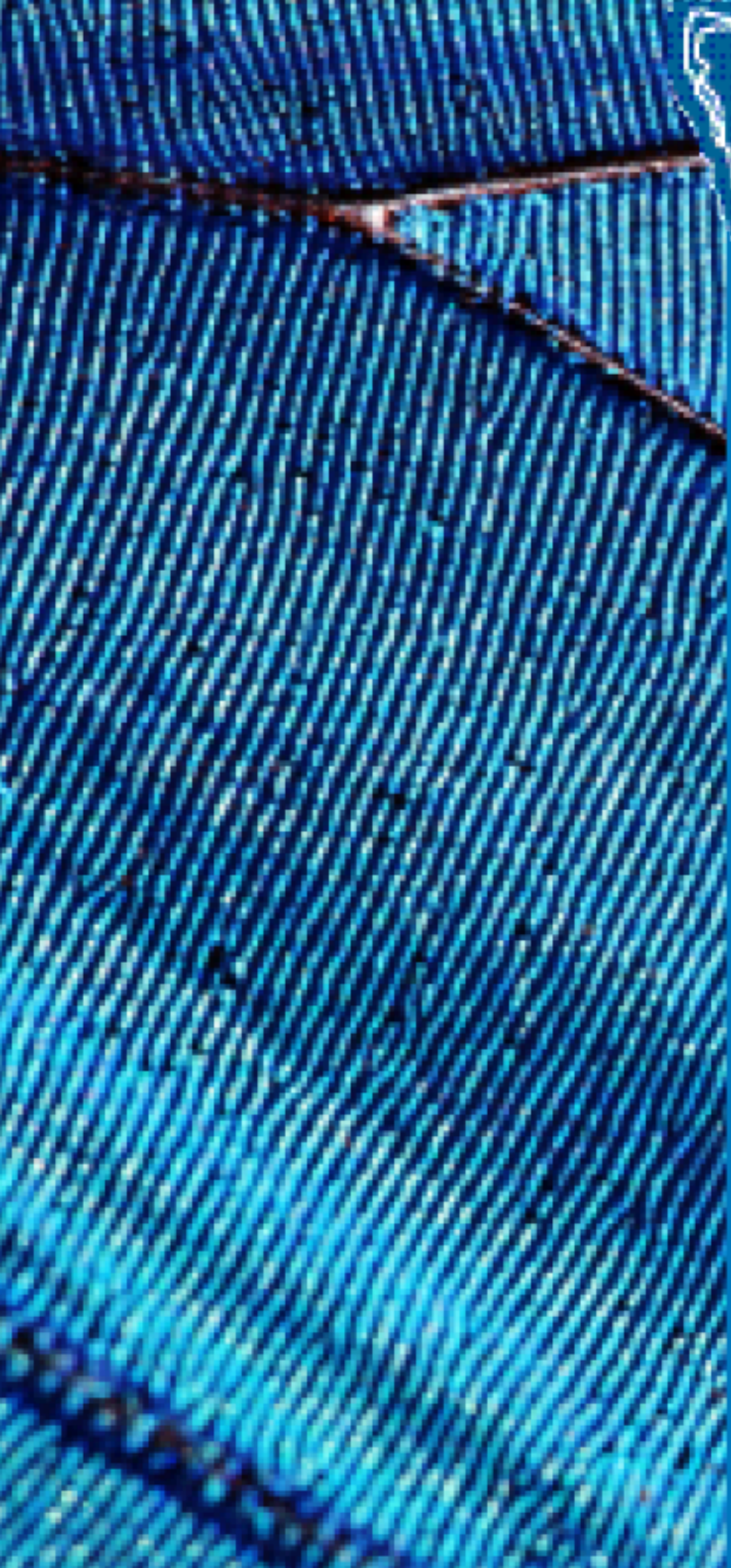


LIVING PRODUCT CHALLENGE 2.0

PETAL HANDBOOKS

JULY 2023

INTERNATIONAL LIVING FUTURE INSTITUTE™

Living Product Challenge v2.0 Handbook

January 2023 — Last update: 29 February 2024

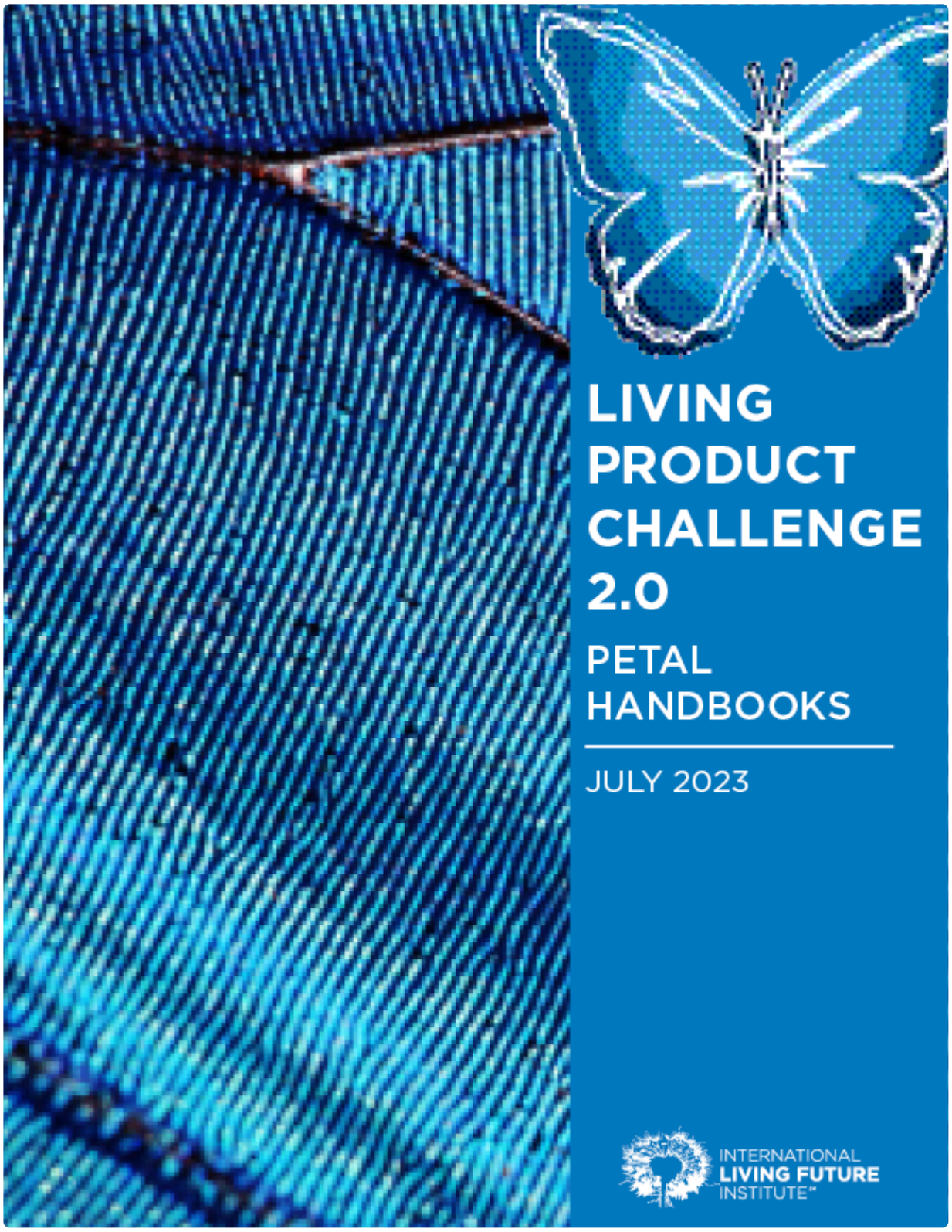
International Living Future Institute

Table of Contents

July 2023

The July 7, 2023 update that follows is the current version of the Living Product Challenge 2.0 Petal Handbooks. Previous versions of the Petal Handbooks are available to download here.

Introduction to the Living Product Challenge



The Living Product Challenge is an attempt to dramatically raise the bar from a paradigm where simply doing less harm is laudable to one in which we seek to be restorative, giving more than we take. The Challenge defines the most advanced measure of sustainability possible for the creation of all products and

works to rapidly diminish the gap between current limitations and the positive endgame solutions we seek. It aims to transform how we think about every single act of design, production and purchasing as an opportunity to positively impact the greater community of life and the cultural fabric of our society.

The Living Product Challenge is a philosophy first, an advocacy tool second, and a certification program third. It is a beacon to guide how the thousands of things we surround ourselves with are made, and to give direction and support to those who make them. Within the larger Living Future Challenge framework that includes Living Buildings, Communities and Food Systems, the Living Product Challenge focuses on humanity's most ubiquitous creations—its manufactured goods. It is in essence a unified tool for transformative thought, allowing us to envision a future that is Socially Just, Culturally Rich and Ecologically Restorative.

Regardless of a product's quantity or the location of its manufacturing facility, the Living Product Challenge is a framework for design and production that achieves symbiosis between people and our planet. It is a challenge to immerse oneself in such a pursuit—and many refer to its ability to do so as a paradigm shift. But products that succeed can claim to be the greenest and most socially responsible of all, and they will serve as models for others that follow.

Program Overview

The Living Product Challenge is structured within seven Petals, or spheres of influence: Place, Water, Energy, Health + Happiness, Materials, Equity, and Beauty. Each petal is therein comprised of Imperatives – a total of 20 – which define the specific requirements that must be achieved by the manufacturer. The program asks manufacturers to engage with every aspect of the product and its manufacturing process, from fair labor practices in supply chains, to material health optimization, access to fresh air for workers, energy consumption and beyond.

LCA and Handprints

A focus on achieving measurable Net Positive impact, in particular, sets LPC apart from any other certification. Instead of looking to solely decrease the negative impacts of production, the program also asks creators of Living Products to go further and use creativity and ecological inspiration to create positive impacts. Said another way, instead of just shrinking your footprint, LPC asks manufacturers to create Handprints, or positive impacts versus business as usual. A product becomes Net Positive if its Handprint is larger than its Footprint.

Handprints must be real and measurable, and there are myriad ways to create them. They can result from engaging the users of products to use them in more ecologically-restorative ways. They can also result from a manufacturer sharing sustainable innovations with competitors or the market at large. Handprint benefits may even go beyond the boundaries of the life cycle of the Living Product, and the company itself, through collaborative efforts with other businesses and organizations to create positive impacts around the world.

While this Handbook provides insight into how manufacturers may document their Footprints and

Handprints, readers should refer to the Handprinting Guide for a comprehensive introduction to the concept, step by step process for their creation and measurement, and inspiration through case studies.

Material Health

LPC also requires that manufacturers understand and engage with the human health impacts of the product, starting with a third party verified inventory of the product substances, and screening those substances against the LBC Red List through the Declare program. It then encourages manufacturers to more deeply understand the health impacts of those ingredients beyond list screening, through engagement of a toxicologist to apply rigorous and widely accepted methodology to assess the materials and optimize them for human and environmental health.

Similar to the deeper dive taken with Handprinting, ILFI has built the Transparent Material Health Guide to explain the philosophy between this program's approach to material health, lay out the process for engaging with its requirements, and define the measure of success. Pursuants of LPC and approved Material Health Assessors should refer to this guide for a comprehensive understanding of achieving Imperatives 08 and 09.

LPC Resources

LPC 2.0 Standard

The Living Product Challenge 2.0 Standard contains seven performance categories, or Petals: Place, Water, Energy, Health and Happiness, Materials, Equity and Beauty. Petals are subdivided into a total of 20 Imperatives, each of which focuses on a specific sphere of influence.

LPC 2.0 Petal Handbooks

This collection of Petal Handbooks describes the rule sets or "body of law" for achieving all Imperatives within the Living Product Challenge 2.0. They should be used in conjunction with the Living Product Challenge Standard 2.0. These rules apply to projects registered under LPC 2.0. Manufacturers may access the Petal Handbooks through the ILFI Member Dashboard.

Manufacturers must follow all rules in place at the time of their registration, including requirements in the most recently updated Petal Handbooks and all Dialogue posts. Rules established in Petal Handbook updates subsequent to a manufacturer's registration date may be followed at the team's discretion.

LPC 2.0 Documentation Requirements

Please use the Living Product Challenge Petal Handbooks for all documentation requirements required for certification, including any updates and additional clarifications provided by ILFI.

LPC 2.0 Documentation Requirements and Audit Checklist

The LPC 2.0 Documentation Requirements Checklist can be used as a project planning template for manufacturers and their teams pursuing LPC to manage and organize progress toward completion of Imperatives and their respective Documentation Requirements with team members, including Site Audit-related documentation requirements, from initial charrettes through the end of certification and in preparation for annual check-ins. Please see the COVID-19 Impact to Program Requirements guidance for information related to changing documentation requirements and additional allowances and direct any additional questions to lpc.support@living-future.org.

LPC Product Life Database

The Product Life Database is a collection of the use-phase detailed product categories. The database includes the energy input requirements, expected lifetimes, and costs of products.

LPC 2.0 Annual Check-In Checklist

The LPC 2.0 Annual Check-In Checklist can be used by certification assessors and manufacturers to organize annual achievements required by the Living Product Challenge, as well as organize progress toward the three-year projects and achievements toward recertification.

LPC 2.0 Label Data Template

Manufacturers can use this template to input data that is published on the LPC Label, which includes Declare label ingredient disclosures and LCA impact information.

LPC 2.0 Case Study Questionnaire

Manufacturers and their teams can use this template to collect observations, interpretations and narrative content related to their experience pursuing individual Imperatives as well as the entire Living Product Challenge program, and complete the Case Study Questionnaire documentation requirement needed for certification.

LPC Dialogue

The Dialogue is the online forum for requesting precedent-setting clarifications, exceptions, and definitions related to program requirements. In responding to those requests, ILFI provides guidance on situations, devised strategies, or innovations that were not contemplated by the rule set articulated in the Petal Handbooks. Anyone can review the posted questions and rulings, but only registered project teams can submit posts to the Dialogue. The searchable Dialogue can be found at the link above and instructions for registered project teams to submit posts to the Dialogue can be found in this post.

Certification Timeline and Guidance

The following outlines the framework and individual stages that comprise the Living Product Challenge certification process. Though the framework represents the basis of engagement with all manufacturers, it

remains flexible to accommodate a manufacturer's specific situation. Certification may take as little as three months (shorter, if similar products have been previously certified or manufacturers already possess all of the requisite documentation), or upwards of a year depending on factors not limited to product complexity and materials, level of company sustainability investment to-date, or the ability to invest time in documentation and/or documentation components.

Establishing any specific deadlines early are important to ensure that all parties are aware of priorities for certification for product launches, conferences or trade shows. Based on previous LPC certifications, ILFI estimates a 16-week certification process after all initial documentation is submitted if all parties abide by the projected timeline. ***In order to guarantee that a determination will be made on certification achievement by a desired date, ILFI requires all final documentation be submitted no later than 8 weeks prior to the certification announcement.*** This timeline should be clearly understood at the kickoff meeting for all parties to meet their deadlines.

Table 1 Certification Overview Timeline

Weeks from Certification	Certification Step
Pre-Registration	Contact LPC.Support@living-future.org Product(s) and Certification Goals Set LPC Assessor Selected *Note: Completion of LCA, 3PV Declare and/or Transparent Material Health is outside the purview of the LPC contract and Assessor role)*
Registration and Kickoff	LPC Proposal Signed Kickoff Meeting (ILFI, Manufacturer + Assessor) Certification Submission Account Created Note: Manufacturers are encouraged, but not required, to complete their LCA and Declare 3PV prior to LPC Certification or early in the process
16+ Weeks	Initial LPC Documentation Submitted (95-99%)
14+ Weeks	Documentation Completion Check by Assessor
12+ Weeks	Site Audit (in-person or remote as appropriate)
10+ Weeks	Documentation Clarification Request
8+ Weeks	Final Documentation Submitted for Certification
6+ Weeks	Assessor Review Complete, Certification Report Drafted
5+ Weeks	ILFI Review Complete, Certification Report Finalized
4+ Weeks	LPC Label Drafted; Case Study Uploaded
2+ Weeks	Certification Documents Finalized and Sent to Manufacturer
0 Weeks	LPC Certification Announcement Coordinated by ILFI and Manufacturer

1 year post-certification	Annual Check-In (notification 3 months prior)
2 years post-certification	Annual Check-In (notification 3 months prior)
3 years post-certification	Recertification (notification 6 months prior)

Site Audits

On-site requirements are an important component of certification, allowing the assessor to confirm important components of documentation at the final facility.

The date of site audit(s) is flexible, but should occur after the manufacturer has submitted initial documentation (defined as 95-99% documentation submitted for initial review). This allows the assessor to get a sense of documentation completion and any potential areas for review before the site review.

Audits typically require 1-2 days of on-site visit. The LPC Assessor goes on a manufacturing tour to review the on-site processes, and the other half of the day is often used to review documentation in-person and gain a common understanding of what, if anything, needs to be submitted further, or altered in either the production process or the product.

The LPC checklist includes the audit requirements and may be used to prepare those at the facility for what needs to be reviewed on-site.

Audit Exceptions
Please see the COVID-19 Impact to Program Requirements guidance for information related to changing documentation requirements and additional allowances and direct any additional questions to lpc.support@living-future.org.

There may be extenuating circumstances in which audits can not take place, such as travel restrictions or safety issues. In this case, an audit may either be postponed or a remote audit may be permitted. For a remote audit, if the Assessor can obtain all visuals and documentation needed for certification from the site in question, the audit will be considered complete. If the Assessor cannot verify documentation as needed, the audit will be considered postponed.

Postponed site visits will not hold up the certification timeline, but certification will be awarded on a provisional basis until an audit is completed. To determine whether an Audit can be conducted remotely or postponed, please reach out to LPC.Support@living-future.org.

How to Use the Petal Handbooks

This collection of Petal Handbooks describes the rule sets or “body of law” for achieving all Imperatives within the Living Product Challenge 2.0. They should be used in conjunction with the Living Product Challenge Standard 2.0. These rules apply to products registered under LPC 2.0. Manufacturers must follow all rules in place at the time of their registration, including requirements in the most recently updated Petal

Handbooks and all Dialogue posts. Rules established in Petal Handbook updates subsequent to a manufacturer's registration date may be followed at the manufacturer's discretion.

IMPERATIVES

Each Imperative section consists of an Imperative overview, including an intent statement and the standard requirements that must be met, Clarifications, Exceptions, Calculation instructions (if applicable), Documentation Requirements, and Resources. It additionally outlines any changes that have occurred between the previous version of the standard and the current version.

Seven Core Imperatives are identified throughout the LPC Standard, one in each Petal. Core Imperatives must be met by all projects pursuing any level of certification under the LPC.

CLARIFICATIONS AND EXCEPTIONS

This handbook contains both Clarifications of program requirements and Exceptions that consolidate Dialogue posts and the footnotes from the Standard to provide a simplified and consistent set of rules for easy reference.

Clarifications elaborate on the intent and requirements of the Standard, providing more specific guidance on terminology, application, and implementation for each Imperative. Clarifications are generally listed in alphabetical order, and are sometimes divided into clarification sub-categories within an Imperative, for more complex topics that require multiple clarifications.

Exceptions reflect current regulatory barriers or market realities and are therefore temporary. Exceptions will be phased out over time as regulations are updated and new technologies or materials become available. Each Exception listed in the Petal Handbook is identified with a two letter abbreviation connected to the relevant Petal, and a unique number, for example PL-004 is the fourth exception of the Place Petal. Materials Petal (MT) exceptions also have specific Red List exceptions notated with the RL- prefix. Note that Exceptions will not always be sequential within an Imperative, as new Exceptions are added in Quarterly Petal Handbook updates. Manufacturers must reference the appropriate Exception numbers when submitting Dialogue posts and documentation for assessment.

GLOSSARY

An ILFI Program Glossary is included with the Petal Handbooks in order to define terminology used throughout the handbooks, and to provide an easily accessible reference for both general and program-specific language. This glossary is used for all of ILFI's programs to provide consistency across programs.

QUARTERLY UPDATES

The Petal Handbooks will be updated quarterly to reflect clarifications and changes from the Dialogue, add clarifying text, tables or graphics, and/or make any other amendments or additions necessary for improving the clarity and content of the handbook. Quarterly updates will occur in January, April, July, and October of each year, at which time the online Petal Handbooks will be revised and the cover sheet time stamped with the latest revision date. With each quarterly update, a list of revisions will be published, summarizing all

changes implemented in that update. The list of revisions will be organized by Petal and Imperative, and will indicate the location of the change within the Petal Handbooks, as well as a brief description of the change. Should manufacturers wish to reference previous versions of the handbook, they may download PDFs of the original Petal Handbooks or of any subsequent quarterly update.

Other ILFI Programs

Living Building Challenge (LPC) is a framework for design, construction, and improvement of the symbiotic relationships between people and all aspects of the built and natural environment. As a certification program, it addresses all buildings at all scales and is an inclusive tool for transformative design. living-future.org/lbc

Core Green Building Certification (Core) is a simple framework that outlines the 10 best practice achievements that a building must obtain to be considered a green or sustainable building. It puts the connection to nature, equity, and community on even footing with the typical water, energy, and materials concerns. Core seeks to bridge the gap between established green building programs and the greater aspirations of the Living Building Challenge. living-future.org/core

Zero Energy certified buildings have best in class energy efficiency improvements of 60-90% over baseline. Zero Energy buildings educate residents and employees, connecting them to their building by making them aware of their own energy use and challenging them to limit it. Zero energy buildings are free from dependence on fossil fuels, providing the groundwork for a resilient future. living-future.org/zero-energy

Zero Carbon certification is the only performance-based carbon standard that addresses both operational and embodied carbon. Zero Carbon buildings operate efficiently, phase out combustion, and use renewable energy. They are the safest properties when weather or energy markets shift. The world's largest companies, investors, and cities are already decarbonizing. living-future.org/zero-carbon

Living Community Challenge is a framework for master planning, design, and construction. It is a tool to create a symbiotic relationship between people and all aspects of the built environment. The program is a call to action to governments, campuses, planners, developers and neighborhood groups to create communities that are as connected and beautiful as a forest. living-future.org/lcc

Declare is a "nutrition label" and online database for building materials, providing

manufacturers with a clear, elegant and informative pathway for disclosing the ingredients within their products, and providing project teams with a database of compliant products. declare.living-future.org

Just is an innovative social justice label for all types and sizes of organizations. The program provides a simple, transparent framework for organizations to reveal much about their operations, including equitable treatment of employees and where they make financial and community investments. Just marks the beginning of a new era of corporate transparency. living-future.org/just-overview

Reveal is a simple, easy label and tool to communicate a building's energy efficiency, and is a great way to show off high performing buildings. Reveal is not required for Energy Petal compliance, and projects do not need to have renewable energy or meet a minimum or maximum threshold for energy efficiency. living-future.org/reveal

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For information, address:
info@living-future.org
The International Living Future Institute
PO Box 5874
Portland, OR 97228-5874

Label Use

Manufacturers that are provided a Living Product Challenge label have the right to use the label on general marketing materials and registered product materials. The label cannot be used on or associated with any other product than the product designated on the label. The label cannot be modified, altered or otherwise tampered with in any way.

Place Petal

PLACE PETAL HANDBOOK

Restoring a Healthy Coexistence with Nature and Community

LIVING PRODUCT CHALLENGE **2.0**

INTERNATIONAL LIVING FUTURE INSTITUTE℠

PETAL INTENT

The intent of the Place Petal is to positively influence how people relate to the natural environment and community that sustains us. It is essential for modern individuals to reconnect with the deep “story” of place, and the unique characteristics found in every community, so that they can be honored, protected and enhanced. In order to have regenerative and resilient communities, we must strengthen the ties between all members of that community, as well as the community’s relationship to the natural world.

The Place Petal articulates where it is acceptable for people to manufacture goods, how to protect and restore a place once it has been developed for manufacturing purposes and why it is important to respect all living species that are native to these places. Moreover, the Place Petal challenges manufacturers to consider how their impact on the local community, economy and ecosystem can function to further connect, strengthen and enrich the places where we make things.

The continued sprawl of development and the growing number of global megalopolises threaten the few wild places that remain. The decentralized nature of our residential communities and industrial zones impedes our capacity to connect not just with one another but also with the products we make, sell and use—all while increasing transportation impacts and pollution. The overly dense urban centers, in turn, crowd out healthy natural systems, isolating culture from a sense of place. As prime land diminishes, more residential and commercial development occurs in sensitive areas that are easily harmed or destroyed. Invasive species threaten ecosystems, which are already weakened by the constant pressure of human encroachment.

IDEAL CONDITIONS + CURRENT LIMITATIONS

The Living Product Challenge envisions an end to the insensitive placement of factories and other manufacturing facilities, and the production of goods that threatens fragile ecosystems, watersheds and species. Instead, we seek a manufacturing sector that conserves the natural resources that support human health and form the foundation for all the products we use. Human behavior is among the most significant barriers to transforming how we make things. A frontier mentality encourages the idea that all natural resources are up for grabs no matter the use or quantity; ecosystems have an inherently low value unless exploited. However, as attitudes change and previously disturbed areas are restored, the natural world can have a healthy relationship with the built environment and our modern systems of production.

I01- Responsible Place (Core)

RESPONSIBLE PLACE

CORE IMPERATIVE

01

PLACE PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

The intent of this Imperative is to establish that manufacturing should not impede the ability of local ecosystems to thrive. The final facility is often one of the areas under the greatest control of the Manufacturer. Therefore manufacturers should take the opportunity to identify and remove any avoidable negative ecological impacts of manufacturing and facility function, and work over time through innovation, infrastructure and landscaping to build positive interactions with the local ecology.

REQUIREMENTS

Living Products are made in facilities that are responsibly located so as to not degrade ecological habitats and their capacity to regenerate. Manufacturers must verify that facilities are not on or adjacent to habitats where there are endangered species unless there is an appropriate provision to protect the species, or the following sensitive habitats:

- Wetlands: maintain at least 15 meters and up to 70 meters of separation.
- Primary dunes: maintain at least 40 meters of separation.
- Old-growth forests: maintain at least 60 meters of separation.
- Virgin prairies: maintain at least 30 meters of separation.
- Prime farmland

Manufacturers must also publicly share a three-year plan that demonstrates how they will achieve on-site landscaping that:

- Matures and evolves to increasingly emulate the functionality of indigenous ecosystems with regard to density, biodiversity, plant succession, water use and nutrient needs.
- Provides wildlife habitat appropriate to the factory's location through the use of native and naturalized plants and topsoil.
- Operates without the use of petrochemical fertilizers or pesticides for maintenance.

CHANGES FROM LPC 1.1 TO 2.0

This Imperative became a Core Imperative in LPC 2.0, introducing requirements for all manufacturers pursuing the Living Product Challenge to create on-site landscaping improvements and develop a three-year plan to restore the surrounding environments to emulate indigenous ecosystems. ILFI also removed a documentation requirement that previously used a World Wildlife Foundation (WWF) tool that has since been retired.

Clarifications

EXISTING FACILITIES

The Imperative language states that facilities should be “responsibly located” with respect to ecological habitats. This does not apply to existing facilities and only applies to newly constructed facilities, where distances from sensitive ecosystems can be feasibly planned and therefore must be followed. Additionally, no part of the factory or facility property boundary should be built on greenfield, or land that was deliberately converted from a greenfield for the purposes of establishing this facility on or after 2015. Existing facilities do not need to meet the minimum distance or greenfield requirements of the Imperative.

IUCN LIST OF SPECIES CLARIFICATIONS

Using the IUCN Red List tool, manufacturers should use the default precision of the map’s point search, which creates a 25km radius around the marker, roughly a minimum search area of 2000 sq. km (these are default search parameters at the time of this writing).

- Using the map, use the zoom function to place a marker on the map plot of the facility, which automatically utilizes the default radius stated above.
- In the “Red List Category” filter, choose “CR – Critically Endangered” and “EN – Endangered” categories. Document species in Animalia and Plantae Kingdoms.
- From the List tab, manufacturers may copy this information into a document or take screenshots for documentation submission for this Imperative.

Manufacturers are not required to use the paid export function for the results of the search from the IUCN Red List tool, but may be interested in an official report for manufacturer initiatives not relating to the Living Product Challenge.

LANDSCAPE PLAN CLARIFICATIONS

To begin developing I01-3 Landscape Plan, manufacturers must complete Step One (identify the Reference Habitat) of the facility location and Step Two (assess baseline ecological condition) using the LBC Ecology of Place Clarifications. The manufacturer must self-identify the appropriate Transect of the facility site and must develop a Landscape Plan for the facility such that the minimum level of ecological function by Transect is achieved.

Manufacturers will find it useful to collect information from site plans and other design documentation for the facility, as well as consulting site maintenance staff, local or regional ecological and environmental organizations, and other appropriate stakeholders with knowledge of the land and site.

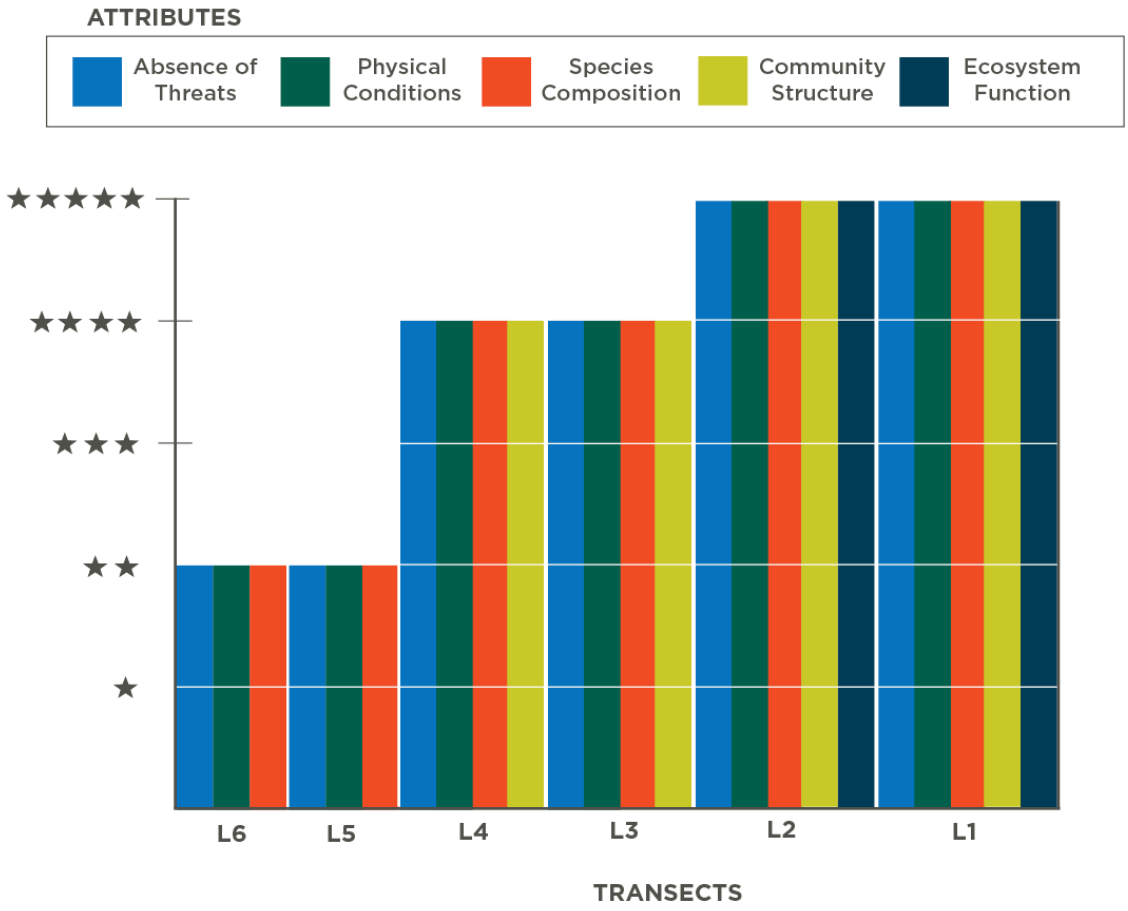


Figure 1-1 Minimum Level of Ecosystem Function Improvement by Transect.

Manufacturers can, but are not required to, follow Step Three of the LBC Ecology of Place Clarifications and model the Landscape Plan after the LBC Adaptive Plans to provide the "description of how the site will be transformed over the 3-Year certification period." If doing so, Manufacturers should use the three-year timeline as stated in the LPC Imperative language, rather than the 12-month timeline used for LBC projects. Manufacturers may also model and develop their own Landscape Plans that otherwise meet the intent of the Imperative.

The focus of the Landscape Plan is the ecosystem function of the facility site and its immediate surroundings, and how a Manufacturer's actions can protect and improve that function. While a Manufacturer may not have direct control over the immediate surroundings, it is asked to consider the relationship between the facility and its context, and specifically how actions around the facility can both avoid detrimental impacts on, and improve the condition of, the broader ecological setting.

Manufacturers are encouraged to target the highest level of performance feasible, given the facility's landscaping capacity, Transect, and the specific natural and human history of the site and immediate surroundings.

NON-OWNERSHIP OF FACILITY

If the manufacturer does not own the final manufacturing facility and can demonstrate that it does not have control over the landscaping of the site, it is not required to fulfill the I01-3 Landscape Plan requirements.

PROTECTION OF ENDANGERED SPECIES

To demonstrate no harm to endangered species means to demonstrate the presence or absence of endangered or critically endangered species using the IUCN tool (plants + animals). See documentation requirements.

Exceptions

All Exceptions require additional documentation. See I01 Exception Documentation Summary Table.

The following Exceptions apply to the Responsible Place Imperative.

PL-018 Third-Party Certification
PL-019 Site Environmental Indicators

PL-018 Third-Party Certification

Forest Stewardship Council Certification or similar demonstrating that the manufacturer imposes appropriate provisions to protect any endangered species and intact habitats that the manufacturing facilities may impinge upon.

PL-019 Site Environmental Indicators

Manufacturers that already use GRI sustainability reporting are considered to comply with Site Documentation requirements, and may submit documentation of EN11 and EN12 in lieu of the written requirements of I01-1 Site Documentation.

Documentation Requirements

BASIC DOCUMENTATION

I01-1 Site Documentation

Description of the site, including size and layout. Aerial photos or maps clearly displaying:

- All areas of operation (final manufacturing facilities) and adjacent properties to a minimum distance of

1,000 feet beyond the property line
- The land use on all sides of the property or properties
- All sensitive ecological habitats on or near the area(s) of operation

I01-2 IUCN List of Species

Itemized list, exported from IUCN's search function, of every Endangered (EN) or Critically Endangered (CR) species in Animalia and Plantae kingdoms within the relevant area(s) of operations (i.e. manufacturing facility or facilities). Include a photo of each species and a brief description, in addition to a statement detailing whether the manufacturing operations affect any of the listed species.

I01-3 Landscape Plan

A plan for each final manufacturing site that outlines:

- Current maintenance practice for the facility grounds
- A description of how the site will be transformed over the 3-Year certification period to:

1. Mature and evolve to increasingly emulate the functionality of the indigenous ecosystem with regard to density, biodiversity, plant succession, water use, and nutrient needs
2. Provide wildlife and avian habitat appropriate to the factory's location through the use of native and naturalized plants and topsoil
3. Operate without the use of petrochemical fertilizers or pesticides.

Photos should be included as relevant.

Exception Documentation

I01 EXCEPTION DOCUMENTATION SUMMARY TABLE		I01-a Conservation Documentation	I01-b GRI Sustainability Report
PL-018	Third-Party Certification	X	
PL-019	Site Environmental Indicators		X

I01-a Conservation Documentation

Official documents, from the organization responsible for the protection or interpretation of the sensitive ecological habitat, that demonstrate the product's compliance with Exception requirements.

I01-b GRI Reporting

In lieu of requirement I01-3, Landscape Plan, and in order to support I01-1 Site Documentation, manufacturers may submit Indicators EN11, EN12, EN13 and EN14, or GRI 304, of their GRI Sustainability Report documentation.

Resources

GRI Sustainability Reporting Standards

GRI Sustainability Reporting Standards (GRI Standards) are global standards that help businesses, governments and other organizations understand and communicate the impact of business on critical sustainability issues.
https://www.globalreporting.org/information/sustainability-reporting/Pages/gri-standards.aspx

IUCN Red List of Threatened Species

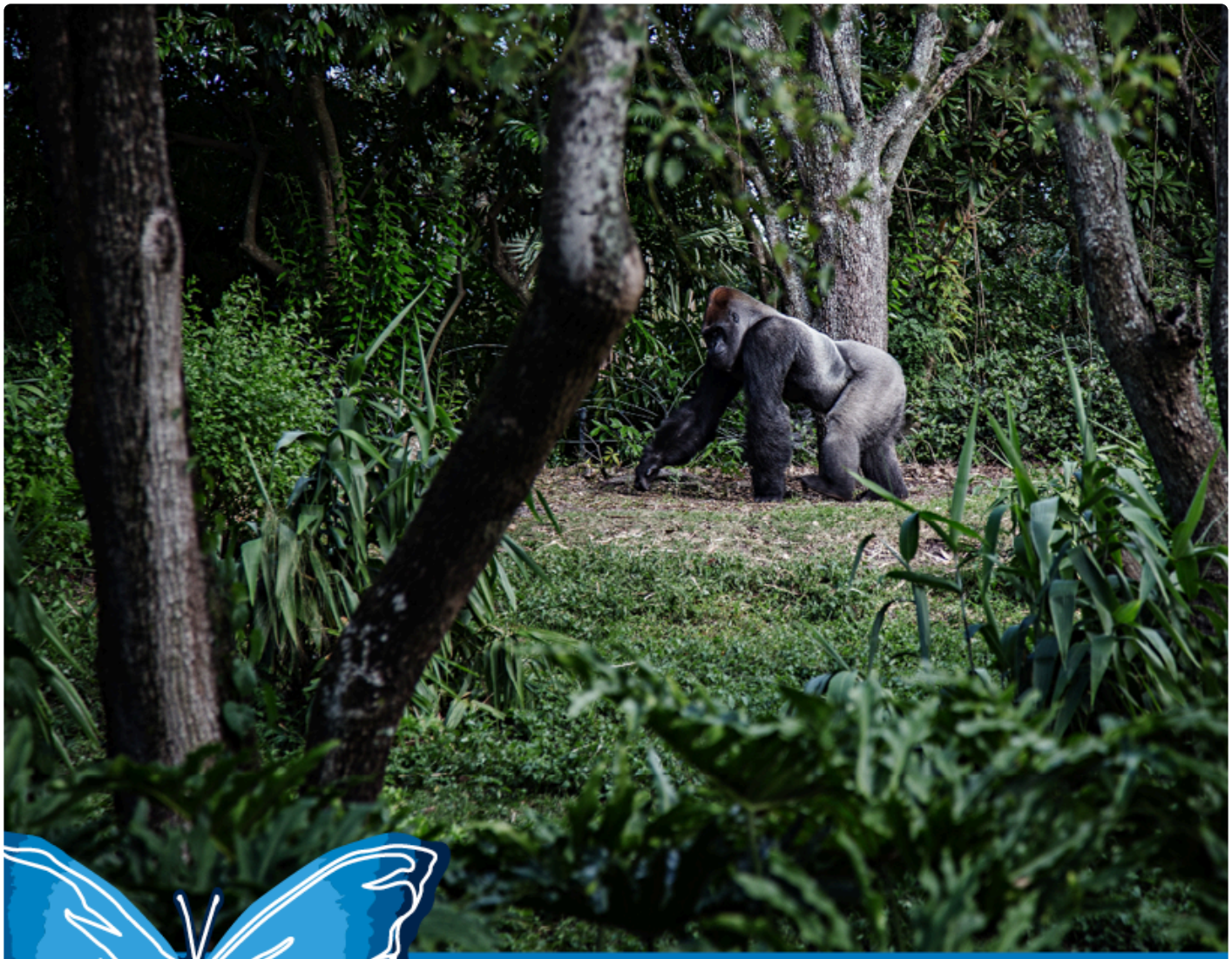
The International Union for Conservation of Nature's Red List of Threatened Species is the world's most comprehensive information source on the global conservation status of animal, fungi and plant species. It provides information about range, population size, habitat and ecology, use and/or trade, threats, and conservation actions that will help inform necessary conservation decisions.

https://www.iucnredlist.org/search/map

LBC Ecology of Place Clarifications

The Landscape Plan in the LPC can take many forms, and the LBC Ecology of Place Imperative provides a structure and guidelines for appropriate site landscaping that is easily translated to the LPC context. Clarifications are provided in the LBC Petal Handbook, which can be accessed via the ILFI Membership Dashboard.

I02- Habitat Exchange



HABITAT EXCHANGE

02

PLACE
PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

Manufacturing should recognize its impacts on all species and seek to give back to ecosystems whose materials support the creation of their products and functioning of our day to day lives. This Imperative asks that manufacturers donate a small percentage of their gross profits to approved conservation organizations that support Ecosystem health, conservation and restoration.

REQUIREMENTS

Living Products support habitat restoration to help account for the ecological impacts from the materials used to create the product. For every dollar of gross profit generated by the sale of the certified product for the duration of the certification period, manufacturers must annually donate a quarter cent to an approved conservation or Land Trust organization.

CHANGES FROM LPC 1.1 TO 2.0

This Imperative was adjusted in 2.0 to align with the giving amounts required in Imperative 16 Equitable Investment, and to support adoption of LPC at scale by manufacturers. The percentage required for donation was reduced from ½ cent per dollar of gross profit, to ¼ cent instead. The Imperative also more clearly calls out the need to maintain donations for the duration of the certification period (rather than just for the initial certification year).

Additional pathways that align with giving programs such as 1% for the Planet were also introduced to allow manufacturers flexibility in meeting the donation requirement “either entirely through money, or through a combination of money, volunteer time, or product only to an approved habitat conservation organization.”

Clarifications

COMPLIANCE PATHS

Existing donations of time, product and money may be used to cover the Imperative requirements for certification, but current efforts first must be quantified and converted consistently into their respective monetary values. Calculation requirements are as follows:

- Monetary donations must all be converted to the same currency used to calculate the required donation.
- Product donations must be calculated using the list price of the product. Discounts may not be counted toward the donation, only the complete donation of product.
- Volunteer hours may be counted toward this Imperative. Manufacturers must use the US national average for hourly value of volunteer time, as calculated by Independent Sector in the Value of Volunteer Time tool to calculate the monetary value of the volunteer time donated.

Additionally, the approved breakdown of the Habitat Exchange donation is the same as for the Equitable Investment Imperative:

- A minimum of 50% of the donation must be money
- Up to 25% of the donation may be contributed through volunteer hours
- Up to 25% of the donation may be made through product donations (any product may be donated, not just the one pursuing certification)

APPROVED HABITAT-FOCUSED CHARITABLE ORGANIZATIONS AND LAND TRUSTS

The recipient of a manufacturer's Habitat Exchange donation must be a registered charity of 501©3 organization that focuses on preservation of sensitive ecosystems or species. The beneficiaries of Habitat Exchange donations are intended to be non-human.

Manufacturers are encouraged to support organizations and prioritize habitat offsets in the same local region as the manufacturing facility or facilities that are part of the certification scope, but may donate to international charitable organizations that are based in a different country than the manufacturing facility or facilities, as long as the organization in question is active in the country of the final facility. If the selected organization has the option to designate funds by region, the manufacturer must designate its donation to the facilities' respective regions.

Donations to organizations that do not fully meet the Charitable Organization or Land Trust qualifications may still qualify for achievement of the Imperative requirements provided the manufacturer and partner organization demonstrate that the donation directly contributes to the preservation of critical habitat for non-human and non-exploitative purposes. For example, The Nature Conservancy meets the intent, but Habitat for Humanity has a human focus and does not qualify for this Imperative. Likewise, beautification donations intended primarily for aesthetic enhancements to a place or location do not count as they are for human purposes.

APPROVED LAND TRUST

Land trusts must:

- Be accredited through the Land Trust Accreditation Commission; or
- Adhere to the Land Trust Alliance Standards and Practices (designated by an S&P icon on the Alliance's geographically based membership list).

Teams can use the Land Trust Alliance's tool to find approved land trusts in the United States, if applicable. These organizations are considered approved if their primary focus is habitat preservation and they are actively responsible for the purchase and/or permanent easement, as well as for ongoing stewardship and conservation, of land in contiguous tracts of at least 100 acres.

VOLUNTEER HOURS

Manufacturers must use the US national average for hourly value of volunteer time, as calculated by Independent Sector Value of Volunteer Time to calculate the monetary value of the volunteer time donated. Volunteer hours that are donated to meet the requirements of the Imperative must be Paid Time Off (PTO) hours, and must be in service to an organization that meets the LPC requirements of charitable organizations and/or land trusts.

PRODUCT DONATIONS

Product donations must be calculated using the list price of the product. Discounts to product list price may not be counted as contributions to the total donation amount, unless it is a product donation, which can be counted at list price.

DONATION TIMING

While the Imperative requires annual giving, timing of charitable contributions is flexible provided that the manufacturer issues the total calculated donation required for the 3-year certification period prior to the time of the product recertification. When budgeting for annual giving, manufacturers may use the performance period (i.e. the fiscal year prior to initial certification) to set predictions for annual giving, and at each annual check-in may “true up” to ensure that donations meet the requirement. Donations that had already been made during the performance period to qualifying charitable organizations or land trusts may be counted toward the total calculated donation required.

Manufacturers that do not make a donation covering all 3 years by the time of certification must offset at minimum the donation amount calculated from the first year of sales, and calculate the donation amount required of the total 3-year certification period to demonstrate awareness and commitment to meeting these donation requirements per the Standard.

Exceptions

None at this time.

Calculations

Example Calculation:

Assume gross profit for sales of LPC product in 2019 totals $500,000 USD.
2020 gross profit is $550,000 USD
2021 gross profit is $750,000 USD

Donation requirement is ¼ cent per dollar of gross profit annually.

$500,000 × .0025 = $1,250 USD
$550,000 × .0025 = $1,375 USD
$750,000 × .0025 = $1,875 USD

Documentation Requirements

BASIC DOCUMENTATION

I02-1 Organization Selection Narrative

Brief description of the approved habitat conservation organization or Land Trust detailing:

- Organization and program purpose
- How the organization functions
- Why the organization was selected for the donation

I02-2 Profit Statement

A statement detailing the gross profit generated by the sale of the product through the 12-month performance period, as well as projected profit over the next three years. Manufacturers may use the performance period (fiscal year prior to certification) to set these predictions, and at each annual check-in may “true up” to ensure that donations meet the requirement. Manufacturers who do not make a donation covering all 3 years by the time of certification must offset at minimum the first year of sales, and identify the costs of the total certification period to demonstrate awareness and commitment to meeting these donation requirements per the Standard.

The statement must include a calculation demonstrating that the required annual donation amount reflects the gross profit multiplied by .0025.

Manufacturers may meet the donation requirement either entirely through money, or through a combination of money, time, or product only to an approved habitat conservation organization. Calculation requirements are as follows:

- A minimum of 50% of the donation must be monetary
- Up to 25% of the donation may be contributed through volunteer hours. Manufacturers must use the US national average for hourly value of volunteer time, as calculated by Independent Sector in the Value of Volunteer Time tool to calculate the monetary value of the volunteer time donated.
- Up to 25% of the donation may be made through product donations. Product donations must be calculated using the list price of the product, Discounts may not be counted toward the donation, only the complete donation of product.

I02-3 Receipt

Receipt for the donation from the selected conservation organization or the Approved Land Trust reflecting the required offset amount.

I02-4 Legal Documents (if following the Approved Land Trust path)

An official letter or document from the Land Trust stating the terms of the offset and confirming that the selected Land Trust is approved.

Resources

LAND TRUST ALLIANCE, *FIND A LAND TRUST*

A listing by state of Land Trust Alliance member land trusts. Accredited Land Trusts are indicated by a modified infinity symbol.
http://findalandtrust.org/

LAND TRUST ALLIANCE, *LAND TRUST STANDARDS AND PRACTICES*

Information regarding the Land Trust Alliance Standards and Practices.
https://www.landtrustalliance.org/topics/land-trust-standards-and-practices

GUIDELINES FOR PRIVATELY PROTECTED AREAS INTERNATIONAL UNION FOR CONSERVATION OF NATURE (IUCN)

https://portals.iucn.org/library/node/47916

INDEPENDENT SECTOR VALUE OF VOLUNTEER TIME

https://independentsector.org/value-of-volunteer-time-2018/

I03- Living Economy Sourcing

LIVING ECONOMY SOURCING

03

PLACE
PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

Living Products should support the local economy and support a low-carbon society wherever possible.

REQUIREMENTS

Living Products consist of materials primarily sourced from local suppliers to limit transportation impacts and support the expansion of a regional economy rooted in sustainable practices, products and services. Manufacturers must demonstrate that material source locations adhere to the following restrictions by weight or cost:

- 10% of materials or more must come from within 1,000 kilometers of the manufacturing site.
- An additional 40% must come from within 2,000 kilometers of the manufacturing site.
- An additional 25% must come from within 5,000 kilometers of the manufacturing site.
- 25% can be sourced from any location.

CHANGES FROM LPC 1.1 TO 2.0

Changes to this Imperative were minor from LPC 1.1 to 2.0. The Imperative moved from the Materials Petal to the Place Petal to better balance Petal requirements, and to recognize the importance of Living Economy Sourcing as a place-based solution. Particularly for some globally-sourced products there is no way to source within the requirements of the program restrictions, but an Exception requires maximum locality and then allows for reporting local community support to recognize that sourcing can only go so far. Documentation requirements were expanded to provide greater specificity of sourcing information.

Clarifications

GLOBALLY SOURCED COMMODITIES

Globally sourced commodities such as minerals, steel or plastic feedstocks are excluded from Imperative requirements.

PLATFORM CERTIFICATION SCALING

Manufacturers seeking to achieve this Imperative as part of an LPC Platform Certification that require use of PL-020 Local Impact Reporting Exception, must report material sourcing per the Imperative requirements radii for each individual facility, demonstrating intention to prioritize local materials sourcing where possible for each facility.

Exceptions

All Exceptions require additional documentation. See I03 Exception Documentation Summary Table.

The following Exceptions apply to the Living Economy Sourcing Imperative.

PL-020 Local Impact Reporting

PL-020 Local Impact Reporting

Complex products with global sourcing needs that cannot be met locally must demonstrate direct benefit to the local community through the manufacturer purchasing local goods and service beyond the material purchases for the product pursuing certification.

For some products with global supply chains, compliance with the Living Economy Sourcing distance range requirements may not be possible. Manufacturers in this situation may document their impact on the local economy, clearly demonstrating their support and engagement of the local community and businesses using existing sustainability reporting standards or other evidence.

Documentation Requirements

BASIC DOCUMENTATION

I03-1 Living Sourcing Table

Documentation should clearly demonstrate, for one product unit:

- Each purchased material by weight or by cost
- Supplier location for each purchased material
- Distance of each site of material purchase from final manufacturing location
- Percentage of each purchased material within each specified radius to demonstrate compliance with the following requirements:

1. 10% or more must come from within 1,000 kilometers of the manufacturing site
2. An additional 40% must come from within 2,000 kilometers of the manufacturing site
3. An additional 25% must come from within 5,000 kilometers of the manufacturing site
4. 25% can be sourced from any location

I03-2 Supporting Documentation

Documentation stating supplier location for each tracked material.

EXCEPTION DOCUMENTATION

I03 EXCEPTION DOCUMENTATION SUMMARY TABLE		I03-a Local Sourcing Intent Statement	I03-b Local Impact Reporting
PL-020	Local Impact Reporting	X	X

I03-a Local Sourcing Intent Statement

Products that wish to meet this Imperative but cannot meet the Imperative requirements must submit a narrative that outlines:

- Any purchased materials that are sourced outside of the allowable radius, and justification for the distance; and
- A statement of intent to source the product's purchased materials as locally as possible.

I03-b Local Impact Reporting

Manufacturers with globally-sourced complex products that do not comply with the sourcing radius requirements of I03-1 may still meet this Imperative by submitting either:

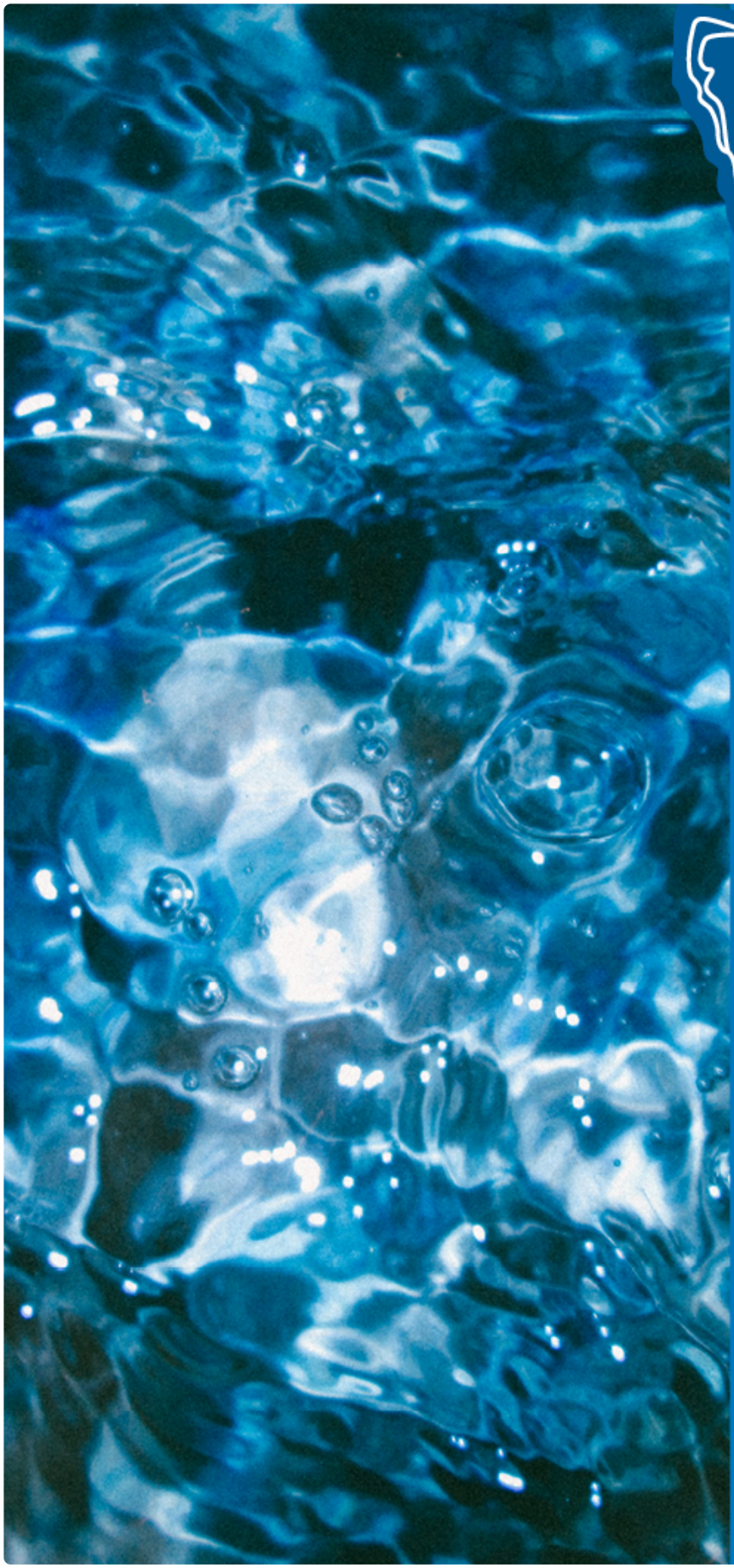
- Their GRI Sustainability Report; specifically, Indicators SO1, SO9 and SO10, and Standard Disclosures 4.14-4.17, Stakeholder Engagement, or other approved sustainability report; or
- a narrative written by the manufacturer describing specific engagement of the local community, and quantifiable evidence of the commitment to supporting the local economy beyond the direct creation of jobs at the facility.

Resources

The GRI Sustainability Reporting Standards (GRI Standards)

Widely adopted global standards for sustainability reporting.
https://www.globalreporting.org/

Water Petal



WATER PETAL HANDBOOK

Creating Products that Respect and Restore the Water Balance of a Given Place and Climate

LIVING PRODUCT CHALLENGE **2.0**

INTERNATIONAL **LIVING FUTURE** INSTITUTE℠

PETAL INTENT

The intent of the Water Petal is to realign how manufacturers use water. It also aims to redefine “waste” in the manufacturing environment so that water is respected as a precious resource. Scarcity of potable water is quickly becoming a serious issue as many communities around the world face severe water shortages and compromised quality. Even regions that have so far avoided the majority of these problems due to a historical abundance of freshwater are at risk; the consequences of climate change, unsustainable water-use patterns and the drawdown of major aquifers signal significant challenges ahead.

IDEAL CONDITIONS + CURRENT LIMITATIONS

The Living Product Challenge envisions a future in which all manufacturing processes are configured based on the carrying capacity and water balance of the facility’s site. The processes should also not harm water quality through resource extraction methods required for material inputs. We further envision a future where water used to make any product respects the natural hydrology of the land, the water needs of the ecosystem it inhabits and those of its neighbors without threatening the water system’s ability to meet those needs. Water does not need to be used as a throughput; rather, it can be used, purified and then used again cyclically—just as nature intended.

Currently many industries are often able to skirt regulations and avoid ethical water use, or deliberately put factories in places where impacts to water and watersheds are not regulated. In other cases, goods are made with an excessive amount of water. In locations where there is water scarcity, overusing a resource that should be a basic human right is undemocratic and unjust. Reaching ideal water-use standards means challenging outdated attitudes and technology with an approach that treats water as an essential resource for all life on this planet, and considers the impact of how water is used along the entire supply chain.

I04- Water Footprint (Core)

WATER FOOTPRINT

CORE IMPERATIVE

04

WATER PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

The intent of this Imperative is to increase awareness by product manufacturers of how and where they use water, and to demonstrate responsible water use. The Imperative requires manufacturers to look at their own facilities as well as upstream in their supply chain, in addition to downstream impacts and pollution.

REQUIREMENTS

Living Products have a quantified water Footprint for their cradle-to-gate production. In order to improve the use and management of water both on-site at the facility and within the life cycle of the product, it is crucial to first understand how process water is used and the fate of that process water.

On-Site Water Footprint:
Manufacturers must determine where and how water is used on-site at the facility and identify opportunities for decreasing water use and/or improving its use and disposal.

Life Cycle Water Footprint:
Manufacturers must conduct a Life Cycle Assessment to assess and document the water Footprint and identify the five processes (key drivers) that make the largest contributions to the product's cradle-to-gate water Footprint. Manufacturers can make use of an existing LCA or Environmental Product Declaration (EPD) that follows the ISO 14044 standard for LCA used for third-party communication. Manufacturers must demonstrate that the water Footprint of the product is lower than the industry average for the product type.

CHANGES FROM LPC 1.1 TO 2.0

This is a new Imperative under LPC 2.0 now separate from the requirement for becoming Net Positive on-site and in the Life Cycle (Imperative 05). It requires that manufacturers understand their on-site and life cycle water impacts, make those numbers transparent and explore opportunities for impact reduction within both of those scales to move towards becoming Net Positive. It also establishes that a valid LCA is required for all products regardless of the level of certification.

Clarifications

ON-SITE VS. LIFE CYCLE REQUIREMENTS

LPC asks manufacturers to measure the impact of production at two scales – on-site at the final manufacturing facility, and within the life cycle of the product. This encourages manufacturers to identify opportunities for impact reduction both on-site, where they may have the most control over efficiency of water use and building closed loop systems, as well as within the product's life cycle by identifying key drivers of impact (hotspots) and engaging with the suppliers to reduce their impact, or identifying suppliers more aligned with their sustainability goals.

Some final manufacturing facilities comprise a significant portion of the cradle-to-gate life cycle impacts of a product, in other cases final facilities will only conduct light assembly and may not use water at all. The combination of these two scopes ensures that the full water impacts of a product are captured, regardless of whether production is vertically integrated or not.

ON-SITE (FINAL MANUFACTURING FACILITY) CLARIFICATIONS

Final Manufacturing Facility (On-Site)
"On-site" within LPC refers to the final manufacturing facility, which is the final location where the product is physically altered (i.e. final point of assembly). If the final point of assembly represents multiple locations (i.e. facilities producing the same product in multiple geographical regions), the manufacturer must identify which of these is included in the certification. If a customer cannot distinguish between products produced at each of the facilities, or ensure that selected products are from a facility that has undergone an audit, the manufacturer must include all relevant facilities in the certification.

Site Performance Period
The site performance period should reflect documentation of water usage over a 12 month period. Manufacturers should use a consistent period of time that aligns with performance in other Imperatives. Data should be taken from a 12 month period within the 24 month period prior to submittal of audit documentation.

A manufacturer may certify a new product line or collection with fewer than 12 months of production data, but should first consult with ILFI or an Assessor to confirm that they will have adequate information to document or accurately predict key product metrics. Annual check-ins that take place with the Assessor post-certification additionally ensure that manufacturers continue to meet the requirements of the program throughout the period of certification.

On-Site Process Water
Process water is defined as water required to produce the product at the final facility, including but not limited to water used for material production (e.g. producing foam or dyeing), machine operation, or rinsing.

Manufacturers are required to identify the sources and fate of all process water in order to identify opportunities to increase on-site renewable water sourcing, potable manufacturing water use efficiency, water reuse and recycling, non-potable water use, and on-site effluent treatment and disposal.

The process water volume should be determined through traceable data, not limited to reviewing monthly data and bills from the 12-month performance period, from meter(s) and submeters, other onsite tracking systems. Manufacturers should clearly describe how they calculated both the production water use (submetering is preferred), as well as how they calculated the product's share of facility functions.

If the Product Share Pathway is used (LPC production at the facility accounts for <75% of output by cost or volume), only process water associated with production of the product(s) pursuing certification must be accounted for. If the Whole Facility Pathway (LPC production accounts for >75% of output by cost or volume) is instead pursued, all water associated with manufacturing on-site would be included in the scope.

If no water at the facility is used toward manufacturing processes for the product pursuing certification, the manufacturer must document this through a manufacturer statement. and the product is considered to have met the requirements of site “Net Positive”. The claim will be confirmed during the site audit.

Implementing On-Site Efficiency Opportunities
Manufacturers are asked to identify opportunities for more efficient use of potable water in the production process as well as further opportunities for closed-loop water use on-site. They must implement and document at least one action by the time of certification and quantify its impacts.

LIFE CYCLE CLARIFICATIONS

Valid LCA
Water footprint data for products pursuing the Living Product Challenge come from LCAs completed to guidelines in ISO 14040 and 14044, or from Type III facility-specific or product-specific cradle-to-grave Environmental Product Declarations completed to a relevant Product Category Rule that are published by product manufacturers/declaration holders, or published by ISO 14025 program operators that have completed the third-party verification and registration of the EPD, as defined in ISO 14025, ISO 14044, and ISO 21930 and/or EN 15804. The LCA must have been completed and/or critically reviewed by an Approved LCA Practitioner (see below) and be made publicly available. The American Center for Life Cycle Assessment (ACLCA) maintains a list of active LCACPs.

An existing LCA may be used if it is still valid. However, manufacturers should note that they may have to further analyze the results or re-engage a consultant who created the LCA in order to discover required program information (e.g. Energy Hotspots) or to better reflect any Footprint reductions that have taken place.

Approved LCA Practitioners
All manufacturers must produce and maintain an LCA report demonstrating the product’s cradle-to-grave impacts, performed in accordance with a relevant PCR (if one exists) and ISO 14040/44 and meets the following:

- Has been critically reviewed by a third party for conformance with IS0 14044
- Has either been performed by an LCA Certified Practitioner certified by ACLCA or by an ILFI-approved LCA practitioner or consultancy.

The American Center for Life Cycle Assessment (ACLCA) maintains a list of active LCACPs.

For EPDs, the ACLCA maintains a list of active ISO 14025 program operators.

Industry Average Footprint
Product manufacturers must identify the industry average water footprint value and identify whether they fall above or below that value.

Acceptable methods for documenting an industry average are presented below, in order of preference:

- Manufacturers can submit a known industry average, industry-wide or sector LCA or EPD commissioned and completed by their industry or trade association(s). The sector LCA or EPD should reflect the same geography as the final facility, or the final facilities respectively.
- If a product-specific industry average LCA or EPD does not exist, manufacturers may use a broader product type LCA or EPD that still represents the product seeking certification. Industry average LCAs or EPDs should be used for comparison purposes and relative performance only and does not take place of any other documentation related to product environmental impacts.
- Three competitor product EPDs may be used in the absence of any established industry averages, if they use the same PCR and background data, impact assessment methods and assumptions are adequately comparable.

The manufacturer must provide rationale for the type of industry average referenced based on the industry landscape. If no industry average exists, the manufacturer must note this and provide a brief narrative regarding efficient use of water throughout the life cycle relative to similar products and identify opportunities for improvement.

Establishing a Footprint Baseline
The water Footprint baseline per functional unit should be established based on the most recent valid LCA data for the product. To establish the scale of water impact required to be offset through Handprinting, the manufacturer may use predicted sales volume for the three years of certification. If those values are too high or too low, the manufacturer may use the annual check-ins with their assessor to “true up” Handprinting impacts.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

Products pursuing the Product Share pathway that do not require on-site water inputs at the final manufacturing facility(s) are considered Site Net Positive within LPC and are exempt from on-site documentation requirements I04-1, I04-2, I04-3 and I04-4. The site audit will confirm compliance.

SITE REQUIREMENTS

I04-1 Site Water Narrative
A 1-2 page narrative, written by the water system designers, engineers or facility manager fully describing the on-site water system at the final facility, and including all of the following information:

- Clear indication of whether the Whole Facility pathway (>75% facility output) or Product Share pathway (≤75% facility output) is being used. If the Product Share pathway is selected, a description

of how water usage was calculated for the product line must be included.
- A list of all water end-uses on site, and whether the demands are met with potable or non-potable water
- A description of the source, reuse, and disposal of all water used in the production process, including system schematics and flow diagram, showing contributing system(s) and major components, their function and location and the water treatment method(s) associated with each.
- An annual water balance diagram showing general water flow and balance of product share or, if applicable, the overall facility and site hydrology. This may be incorporated into the flow diagram required above.
- Top five impactful opportunities for water usage reduction at the facility or in the production process.

If the product is not pursuing I05 Net Positive Water, the manufacturer must complete the following:

- A description of the systems required to meet 100% of the Product Share or, if applicable, the Whole Facility's water usage via on-site resources.
- Description of any existing barriers to becoming on-site water Net Positive and potential solutions.

I04-2 Site Water Supply and Use Table
Completed Water Supply and Use Table as provided, documenting actual water use at the final manufacturing facility from monthly readings throughout the 12-month occupancy period from meter(s) or other onsite tracking systems that clearly record the amount of water used from each applicable supply source.

Manufacturers should also provide supporting documentation in the form of water bills or submetering of end uses to make table claims traceable.

I04-3 On-Site Effluent Treatment Documentation
For any production water treated and disposed or discharged on-site, manufacturers must identify all potential Red List substances used in production of the product pursuing certification. Manufacturers must also describe and document all on-site industrial water treatment and testing methods, including documentation of compliance with local wastewater treatment regulation.

I04-4 Water System Photographs
Photographs of any water systems, particularly portions that will be hidden from view at time of audit due to completion of construction.

LIFE CYCLE REQUIREMENTS

I04-5 Industry Average
Acceptable methods for determining the industry average cradle-to-gate water Footprint value are identified in the Industry Average clarification.

The manufacturer should document the industry average value, clearly identifying and documenting the source of the average, and compare it to the product water Footprint. If the Footprint is above the industry average, manufacturers should identify opportunities for reducing the water Footprint by the time of

recertification.

If no industry average exists, the manufacturer must note this and provide a brief narrative regarding efficient use of water throughout the life cycle relative to similar products and identify opportunities for improvement.

This requirement is superseded by documentation requirement I05-5 Industry Average if pursuing I05 Net Positive Water.

I04-6 Hotspot Identification
Documentation of the water consumption hotspots of the product's cradle-to-gate life cycle:

- A table of process contributions to cradle-to-gate life cycle water consumption, listing at least the top 5 processes ranked in terms of water consumption.
- A brief 1-2 paragraph narrative that interprets the main results and identifies the 5 main drivers of the product's water consumption footprints.
- An analysis of opportunities for leveraging these hotspots to reduce impact in the product's life cycle

Resources

LBC Water Petal Handbook
The LBC Water Petal Handbook identifies strategies and resources to support buildings that use water efficiently and are ultimately water net positive.

IAPMO Water Demand Calculator
The Water Demand Calculator is a free tool used to determine the demand load expected from indoor water use.
http://www.iapmo.org/water-demand-calculator/

ISO 14044
ISO 14044:2006 specifies requirements and provides guidelines for life cycle assessment (LCA) including: definition of the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, relationship between the LCA phases, and conditions for use of value choices and optional elements.
https://www.iso.org/standard/38498.html

ISO 14025 for Environmental Product Declarations
An Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable information about the life cycle environmental impact of products. As a voluntary declaration of the life-cycle environmental impact, having an EPD for a product does not imply that the declared product is environmentally superior to alternatives. EPDs exist at multiple scopes from facility-specific and product-specific production to a generalized sector or industry EPD that aggregates life cycle inventory data from multiple manufacturers and their processes. They are completed to

a relevant Product Category Rule (PCR) that are published by product manufacturers/declaration holders, or published by ISO 14025 program operators that have completed the third-party verification and registration of the EPD, as defined in ISO 14025, ISO 14044, and ISO 21930 and/or EN 15804.

I05- Net Positive Water

NET POSITIVE WATER

HANDPRINTING IMPERATIVE

05

WATER PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

This Imperative encourages manufacturers to treat water like the precious resource it is, minimizing waste and the use of potable water throughout the life cycle of their product, and avoiding downstream impacts and pollution. It then challenges manufacturers to go beyond impact reductions such that there is more accessible potable water in the world due to the creation of the product.

REQUIREMENTS

Living Products value water as a precious resource; manufacturers operate within the water carrying capacity of their facility locations and work in harmony with the natural water flows of their sites. Manufacturers must achieve the Net Positive requirements for water within both their own site operations and the full life cycle of the product.

On-Site Net Positive:
100% of the product's manufacturing water needs at the final manufacturing facility must be supplied by captured rainwater or another natural closed loop water system. Manufacturers can also recycle industrial water. In addition:

- All water used must be purified as needed without the use of chemicals.
- All stormwater and water discharge must be treated on-site and managed either through reuse, a closed-loop system or infiltration.
- Excess stormwater can be released onto adjacent sites under certain conditions.

Life Cycle Net Positive:
Manufacturers must reduce the product's cradle-to-gate water Footprint through on-site and supply chain innovations to conserve or capture water, and then create a water Handprint greater than the Footprint to become water Net Positive through one or more of the following strategies:
Innovate to conserve or recapture more water across the life cycle of the product compared to the base case.
Engage with customers and other product users to achieve water conservation and/or restoration.
Work outside of the supply chain to reduce potable water consumption or harvest potable water.

CHANGES FROM LPC 1.1 TO 2.0

This Imperative from LPC 1.1 was split into two Imperatives so that I04 would become a core requirement of all Living products, and creating a clearer path to becoming Net Positive. There is no longer a 3-year plan to reach Net Positive. Living Products must be Net Positive at the time of certification and maintain that status through recertification. To support this, new exceptions recognize a portfolio approach to demonstrating On-Site Net Positivity across multiple facilities.

Clarifications

On-Site vs. Life Cycle Requirements

At the final Facility, the manufacturer must meet the requirements of having 100% of potable process water come from on-site renewable sources, be sufficiently treated and discharged without the use of chemicals, and be treated to maintain and not actively diminish the quality of natural habitats on and off-site. Where on-site closed loop solutions have been exhausted, manufacturers may create Handprints within the same watershed to offset remaining potable process water.

In the product life cycle, the manufacturer must document and calculate impacts of water Footprint reduction methods and quantify the reduction in product water Footprint. In addition, the manufacturer must clearly demonstrate the size of the total water Footprint based on production volume, and demonstrate that Handprinting actions offset a minimum of 1 year of impacts (see Net Positive Timeline clarification below if 1 year cannot be met) by the initial certification date, with clear and detailed plans to offset the remaining two years of Footprint impacts.

Non-quantifiable impacts (e.g. social impacts) resulting from manufacturer Handprinting actions are highly encouraged, but are not required for achievement of the Imperative.

ON-SITE CLARIFICATIONS

Closed Loop Systems
Production process water needs must be met, to the maximum extent possible, by a closed-loop system within the carrying capacity of the site's natural water systems. Ideally this means all water used in production of the product(s) pursuing certification comes from, and is returned to, the facility site.

For example, if the water supply is rainwater, there must be sufficient opportunities for evapotranspiration and infiltration to support the natural ecosystem. If the supply is groundwater (e.g. wells), the manufacturer must show that the aquifer is being recharged with the same amount that is withdrawn on an annual basis, and that withdrawing water for the project does not produce any negative or irreversible consequences (e.g., saltwater intrusion, draining of fossil water). When water is returned to the aquifer after use, it must be reintroduced so that it does not compromise natural systems (e.g., treated and reintroduced at an appropriate temperature to avoid thermal pollution, etc.).

If pursuing the Whole Facility Pathway, project teams must research the current functions and capacity of natural water sources and systems, and ensure that the project as developed emulates the natural hydrologic state of the site prior to human development to the maximum extent possible.

Manufacturers may use water from a municipal reclaimed water system as a resource for non-potable water, so long as the water supplied is municipally treated domestic sewage and not non-treated or minimally treated water that is sourced from the municipality's potable water supply. Similarly, manufacturers may also contribute their treated greywater or treated domestic sewage water to the system. Any water contributed to municipal systems must be treated to the same or acceptable standards as the water in the reclaimed water

system and used beneficially.

Handprinting for On-Site Impacts
I05 requires that the manufacturer demonstrate that process water comes from on-site renewable sources and be treated and discharged without the use of harmful chemicals. If sourcing municipal potable water to meet on-site water demands or discharging effluent to municipal treatment centers, the manufacturer must offset these impacts through Handprinting. Achieving on-site Net Positive is now possible through either on-site closed-loop systems, or Handprinting. If a Handprinting pathway is selected, it must be regional and take place in the same watershed as the facility.

The potable water reduction from Handprinting measures must be metered or determined using utility data if possible. If metering or utility data is not possible/available, then calculated water savings is acceptable for documentation of this requirement.

Where the Handprinting offset can be demonstrated by metering, the reduction in potable water use must be compared to the water use during either the immediately preceding year or an average of the immediately preceding 5 years. If the Handprinting strategy is being implemented in a new building, the project team must show a water reduction beyond BAU or code.

Where the Handprinting offset is calculated, conservative and industry-accepted assumptions regarding usage patterns must be used.

Handprinting impacts for on-site impacts must be in place by the time of the certification audit, and the associated water savings must be calculated to last for at least 15 years.

LIFE CYCLE NET POSITIVE CLARIFICATIONS

Net Positive Timeline
By the time of certification, manufacturers must create a water Handprint greater than the cradle-to-gate water Footprint established in the 12-month performance period as identified in I04, and then maintain Net Positivity on an annual basis moving forward.

While Net Positive Water is encouraged to be accounted for on an annual basis, the minimum requirement at the time of certification is Net Positive achievement for at least 3 months of potable water consumption, calculated multiplying the water Footprint by production volume. This may help manufacturers that are scaling production and sales during the certification process and after certification is achieved and product sales begin.

Manufacturers who have offset less than the full 3 years of production impacts at the time of certification, must have a robust plan in place to maintain Net Positivity through the certification period in order to be approved.

This plan must include all of the following:

- Description of each Handprinting activity

- Timeline of implementation
- Clear description of how the Handprint will be measured
- Statement from the manufacturing leadership pointing to awareness of the program requirements and committing to maintaining Net Positivity over the certification period

Handprinting for Life Cycle Impacts
Preference should be given to Handprinting actions that are regional to the facility or to upstream facilities that have significant water impact, in order to better balance footprints and Handprints for the local ecology.

Water Handprints are defined as actions that leave the watershed with more potable water than the business-as-usual scenario. While the specifics of the action, location and context of Handprints are critical to identify, there are some examples to set manufacturers on the right track. These include:

- Reducing the water footprint of another building or facility outside the product Footprint (example, installing water efficient low-flow fixtures). Protecting land designated for deforestation and therefore increasing infiltration such that an aquifer is recharged with more and cleaner water
- Some examples: help other manufacturers or upstream supply chain vendors identify water saving actions in their own facilities; helping them identify water footprint actions in their own supply chain (e.g. new process in paper and wood pulp products that reduces water consumption by 25%);

Refer to the Handprinting Guide for more information, guidance and inspiration on Handprint creation.

Exceptions

The following Exceptions apply to the Net Positive Water Imperative.

WT-010 Chlorine Disinfection

WT-010 Chlorine Disinfection

Chlorine disinfection for potable water uses in facilities regulated as “public water systems” under the U.S. Safe Drinking Water Act (or equivalent regulations outside of the US) is allowed. The US EPA defines public water systems as those that have at least 15 service connections, or regularly serve at least 25 individuals. For these facilities, chlorine disinfection may be required for regulatory compliance. However, to use this Exception, the manufacturer must exhaust all regulatory appeals short of legal appeals. The chlorine added should be the minimum amount allowed by the code. In addition, the manufacturer must include and document point-of-use dechlorination with a 0.5 micron carbon block filter or other approved dechlorination method.

Documentation Requirements

BASIC DOCUMENTATION

Products that do not require on-site water inputs at the final manufacturing facility(s) are considered Site Net Positive within LPC and are exempt from on-site requirement I05-1.

I05-1 Site Net Positive Calculations

Completed Water Supply and Use Table showing total actual water use from monthly readings throughout the 12-month performance period from meter(s) or other on-site tracking systems that clearly record the amount of water used from each supply source.

If the project is using Handprinting to meet their on-site requirements, also include all of the following:

- Metered data showing the amount of water pulled from the municipal potable water system;
- Metered or calculated data showing the reduction in water being sent to the sewer elsewhere based on the project team's handprinting strategy; and
- A description of the Handprinting strategy with a map showing that the impact occurred in the same watershed as the facility.

I05-2 Site Net Positive Narrative

A description of the on-site systems used to meet the Net Positive requirements that 100% of process and product water are sourced from on-site renewable resources. The narrative should include a description of how the facility sufficiently treated and discharged water on-site without the use of chemicals, including results from water quality effluent testing as applicable to a quality required to maintain the quality of natural habitats on- and off-site.

I05-3 Effluent Quality

Manufacturers must identify all potential harmful substances used in production that could end up in the water from the manufacturing facility, and demonstrate that they are adequately treating water to remove the presence of any harmful substances. Manufacturers should submit recent water effluent testing reports to support claims of safe water effluent in terms of its content, temperature and safety for the ecosystem.

I05-4 Life Cycle Net Positive Calculations

Calculations clearly demonstrating all of the following:

- The product's baseline water Footprint per product, calculated impacts of any footprint reduction methods and the product's reduced Footprint size
- The total water Footprint per year for all 3 years of certification (Year 1 = certification until 1st annual check-in) based on predicted production.
- All existing and planned individual Handprinting actions (e.g. installing a water-efficient showerhead)

including the actual or predicted date of implementation and the scale of the action.
    - If the manufacturer is not offsetting the full 3 years of production by the time of certification, they should refer to Clarification: Net Positive Timeline
- The impact of each individual action (e.g. the impact of installing 1 water-efficient showerhead) and the Handprint effort at scale (e.g. the total impact of installing 20 water-efficient showerheads).
- The size of the total Handprint created and its comparison to the Footprint. The calculated value of the Handprint should exceed the Footprint for at least 3 months of production to comply, and documentation should clearly indicate how the manufacturer will maintain Net Positivity each year over the full 3-year certification period.

I05-5 Industry Average

Product manufacturers must demonstrate that their product's cradle-to-gate water footprint is below the industry average, or if they are above the industry average, create a public plan (published as part of the LPC Case study) to optimize their life cycle water use by the time of recertification. Acceptable methods for arriving at an industry average value are identified in the Industry Average clarification and sources should be clearly documented.

If an industry average exists and the manufacturer's water Footprint is above that average, the manufacturer must publish a plan that identifies how they intend to reduce the water impacts of the product by the time of recertification and includes:

- The current industry average versus their baseline water Footprint
- The product's carbon and and fossil energy Footprints versus those industry averages
- Identification of the water Hotspots in the Footprint
- Specific actions the manufacturer will take to decrease potable water use in the supply chain, dates of action implementations and commitments to achieve those reductions by the time of recertification

If no industry average exists, the manufacturer should provide either:

- A self-comparison: a narrative with calculations demonstrating life cycle reductions of the product versus a previous LCA created for the product
- A self-assessment: a brief narrative regarding efficient water use throughout the life cycle relative to similar products and identify opportunities for improvement.

I05-6 Water Handprint Narrative

A narrative accompanying I05-4 calculations, that clearly describes how the manufacturer has reduced the product's water Footprint, created a water Handprint greater than the reduced Footprint to become measurably Net Positive, and how it will maintain Net Positivity through the 3-Year certification period. All of the following information should be provided:

- A brief narrative explaining the Handprinting actions, including collaborations with other groups or stakeholders to create the Handprint.
- The quantifiable water impacts of the Handprinting actions. Inclusion of non-quantifiable impacts is

encouraged, but not required.
- A spreadsheet documenting all input assumptions and the resulting Handprint impact calculations.
- The final water Footprint value and Handprint value.

ADDITIONAL DOCUMENTATION FOR WHOLE FACILITY COMPLIANCE

I05-7 Stormwater Calculations

Stormwater calculations by the project engineer demonstrating Imperative requirements for working in harmony with natural water flows, based on a minimum ten-year storm.

I05-8 Bio-solids Disposal Documents

Evidence of appropriate use of bio-solids and liquids within a 100-mile radius of the facility.

EXCEPTION DOCUMENTATION

Exception Documentation For Whole Facility Compliance

These exceptions are only applicable to the Whole Facility path. Manufacturers that use Exceptions require additional documentation shown in the table below.

I05 EXCEPTION DOCUMENTATION SUMMARY TABLE		I05-a Design Documents	I05-b Appeals Documentation
WT-010	Chlorine Disinfection	X	X

I05-a Design Documents

Design documents, such as project manual excerpts, drawings or cut sheets, showing product meets Exception requirements.

I05-b Appeals Documentation

Documentation of the team's effort to comply with requirements despite regulatory barriers. Team should include all the following documents:

- The regulatory statute or code that hinders product compliance.
- Summary of all potential appeals and outcomes.
- Written appeal documents and response showing the decision(s) from regulatory authority

Resources

LBC Water Petal Handbook
The LBC Water Petal Handbook identifies strategies and resources to support buildings that use water efficiently and are ultimately water net positive.

Handprinting Guide
The Handprinting guide delves further into Net Positive requirements for LPC, and provides guidance and case studies to achieve Net Positive impact on-site and within the life cycle.

ISO 14044
ISO 14044:2006 specifies requirements and provides guidelines for life cycle assessment (LCA) including: definition of the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, relationship between the LCA phases, and conditions for use of value choices and optional elements.
https://www.iso.org/standard/38498.html

ISO 14025 for Environmental Product Declarations
An Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable information about the life cycle environmental impact of products. As a voluntary declaration of the life-cycle environmental impact, having an EPD for a product does not imply that the declared product is environmentally superior to alternatives. EPDs exist at multiple scopes from facility-specific and product-specific production to a generalized sector or industry EPD that aggregates life cycle inventory data from multiple manufacturers and their processes. They are completed to a relevant Product Category Rule (PCR) that are published by product manufacturers/declaration holders, or published by ISO 14025 program operators that have completed the third-party verification and registration of the EPD, as defined in ISO 14025, ISO 14044, and ISO 21930 and/or EN 15804.

Energy Petal

ENERGY PETAL HANDBOOK

Relying on Renewable Resources

LIVING PRODUCT CHALLENGE **2.0**

INTERNATIONAL **LIVING FUTURE** INSTITUTE℠

PETAL INTENT

The intent of the Energy Petal is to signal a new age of product design and manufacturing, wherein facilities of all types rely solely on renewable forms of energy and operate year-round in a safe, pollution-free manner, ultimately giving back more than they take. In addition, this Petal encourages manufacturers to consider the full life cycle energy Footprint of their products and to look for ways that product or process innovation can conserve energy.

Living Products will be manufactured in ways that produce more energy than is required to make the product on-site. Further, Living Products will be designed and distributed in ways that enable them to generate or conserve more energy over their entire life cycle than is required to produce them.

The Energy Petal aims to prioritize reductions and optimization before technological solutions are applied to eliminate wasteful spending—of energy, resources and dollars. The majority of energy generated today is from highly- polluting and often politically-destabilizing sources including coal, gas, oil and nuclear power. Large-scale hydropower, while inherently cleaner, results in widespread damage to ecosystems. Burning wood, trash or pellets releases particulates and carbon dioxide (CO2) into the atmosphere; it also often strains local supplies of sustainably harvested biomass while robbing the soil of much-needed nutrient recycling. These ects of these energy sources on regional and planetary health are becoming increasingly evident through climate change, the most worrisome major global trend attributed to human activity.

IDEAL CONDITIONS + CURRENT LIMITATIONS

The Living Product Challenge envisions a safe, reliable and decentralized power grid powered entirely by renewable energy and supplied to incredibly efficient buildings and infrastructure without the negative externalities associated with combustion. Although considerable progress has been made to advance renewable energy technologies, there is still a need for greater efficiency from these systems and for new, cleaner ways to store the energy they generate. These realities together with the current cost of available systems, and restrictions by utilities and government agencies on system size and interconnection with the grid, are the major limitations to reaching our goals.

I06- Energy Footprint (Core)

ENERGY FOOTPRINT

CORE IMPERATIVE
06

ENERGY PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT:

Manufacturers should understand their impacts both on-site at their facilities location}, as well as how their supply chains impact their footprint regarding energy use. Requiring every manufacturer to measure their energy impacts on-site and throughout the life cycle, identify hotspots of usage and explore Handprinting and efficiency solutions enlightens and can spur change even on the path to becoming Net Positive.

REQUIREMENTS:

Living Products have a quantified energy Footprint for their cradle-to-gate production. In order to improve energy management, it is critical to understand the amount and types of energy used for on-site production, as well as the life cycle energy impacts.

On-Site Energy Footprint:
Manufacturers must clearly describe the sources of energy at the final facility and when and how energy is used in production. They must also identify opportunities for decreasing energy use and increasing the percentage of power supplied by renewable energy on-site.

Life Cycle Energy Footprint:
Manufacturers must conduct a Life Cycle Assessment to assess and document the fossil-based energy Footprint and identify the five processes (key drivers) that make the largest contributions to the product's cradle-to-gate fossil energy Footprint. The fossil energy Footprint reflects the use of fossil fuel energy across the supply chain. The manufacturer can make use of an existing LCA or Environmental Product Declaration (EPD) that follows the ISO 14044 standard for LCA that is used for third party communication. The manufacturer must also demonstrate that the fossil energy Footprint of the product is lower than the industry average for the product type.

CHANGES FROM LPC 1.1 TO 2.0

This is a new Imperative under LPC 2.0 now separate from the requirement for becoming Net Positive on-site and in the Life Cycle (Imperative 07). It requires that manufacturers understand their on-site and life cycle fossil energy impacts, make those numbers transparent and explore opportunities for impact reduction within both of those scales to move towards becoming Net Positive. It also establishes that a valid LCA is required for all products regardless of the level of certification.

Clarifications

ON-SITE VS. LIFE CYCLE REQUIREMENTS

LPC asks manufacturers to measure the impact of production at two scales – on-site at the final manufacturing facility, and within the life cycle of the product. This encourages manufacturers to identify

opportunities for impact reduction both on-site, where they may have the most control over efficiency and ability to maximize renewable energy, as well as within the product's life cycle by identifying key drivers of impact (hotspots) and engaging with the suppliers to reduce their impact, or identifying suppliers more aligned with their sustainability goals.

Some final manufacturing facilities comprise a significant portion of the cradle-to-gate life cycle impacts of a product, in other cases final facilities will only conduct light assembly or may not use energy at all. The combination of these two scales ensures that the full fossil energy impacts of a product are captured, regardless of whether the manufacturer is vertically integrated or not.

ON-SITE (FINAL MANUFACTURING FACILITY) CLARIFICATIONS

Site Performance Period
The site performance period should reflect documentation of energy usage over a 12 month period. Manufacturers should use a consistent period of time that aligns with performance in other Imperatives. Data should be taken from a 12 month period within the last 24 months prior to the certification audit.

A manufacturer may certify a new product line or collection with fewer than 12 months of production data, but should first consult with ILFI or an Assessor to confirm that they will have adequate information to document or accurately predict key product metrics. Annual check-ins that take place with the Assessor post-certification additionally ensure that manufacturers continue to meet the requirements of the program throughout the period of certification.

Final Manufacturing Facility (On-Site)
"On-site" within LPC refers to the final manufacturing facility, which is the final location where the product is physically altered (i.e. final point of assembly). If the final point of assembly may take place at different multiple locations (i.e. facilities producing the same product in multiple states), the manufacturer must identify which of these is included in the certification. If a customer cannot distinguish between products produced at each of the facilities, or ensure that selected products are from a facility that has undergone an audit, the manufacturer must include all relevant facilities in the certification.

Process Energy (Product Share Energy Scope)
Manufacturers using the Product Share Pathway (where LPC production accounts for <75% of facility output by cost or volume) must only offset fossil energy use associated with manufacturing the product that is pursuing certification.

Process energy refers to the energy required to produce the product on-site at the final manufacturing facility. This includes all production-associated energy (machine operation, power tools, heating for steam production).

The on-site energy footprint should be determined through traceable data from meter(s) and submeters, other onsite tracking systems or web-link to an online mechanism that clearly records energy produced and consumed (e.g., total energy generated; total energy use by subsystem including simulated/designed demand if available). Manufacturers should clearly describe how they calculated both the production energy (submetering is preferred).

If the Whole Facility Pathway production accounts for >75% of output by cost or volume) is instead pursued, all fossil energy use on-site would be included in the scope.

If no fossil energy at the facility is used toward manufacturing the product, the manufacturer must document this through a manufacturer statement and the product is considered to have achieved site “Net Positive”. The claim will be confirmed during the site audit.

Implementing On-Site Efficiency Opportunities
Manufacturers are asked to identify opportunities for more efficient use of fossil energy use on-site. They must implement and document at least one action by the time of certification and attempt to quantify its impacts.

LIFE CYCLE (FOOTPRINT) CLARIFICATIONS

Valid LCA
Energy footprint data for products pursuing the Living Product Challenge come from life cycle assessments completed to guidelines in ISO 14040 and 14044, or from Type III facility-specific or product-specific cradle-to-grave Environmental Product Declarations completed to a relevant Product Category Rule that are published by product manufacturers/declaration holders, or published by ISO 14025 program operators that have completed the third-party verification and registration of the EPD, as defined in ISO 14025, ISO 14044, and ISO 21930 and/or EN 15804. The LCA must have been completed and/or critically reviewed by an Approved LCA Practitioner (see below) and be made publicly available. The American Center for Life Cycle Assessment (ACLCA) maintains a list of active LCACPs.

An existing LCA may be used if it is still valid. However, manufacturers should note that they may have to further analyze the results or re-engage a consultant who created the LCA in order to discover required program information (e.g. Energy Hotspots) or to better reflect any Footprint reductions that have taken place.

Approved LCA Practitioners
All manufacturers must produce and maintain an LCA report demonstrating the product’s cradle-to-grave impacts, performed in accordance with a relevant PCR (if one exists) and ISO 14040/44 and meets the all of the following:

- Has been critically reviewed by a third party for conformance with IS0 14044
- Has either been performed by an LCA Certified Practitioner certified by ACLCA

The American Center for Life Cycle Assessment (ACLCA) maintains a list of active LCACPs. The list is not limited to LCACPs in North America or the Americas.

For EPDs, the ACLCA maintains a list of active ISO 14025 program operators.

An existing LCA may be used if it is still valid. However, manufacturers should note that they may have to further analyze the results or re-engage a consultant who created the LCA in order to discover required program information (e.g. Energy Hotspots) or to better reflect any Footprint reductions that have taken

place.

Industry Average
Product manufacturers must demonstrate that their product's fossil energy footprint is below the industry average, or take steps to bring the footprint below the industry average prior to certification.

Manufacturers can submit the industry average, industry-wide or sector LCA or EPD commissioned and completed by their industry or trade association(s). The sector LCA or EPD should reflect the same geography as the final facility, or the final facilities respectively.

If a product-specific industry average LCA or EPD does not exist, manufacturers may use a broader product type LCA or EPD that still represents the product seeking certification. Industry average LCAs or EPDs should be used for comparison purposes and relative performance only and does not take place of any other documentation related to product environmental impacts.

If no industry average exists, the manufacturer must note this and provide a brief narrative regarding efficient use of fossil energy throughout the life cycle relative to similar products and opportunities for improvement.

Establishing a Footprint Baseline
The fossil energy Footprint baseline per functional unit should be established based on the most recent valid LCA data for the product. To establish the scale of fossil energy impact required to be offset through Handprinting, the manufacturer may use predicted sales volume for the three years of certification. If those values are too high or too low, the manufacturer may use the annual check-ins with their assessor to "true up" Handprinting impacts if they are too low, or establish how much is in their Handprint bank.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

Products pursuing the Product Share Pathway do not require on-site process energy must submit a statement to this effect. These products are exempt from on-site requirements I06-1, I06-2, I06-3, and I06-4. The site audit will confirm compliance.

SITE REQUIREMENTS

I06-1 Site Energy Narrative

A 2-3 page narrative describing the energy system at the final manufacturing facility, written by the energy

designers, engineers or facility manager.

The narrative should include all of the following:

- Whether the Whole Facility or Product Share pathway is being used; if Product Share is selected, include a description of how on-site process energy usage was calculated for the product line
- A description of where and how energy is used to create the product and the overall facility energy demands, including the types and sources of energy at the facility
- A schematic drawing of on-site energy systems
- Description of all subsystems of the energy using and producing systems, including all areas listed in the I06-2 Energy Use Table
- Opportunities for energy usage reduction at the facility or in the production process

If the product is not pursuing I07 Net Positive Energy, the manufacturer must also provide all of the following:

- How the 105% of the Product Share or, if applicable, the Whole Facility's energy usage could be met via on-site renewable resources (or ILFI-approved off-site infrastructure)
- Description of any existing barriers to becoming on-site Net Positive and potential solutions

I06-2 On-Site Energy Use

Completed Energy Use Table with monthly data from the 12-month performance period, including data from meter(s), other onsite tracking systems, or web-link to an online mechanism that clearly records energy produced and consumed (e.g., total energy generated; total energy use by subsystem including simulated/ designed demand if available). Additional strategies may be submitted for approval.

I06-3 Photographs

Photographs of the systems, particularly portions that will be hidden from view at time of audit due to completion of construction or lack of access to auditors.

I06-4 Energy Bills

Utility bills for a continuous 12-month period beginning with the designated start date of the performance period.

If the product is not connected to a utility or is sub-metered from a utility meter serving a larger area, and therefore has no energy bills, the manufacturer must write and sign a letter substantiating that this is the case, in conjunction with the sub-metered data.

LIFE CYCLE REQUIREMENTS

I06-5 Industry Average

Acceptable methods for determining the industry average cradle-to-gate energy Footprint value are

identified in the Industry Average clarification.

The manufacturer should document the industry average value, clearly identifying and documenting the source of the average, and compare it to the product energy Footprint. If the Footprint is above the industry average, manufacturers should identify opportunities for reducing the energy Footprint by the time of recertification.

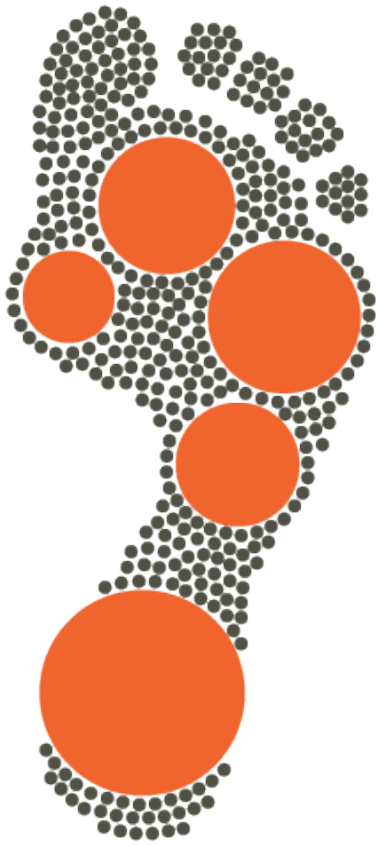
If no industry average exists, the manufacturer must note this and provide a brief narrative regarding efficient energy use throughout the life cycle relative to similar products and identify opportunities for improvement.

I06-6 Hotspot Identification

The following data shall be provided, documenting the cradle-to-gate fossil fuel-based energy consumption hotspots of the product's life cycle:

- A table of process contributions to cradle-to-gate life cycle energy consumption, listing at least the top 5 processes ranked in terms of energy consumption
- A brief one- to two-page narrative that interprets the results and identifies the five main drivers of the product's cradle-to-gate fossil energy consumption footprints
- An analysis of opportunities for leveraging these hotspots to reduce impact in the product's life cycle

Figure below illustrates importance of Hotspot identification in determining drivers of Footprint size and reducing impact.



Resources

ISO 14044

ISO 14044:2006 specifies requirements and provides guidelines for life cycle assessment (LCA) including: definition of the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, relationship between the LCA phases, and conditions for use of value choices and optional elements.
https://www.iso.org/standard/38498.html

ISO 14025 for Environmental Product Declarations

An Environmental Product Declaration (EPD) is an independently verified and registered document that communicates transparent and comparable information about the life-cycle environmental impact of products. As a voluntary declaration of the life-cycle environmental impact, having an EPD for a product does not imply that the declared product is environmentally superior to alternatives. EPDs exist at multiple

scopes from facility-specific and product-specific production to a generalized sector or industry EPD that aggregates life cycle inventory data from multiple manufacturers and their processes. They are completed to a relevant Product Category Rule (PCR) that are published by product manufacturers/declaration holders, or published by ISO 14025 program operators that have completed the third-party verification and registration of the EPD, as defined in ISO 14025, ISO 14044, and ISO 21930 and/or EN 15804.

Handprinting Guide

I07- Net Positive Energy

NET POSITIVE ENERGY

HANDPRINTING IMPERATIVE

07

ENERGY PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

Living Products should reduce or eliminate their use of fossil energy, and ultimately create more renewable energy than they use both on-site at their facilities, as well as accounting for the entire life cycle of their creation. Their manufacturing should use energy efficiently and support the decentralized production of renewable energy.

REQUIREMENTS

Living Products are Net Positive for energy within both their own site operations and the full life cycle of the product.

On-Site Net Positive:
105% of the energy used to produce the product at the final manufacturing site must be generated from renewable energy produced on-site on a net annual basis.

Life Cycle Net Positive:
Manufacturers must first reduce the product's cradle-to-gate fossil energy Footprint through on-site and supply chain innovations to use less combustion-based energy. They must then create an energy Handprint greater than the product's fossil energy Footprint to become Net Positive through one or more of the following strategies:

- Innovate to conserve energy or generate renewable energy across the life cycle of the product.
- Engage with users to achieve energy conservation through improved use of the product.
- Work outside of the supply chain to reduce energy consumption or generate renewable energy.

CHANGES FROM LPC 1.1 TO 2.0

This Imperative from LPC 1.1 was split into two Imperatives so that I06 Responsible Energy Footprint would become a core requirement of all Living Products, building awareness of fossil energy use and creating a clearer path to becoming Net Positive. There is no longer a 3-year plan to reach energy Net Positive. Living Products must be Net Positive for energy at the time of certification and maintain that status through recertification. To support this, new exceptions recognize a portfolio approach to demonstrating On-Site Net Positivity across multiple facilities.

Clarifications

ON-SITE VS. LIFE CYCLE NET POSITIVE

At the final Facility, the manufacturer has met the requirements of having offset 105% of the process fossil energy associated with manufacturing the product) that is pursuing certification (if following the Product

Share pathway), or of all process fossil-based energy used on-site (if following the Whole Facility pathway).

Process energy refers to the energy required to produce the product on-site at the final Facility. This includes all production-associated energy (such as machine operation, power tools, heating for steam production).

The on-site energy footprint should be determined through traceable data from meter(s) and submeters (if installed), other onsite tracking systems or web-link to an online mechanism that clearly records energy produced and consumed (e.g., total energy generated; total energy use by subsystem including simulated/ designed demand if available). Manufacturers should clearly describe how they calculated the production energy (submetering is preferred).

In the product life cycle, the manufacturer must document and calculate impacts of energy Footprint reduction methods and quantify the reduction in product energy Footprint. In addition, the manufacturer should clearly compare the size of the total Handprint created and its comparison to the Footprint.

Non-quantifiable impacts (e.g. social impacts) resulting from manufacturer Handprinting actions are highly encouraged, but are not required for achievement of the Imperative.

APPROVED RENEWABLE ENERGY SOURCES

Renewable Energy is defined as passive solar, photovoltaics, solar thermal, wind turbines, water-powered microturbines, direct geothermal, or fuel cells powered by hydrogen generated from renewably powered electrolysis. Project teams intending to use technology other than what is indicated here must submit requests to LPC.Support@living-future.org. It is not acceptable to measure a project's performance by including the savings from another building that is outside the project boundary or the scope of the project without an Exception.

RENEWABLE ENERGY ADDITIONALITY

New renewable energy assemblies and infrastructure must provide additionality, i.e., create new renewables that would not otherwise exist but for the project, unless they meet an Exception.

ON-SITE RENEWABLE ENERGY

Renewable energy sources offsetting on-site energy use are to be located within the final manufacturing facility grounds unless the project meets an Exception.

LIFE CYCLE NET POSITIVE CLARIFICATIONS

NET POSITIVE TIMELINE

By the time of certification, manufacturers must create an energy Handprint greater than the cradle-to-gate energy Footprint established in the 12-month performance period as identified in I06, and then maintain Net

Positivity on an annual basis moving forward.

While Net Positive Energy is encouraged to be accounted for on an annual basis, the minimum requirement at the time of certification is Net Positive achievement for at least 3 months of fossil energy consumption, calculated by multiplying the fossil energy Footprint by production volume. This may help manufacturers that are scaling production and sales during the certification process and after certification is achieved and product sales begin.

Manufacturers who have offset less than the full 3 years of production impacts at the time of certification, must have a robust plan in place to maintain Net Positivity through the certification period in order to be approved.

This plan must include:

- Description of each Handprinting activity
- Timeline of implementation
- Clear description of how the Handprint will be measured
- Statement from the manufacturing leadership pointing to awareness of the program requirements and committing to maintaining Net Positivity over the certification period

Exceptions

The following Exceptions apply to the Net Positive Energy Imperative.

EC-017 Renewable Energy Certificates for Contract Manufacturing

When small companies engaged in contract manufacturing are unable to leverage that contract to generate energy on the site of manufacture, and when it is not feasible to engage in a Power Purchase Agreement (PPA), those companies may purchase Green-e Energy Certified Renewable Energy Credits (RECs) in order to meet the energy generation requirement of I07-1 Site Net Positive Calculations.

Companies eligible for this exception must meet all of the following criteria:

- not own the final production facility
- not be eligible to contract under a PPA

- control less than 75% of the facility's production output by cost
- not occupy any other energy intensive facility at which they could engage in a PPA or install on-site renewables

RECs purchased to meet this exception must meet all of the following criteria:

- Be Green-e Energy Certified (within the U.S.) or comply with an ILFI-approved national or international standard, such as I-REC (outside the U.S.)
- Be purchased within the 21-month window of eligible generation dates established by Green-E Energy (within the 12 months of the sale calendar year, the six months before the sale calendar year began, or three months after the sale calendar year has ended
- Correspond to energy produced as locally as possible (at minimum within the same regional grid).

EC-018 Pre-existing Infrastructure (LPC)

To meet the on-site Net Positive requirement of LPC, manufacturers can take advantage of pre-existing renewable energy systems located on manufacturing facilities or administrative buildings that are owned or operated by the manufacturer attempting certification. This is allowed as long as the renewable energy output has not been double counted for other products attempting LPC certification. The project team must provide all of the following:

- Photographs of the existing system
- Metering data or other records documenting the amount of energy produced by the existing renewable energy system
- Calculations indicating how much of the renewable energy produced by the existing system will be attributed to the LPC product and confirmation that as the production of the product scales, the existing renewable energy system can reasonably meet increased needs until the time of recertification, 3 years
- A narrative signed by the owner outlining the system design and Imperative approach and explaining the system's ownership, operations, and/or physical location in relation to the manufacturer and associated facilities
- A signed statement from the owner of the renewable energy system that the energy attributed to the LPC product will not be double counted for any other claims.

EC-019 Off-site Renewables (LPC)

Manufacturers that produce the same product attempting certification at multiple manufacturing locations or manufacturers that have demonstrated they are unable to provide renewables on the product manufacturing site may locate renewables off site, as long as the renewable infrastructure has met all of the following requirements:

- The facility is located within the same regional grid as the product manufacturing location; on the site of a manufacturing location or administrative location operated by the manufacturer attempting

certification; or installed to directly serve a community group, school or not-for-profit
- The facility is located on a previously developed site that is not classified as, or adjacent to: wetlands, primary dunes, old-growth forest, virgin prairie, prime farmland, or within the 100-year flood plain OR be installed in a way to allow continuation of ecologic or natural resource functions
- The renewable infrastructure provides additionality
- The system is physically identifiable and specifically attributed or allocated to the product for the duration of LPC certification (minimum of three years)
- The system is directly metered
- The system is clearly and visibly explained in detail at the LPC manufacturing site

EC-020 Photovoltaic Array Ownership

Third-party ownership of a PV installation is allowed with a long-term lease agreement in place. The contract length must be a minimum of 15 years.

EC-021 Shared/3rd Party Arrangements

It is acceptable to place PV panels on the rooftops or other areas of adjacent properties and use the energy generated from these adjacent off-site sources to power the facility. Resources may only be attributed to one facility; they cannot be “double counted.” The manufacturer must provide technical documents showing the facility contributed financially to the development of the renewable system, such as:

- Proof of purchase and maintenance agreements; or
- Third-party agreements to acquire the equipment and manage ongoing maintenance. The team must also submeter and track energy to show that the energy required for the facility is covered by the system, and attributed to only the facility.

Documentation Requirements

BASIC DOCUMENTATION

All Basic Documentation is required for all products unless noted otherwise.

I07-1 Site Net Positive Calculations

A description of how the Product Share of energy usage is calculated and renewable energy is used to provide 105% of energy needs if the Product Share path is taken, or a description of how the whole facility energy usage is calculated and renewable energy is used to provide 105% of the entire facility energy needs for the Whole Facility approach

Calculations clearly demonstrating how the manufacturer has met the requirements of having 105% of energy needs come from on-site renewable sources.

I07-2 Renewable Energy Certificates

In order to claim that the product is 100% powered by renewable energy at the final manufacturing facility, the manufacturer must demonstrate ownership of sufficient Renewable Energy Certificates (RECs) to cover the claim. The purchase of RECs themselves do not suffice to demonstrate the creation of additional renewable energy but must support any renewable energy claims.

This means either the manufacturer has retained the RECs associated with on-site renewable energy production, or if the RECs must be sold, has purchased new RECs. In cases where new RECs must be purchased, additional documentation is required. This should include the number of RECs purchased, the cost of purchase, and a demonstration that this purchase accounts for a minimum of 105% of the on-site energy usage in the performance year. The RECs purchased must meet all the following criteria:

- Green-E Certified
- Less than 5 years old
- Tied to production within the same regional grid as the final manufacturing facility or property owned and operated by the manufacturer achieving certification
- Physically identifiable: the location and attributes must be known, rather than be a generalized power purchase
- Specifically attributed or allocated to the project for a minimum of 15 years through a recognized ownership structure, such as a Power Purchase Agreement. All utilized RECs by the manufacturer should have a specific location searchable and visible on Google Earth / Maps or StreetView

Documentation should also indicate intention to continue the requisite purchase of RECs throughout the certification period to cover all 3 years of production.

I07-3 Life Cycle Net Positive Calculations

Calculations clearly demonstrating all of the following:

- The product's baseline fossil-based cradle-to-gate energy Footprint per product, calculated impacts of any footprint reduction methods and the product's reduced Footprint size
- The total fossil-based cradle-to-gate energy Footprint per year for all 3 years of certification (Year 1 = certification until 1st annual check-in) based on predicted sales
- All existing and planned individual Handprinting actions (e.g. installing an off-site photovoltaic panel array) including the actual or predicted date of implementation and the scale of the action. If the manufacturer is not offsetting the full 3 years of production by the time of certification, they should refer to the Clarification Net Positive Timeline
- The calculated impact of each individual action (e.g. the impact of installing an on-site PV array) and the calculated Handprint impact at scale (e.g. the total impact of a portfolio-wide transition to on-site renewables production)
- The size of the total Handprint created and planned, and its comparison to the 3-year predicted Footprint. The calculated value of the Handprint should exceed the Footprint for at least 3 months of production, and documentation should clearly indicate how the manufacturer will maintain Net Positivity each year over the full 3-year certification period.

Manufacturers who are scaling Handprints with product scales may submit to LPC.Support@living-future.org for approval to be certified after 3 months of Net Positive achievement, but must complete a more detailed plan and demonstrate company leadership's understanding of the requirements and commitment to maintain Net Positivity.

I07-4 Energy Handprint Narrative

A narrative accompanying I07-3 calculations that clearly describes how the manufacturer has reduced the product's energy Footprint, created an energy Handprint greater than the reduced Footprint to become measurably Net Positive, and how it will maintain Net Positivity through the 3-Year certification period. Each of the following must be provided:

- A brief narrative explaining the Handprinting actions, including collaborations with other groups or stakeholders to create the Handprint
- The quantifiable energy impacts of the Handprinting actions. Inclusion of non-quantifiable impacts is encouraged, but not required
- A spreadsheet documenting all input assumptions and the resulting Handprint impact calculations
- The final energy Footprint value and Handprint value

EXCEPTION DOCUMENTATION

Manufacturers that use Exceptions require additional documentation. The table below shows the documentation required for each Exception.

I07 EXCEPTION DOCUMENTATION SUMMARY TABLE		I07-a Additional Narrative	I07-b Metering Documentation	I07-c Technical Documents	I07-d Photographs
EC-017	Renewable Energy Certificates for Contract Manufacturing	X	X		X
EC-018	Pre-existing Infrastructure (LPC)			X	
EC-019	Off-site Renewables (LPC)			X	
EC-020	Photovoltaic Array Ownership	X	X		X
EC-021	Shared/3rd Party Arrangements		X	X	

I07-a Additional Narrative

A narrative describing the facility's need for the Exception, the approach to, and implementation of, the alternative solution, and compliance with Exception requirements.

I07-b Metering Documentation

Metering documentation or data showing compliance with Exception requirements.

I07-c Technical Documents

Legal, financial or contract documents showing compliance with Exception requirements.

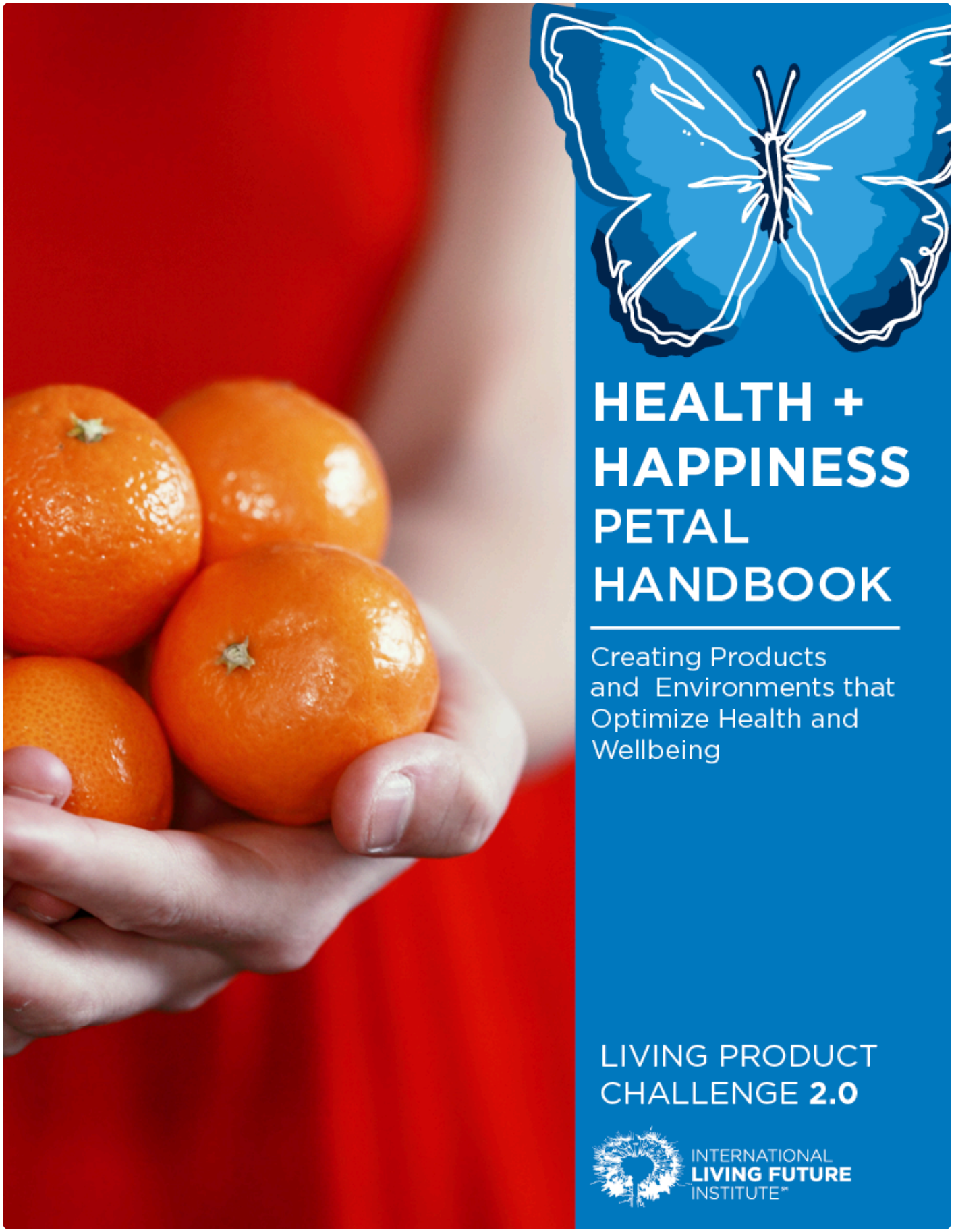
I07-d Photographs

Photographs showing compliance with Exception requirements, including images of all components that will be changed from an existing state, or hidden by the completion of the performance period.

Resources

Handprinting Guide

Health & Happiness Petal



HEALTH + HAPPINESS PETAL HANDBOOK

Creating Products and Environments that Optimize Health and Wellbeing

LIVING PRODUCT CHALLENGE **2.0**

INTERNATIONAL **LIVING FUTURE** INSTITUTE℠

PETAL INTENT

The intent of the Health + Happiness Petal is to focus on the most important conditions that must be present to create products and materials that truly benefit consumers. The Petal is not designed to address all potential ways that goods can compromise society. Instead, it aims to encourage the creation of items whose purpose is to holistically protect and enhance the physical and emotional wellness of the people who manufacture, install and use them.

This Petal focuses in particular on the toxicological impact of materials on both human and environmental health. Persistent Bioaccumulative Toxic chemicals from product manufacturing, use and disposal are building up in our environment with significant consequences for human and ecosystem health. Many of the goods we use in our daily lives are harmful to our health and well-being, and some goods greatly diminish human potential. It is crucial for manufacturers of all products to first identify what is in their products, remove the most harmful materials and then look more carefully at chemical and material alternatives to continually raise the bar until we reach a materials economy where healthy materials are the only option.

Materials used in products have health implications not only for consumers, but also for the people who manufacture these products, their parts and contractors who install them. Materials considerations take all of these stakeholders into account. Additionally, many manufacturing facilities have substandard conditions for the health and productivity of workers. It is rare for a manufacturing facility to prioritize health-and-wellness as we are starting to expect in homes and offices. By focusing on the major pathways where manufacturing can impact health—the materials used in products, the spaces in which they are made, and the surrounding communities—we can create a consumer society that is designed to optimize the human condition.

IDEAL CONDITIONS + CURRENT LIMTATIONS

h2. IDEAL CONDITIONS + CURRENT LIMITATIONS

The Living Product Challenge envisions a nourishing, highly productive and healthy modern world with consumer products that enrich our daily lives. However, even the most restorative products require acceptance by their users and engagement from their makers. It is difficult to ensure that goods will continue to optimally enhance health and happiness over time since available technologies and consumer preferences change quickly. It can also be complicated to ensure optimal use of products over their complete life cycles due to the unpredictable ways in which people use and maintain them. Finally, it will always be challenging to predict the unintended consequences from the use of any product, as almost anything created can be used in unforeseen ways. Those impacts may be unknown for many decades.

The precautionary principle guides all materials decisions when impacts are unclear. There are significant limitations to achieving the ideal for the materials realm. Although consumers and product buyers are starting to weigh social and environmental impacts in parallel with other more conventional considerations, such as aesthetics, function and cost, the biggest shortcoming is due to the market itself. While there are a huge number of “green” products for sale, there is also a shortage of good, publicly available data that backs up manufacturer claims and provides consumers with the ability to make conscious, informed

choices. Transparency is vital; as a global community, the only way we can transform into a truly sustainable society is through open communication and honest information sharing. However, many manufacturers are wary of sharing trade secrets that they believe afford them a competitive advantage, and instead make proprietary claims about specific product contents.

Declare

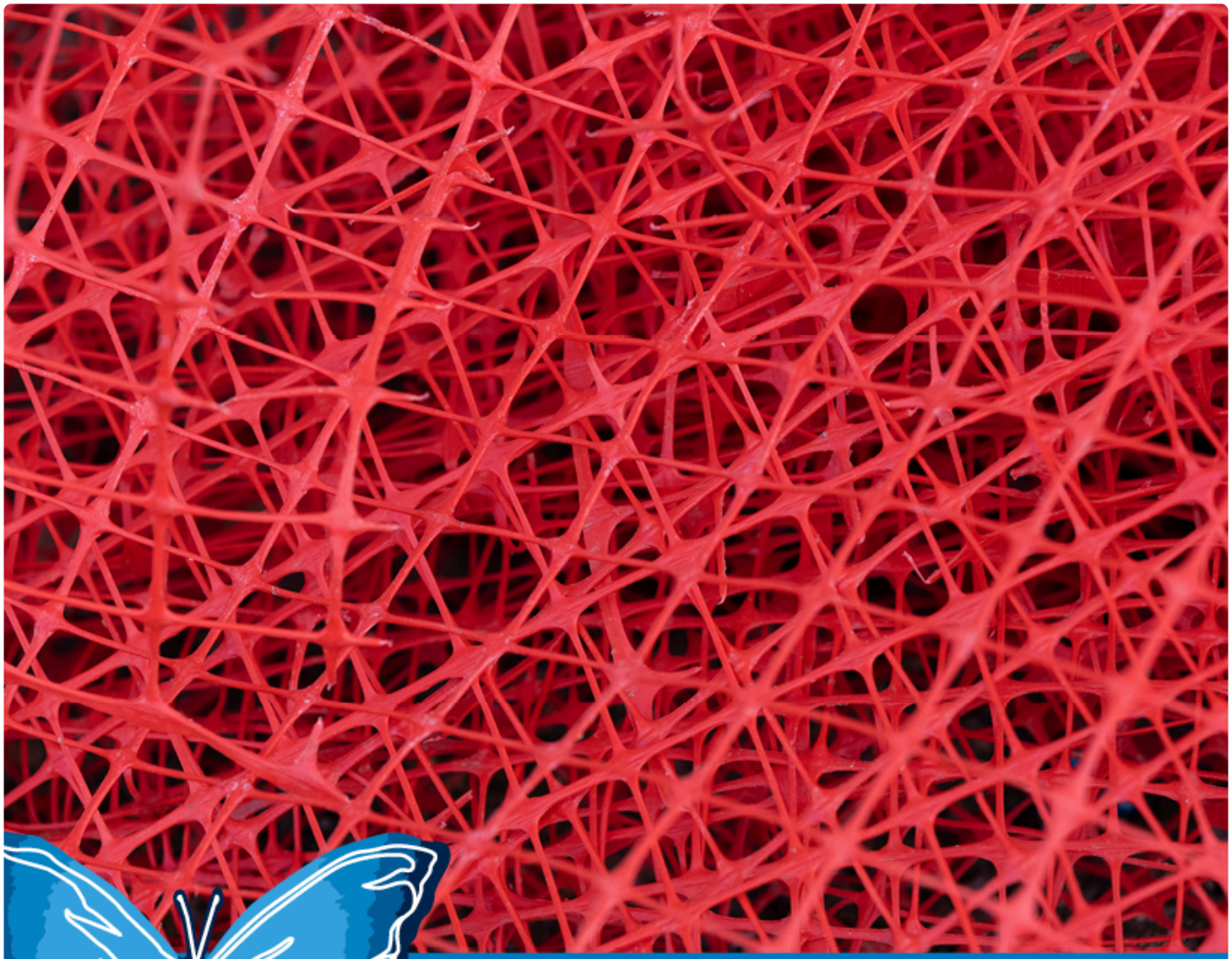
Declare, the Institute's "ingredients label for products" label and online database with a direct connection to the Living Building Challenge Materials Petal. While manufacturers often initially resist disclosure, most major building manufacturers are now recognizing the benefit of toxic-chemical avoidance and transparency through Declare. This movement in the building industry needs to be shared among new industries, such as consumer goods, electronics and apparel, to ensure that manufacturers are transparent with their customers. Since its start in 2012, Declare has grown rapidly to cover almost every building product category and is swiftly moving into consumer products. Third Party Verified Declare began in 2017 to provide added rigor by verifying ingredient and product claims through a trusted third party.

Transparent Material Health

A lack of toxicity and health information about many ingredients used in modern production means that a truly healthy product must go beyond just screening against a list of known problematic chemicals and disclosing them.

The Transparent Material Health Imperative requires the evaluation of substances with unknown impacts using rigorous hazard assessment tools to ensure known toxins are not replaced by chemicals with unknown toxicity or those likely to cause harm, known as regrettable substitution. The designation of Transparent Material Health is a high bar for definitively ensuring material health while maintaining the commitment to transparency that increases information in the market and accelerates transformation of the materials economy.

I08- Red List (Core)



RED LIST

CORE IMPERATIVE

08

HEALTH + HAPPINESS PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

All Living Products are free of the worst in class materials and chemicals, demonstrating transparency and safety no matter the level of certification.

REQUIREMENTS

Living Products are free of Red List materials or chemical substances. Through an LBC Red List Free or LBC Red List Approved (formerly LBC Compliant) Third Party Verified Declare label, manufacturers must demonstrate that neither the product nor its packaging contain any Red List materials or chemical substances. Additionally, the manufacturing process may not produce byproducts or emissions that are considered toxic or included on the Red List.

Antimicrobials (marketed with a health claim)	Monomeric, polymeric, and organophosphate halogenated flame retardants (HFRs)
Alkylphenols and related compounds	Organotin Compounds
Asbestos compounds	Perfluorinated compounds (PFCs)
Bisphenol A (BPA) and structural analogues	Phthalates (orthophthalates)
California-banned solvents	Polychlorinated biphenyls (PCBs)
Chlorinated Polymers, including:	Polycyclic aromatic hydrocarbons (PAHs)
• Chlorinated polyethylene (CPE)	Short-chain and medium-chain chlorinated paraffins
• Chlorinated polyvinyl chloride (CPVC)	Toxic heavy metals:
• Chloroprene (neoprene monomer)	• Arsenic
• Chlorosulfonated polyethylene (CSPE)	• Cadmium
• Polyvinylidene chloride (PVDC)	• Chromium
• Polyvinyl chloride (PVC)	• Lead (added)
Chlorobenzenes	• Mercury
Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs)	Volatile organic compounds (VOCs) in wet- applied products [1]
Formaldehyde (added)	Wood Treatments containing creosote or pentachlorophenol

[1] VOCs are limited, not banned. Refer to VOC Clarifications section below for specific reference standards + thresholds.

CHANGES FROM LPC 1.1 TO 2.0

While this Imperative has not itself seen changes through the update to LPC 2.0, the Declare program and the LBC Red List have updated since the publication of LPC 2.0, impacting the requirements and language of this Imperative.

New Red List Classes: Three new Red List chemical classes were identified in the LBC Standard, released in May 2019, although no new Chemical Abstracts Service Registry Numbers (CASRNs) were added to the Red List at the time of its publication. ILFI has moved to an annual Red List update schedule to maintain pace with best available science.

LBC Watch List: The LBC Watch List was created to allow ILFI to signal what is under consideration for future inclusion on the Red List. Only chemicals designated “Priority for Red List Inclusion” for a minimum of 12 months may be added to the Red List, encouraging a dialogue around the Red List and providing industry time to adapt.

Red List Organization: The Red List is now organized by chemical class rather than by specific materials or chemicals. As part of this effort, some chemical groups were re-named, re-grouped and/or expanded to align with industry standards. Project teams should still refer to the specific list of CASRNs identified on the Red List to identify compliant products.

Declare Program Updates: The Declare program has been updated. See the Declare Manufacturers’ Guide for a summary of changes. Declaration Status names have changed. In addition, VOC emissions testing no longer impacts Declaration Status and is accounted for separately on the label.

Exceptions: Some Red List Exceptions were retired, renamed, combined or superseded in order to organize the Exceptions by chemical class and streamline review. The logic for requesting new Red List Exceptions and applying published Exceptions is outlined on the Red List Imperative Exception flow chart.

Clarifications

REQUIREMENTS CLARIFICATIONS

Approved Declare Statuses in LPC
Red List Free Packaging
Volatile Organic Compounds
LBC Watch List + Red List Update Process

GENERAL CLARIFICATIONS

Chemical Abstract Services Registry Numbers
Special CASRN Reporting Requirements
Unintentional Trace Amounts

Approved Declare Statuses in LPC

Third Party Verified Declare labels are a core requirement of LPC. While Declare has three possible statuses, LPC only accepts labels that achieve LBC Red List Free or LBC Red List Approved status. The

other status, Declared, indicates a product that contains Red List ingredients whose presence is not excused by a temporary exception. Products that achieve LPC should be free of any Red List ingredients considered avoidable.

“LBC Red List Free” products disclose 100% of product ingredients plus residuals present at or above 100 ppm (0.01%) in the final product and do not contain any Red List chemicals. They have been shown to meet the requirements of the Living Building Challenge Red List Imperative.

“LBC Red List Approved” products meet the written requirements of the Living Building Challenge Red List Imperative, but rely on one or more Declare Program Exceptions to demonstrate compliance. A minimum of 99% of product ingredients plus residuals present at or above 100 ppm (0.01%) in the final product are disclosed. The product may contain one or more Red List chemicals if they fall under an existing, published Declare Program Exception. They have been shown to meet the requirements of the Living Building Challenge Red List.

Third Party Verification requirements and process are outlined in the Declare Manufacturer’s Guide.

Declare Status Requirement and Annual Red List Updates

ILFI makes annual updates to the Red List and Watch List that may impact the Declaration Status of Declare labelled products LPC certified products. Though a Red List Free or Red List Approved label is required at the time of certification, if ILFI makes additions to the Red List that impact the product’s Declaration Status during its three-year certification period, the manufacturer is encouraged to remove the substance but may maintain a Declared label through the end of the certification period to meet this core Imperative of LPC. This may force the manufacturer to disclose any remaining proprietary ingredients, as these cannot be held proprietary in combination with the presence of a Red List ingredient not covered by an Exception—the Declared status requires 100% disclosure of all intentionally-added ingredients in a product at or above 100ppm (0.01%) in the final product. At the end of the three-year certification period, the manufacturer must remove the Red List ingredient or obtain an Exception that would allow them to regain Red List Free or Red List Approved Status, in order to successfully qualify for LPC recertification.

If a manufacturer adds a Red List ingredient to their own product during the three-year certification period that results in a Declared Status, they will not be exempt from this requirement and will lose certification at their next annual check-in.

Red List Free Packaging

Packaging of LPC products should uphold the principles of the Living Product Challenge. Therefore, manufacturers are challenged to source packaging that is free of Red List ingredients. Manufacturers and suppliers are not expected to produce 100 ppm documentation for packaging ingredients but must obtain supplier confirmation that the packaging materials are free of Red List ingredients. If the supplier cannot provide this assurance the manufacturer must find an alternative supplier willing to provide this statement, or materials that support these requirements.

Volatile Organic Compounds (VOCs)

Unlike other items that appear on the Red List, Volatile Organic Compounds (VOCs) are not banned outright. Wet-applied products must meet established emissions and/or VOC content standards described below.

Wet Applied Products

Wet-applied products (including coatings, adhesives, and sealants) applied on site must have VOC levels below the South Coast Air Quality Management District (SCAQMD) Rule 1168 for Adhesives and Sealants or CARB 2007 Suggested Control Measure (SCM) for Architectural Coatings Table 1, as applicable.

> "Developing a reformulated product is a great step, but we're taking a holistic approach with the goal of influencing the entire supply chain, going beyond providing an LBC Red List Compliant product. That's how we'll truly make a positive impact on the building and construction industry."
> *-Brent Trenga, Kingspan*

LBC Watch List and Red List Update Process

Living Building Challenge 4.0 added the LBC Watch List to improve communication and flexibility with regard to Red List updates. The intent of the LBC Watch List is to signal to manufacturers and project teams that ILFI has identified certain chemicals and compound groups for potential inclusion in the LBC Red List before they are actually added. The LBC Watch List does not impact a Declare product's Declaration Status, or limit the ability of project teams to use products that contain LBC Watch List chemicals. Although Priority Items on the LBC Watch List will flag in light orange on a Declare label, the Red List remains the enforceable screening list.

The LBC Watch List fills an important role in the identification and prioritization of chemicals for possible Red List inclusion. Chemicals on the LBC Watch List must be designated as "Priority for Red List Inclusion" for at least 12 months before they can be added to the Red List. This allows manufacturers time to engage in Research and Development (R&D) efforts to phase these chemicals out of their products, contributing to the collective goal of a healthier materials economy. The LBC Watch List also encourages a dialogue around the Red List between ILFI, manufacturers, and project teams. Chemicals may remain on the LBC Watch List for more than 12 months. The Red List and Watch List are reviewed and rereleased with any changes to CASRNs annually, in January.

Project teams are held to the Red List CASRN list that is published and current on the date of project registration. New CASRNs added to the Red List after a project's registration date do not impact an individual project team's vetting scope and do not impact compliance for the individual project.

However, because updates to the Red List are intended to represent improved protection of human and

environmental health, Living Building Challenge project teams may, at their discretion, use a newer version of the Red List than was current when they registered. Project teams must clearly document the date and version of the Red List selected, and use the list in its entirety across all vetted materials.

Watch List CASRN Numbers are intended to communicate to the relevant industry which specific chemicals may be added to the Red List in the near future, and do not impact the vetting efforts of individual project teams.

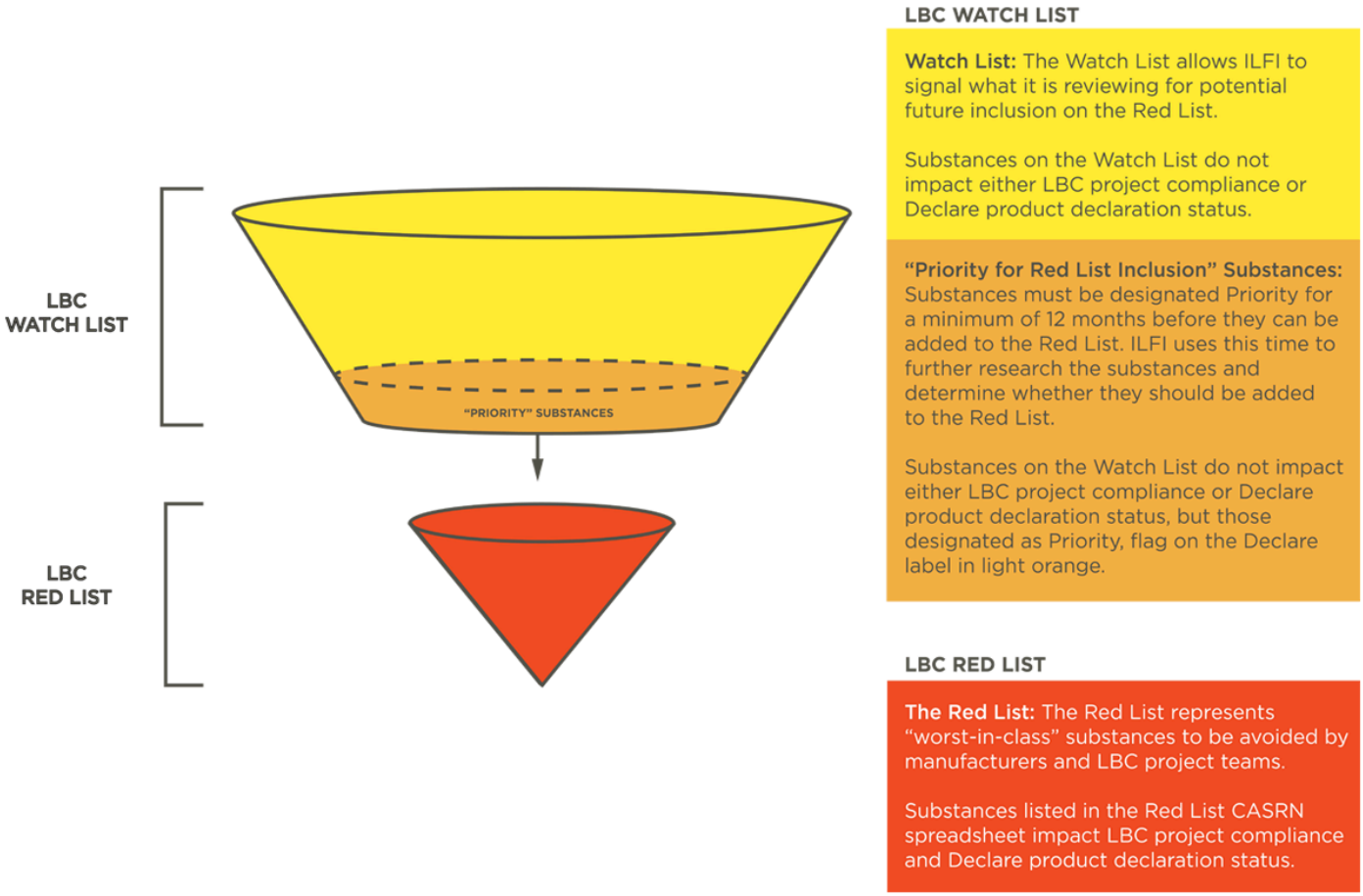


Figure 13-1 Relationship of the LBC Watch List and the LBC Red List

Chemical Abstract Service Registry Numbers (CASRNs) and Red List Classes

Chemical Abstract Service Registry Numbers (CASRNs) are unique numerical identifiers for registered chemicals, compounds, or organic substances. They are an effective and transparent way to evaluate building product ingredients and communicate with manufacturers, and it is the chemicals identified by CASRN in the Red List that govern a product's compliance with this Imperative.

The chemical classes identified in the requirements of this Imperative organize the chemicals present on the CASRN Red List and signal which classes contain chemicals that are candidates for addition to the CASRN Red List. While all chemicals on the CASRN Red List fall within the Red List Classes, not all chemicals

contained in the Red List Classes are necessarily on the CASRN Red List.

The Red List Classes and CASRN Red List will be reviewed and updated annually according to the LBC Watch List and Red List Update process.

Special CASRN Reporting Requirements

Project teams should always seek to represent all materials in a product at or above 100 ppm with an ingredient name and CASRN as part of the ingredients list. However, ILFI recognizes that there are currently limitations to the information that can be gathered about certain materials. In these cases, project teams should follow the instructions below in order to adequately characterize the material with or without a CASRN.

- **Biological Ingredients:** Biological ingredients such as wood and agrifiber do not require vetting and disclosure of a CASRN unless the ingredient is already registered with Chemical Abstract Services, in which case the material should be vetted and the number reported.
- **Float Glass:** Float glass does not require vetting and CASRN reporting, but all glass coatings/ interlayers/films must be vetted and reported.
- **Geological Materials:** Geological materials such as natural granite do not require vetting and disclosure of a CASRN. Manufactured stone products require the disclosure with a CASRN for all resins/binders/sealers.
- **Impurities:** There are instances when a Red List chemical is present in a product because it naturally occurs in the product's raw materials or was unintentionally added through certain manufacturing or reclamation processes. Impurities do not require vetting or reporting.
- **Metal Alloys:** Metal alloys that do not have an assigned CASRN do not require vetting and CASRN reporting, but the alloy number must be reported. Materials that are registered with Chemical Abstract Services, such as carbon steel and stainless steel, must be vetted and reported with a CASRN.
- **Recycled Content:** Recycled content should be reported using all known primary ingredients; a CASRN should be reported as applicable (based on guidance above).
- **Reaction Products:** When a reaction occurs during the manufacturing of the product, the final reacted substance must be reported with a CASRN. If any residual reaction substances remain in the product above 100 ppm that are not covered by the CASRN of the reaction substance, they must also be reported with a CASRN.
- **Small Product Hardware:** Small metal hardware (i.e., hardware within a manufactured product) must be reported with the metal type (e.g., steel), but reporting an alloy number is not required. Hardware materials with an applicable CASRN, must report the CASRN.

Unintentional Trace Amounts

There are instances when a Red List ingredient is present in a product because it naturally occurs in the product's raw materials or was unintentionally added through certain manufacturing or reclamation processes. Therefore, as a general rule, products should have no "intentionally added" Red List ingredients. Intentionally added ingredients are defined as each discrete chemical, polymer, metal, bio-based material,

or other substance added to the product by the manufacturer or suppliers that exists in the product as delivered for final use.

Unintentional trace amounts do not need to be reported on a product's ingredient list, even if unintentional trace amounts of Red List ingredients are expected. A full list of all intentionally added ingredients is still required. The following products, that are likely to unintentionally contain some Red List ingredients, are known to fall under this Clarification, and other products not listed may also apply.

Table 13-1 Materials with Possible Unintentional Trace Amounts of Red List Chemicals

Naturally Occurring	From Manufacturing
Clay	Recycled Steel
Wood	Galvanized Metal
Gypsum	Portland Cement
Minerals	Synthetic Gypsum
	Magnesium Oxide Board
	Paint

Toxic Chemical Release

The Toxic Release Inventory, overseen by the US EPA, tracks the management of EPA-defined toxic chemicals that pose potential threats to human health and the environment. US facilities that meet the reporting criteria must provide information on how much of these chemicals are released into the environment through air, water or land disposal, or how much is managed through recycling, energy recovery and treatment.

This information is compiled by the EPA in order to inform decision-making by companies, government agencies, non-governmental organizations and the public.

Chemicals covered by the TRI program generally have one or more of the following endpoints:

- Cancer or other chronic human health effects
- Significant adverse acute human health effects

- Significant adverse environmental effects

As of January 2021, the chemical list contains 770 individually listed chemicals and 33 chemical categories. A list of reportable chemicals can be found at https://www.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals.

LPC manufacturers must demonstrate that their emissions and byproducts are not found on the TRI list.

Exceptions

The following exceptions are relevant to manufacturers' pursuit of Declare within LPC. For all Declare-related exceptions, please see the Declare Manufacturer's Guide.

Exception Evaluation
RL-002b Small Electrical Components
RL-019 Innovative Materials Inventory

Exception Evaluation

Possible Red List Exceptions will be evaluated using the following evaluation process. Each Exception request will follow the flow chart and may not skip any steps during the evaluation process. All existing Red List Exceptions for LBC 4.0 and Declare 2.0 have been vetted using this evaluation process, and all future Exception requests will be held to this process.

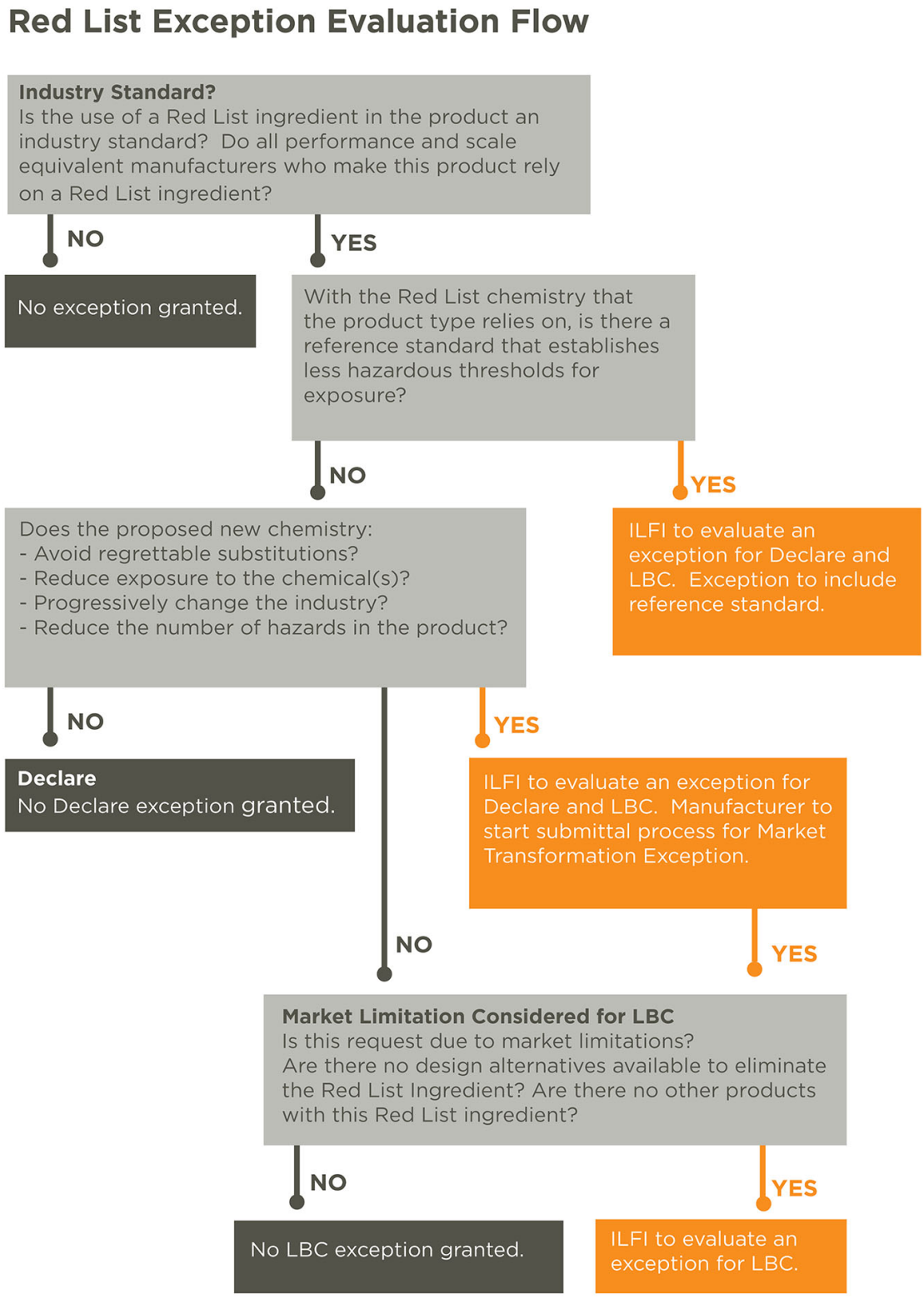


Figure 13-2 Red List Exception Evaluation Flowchart

For products with a Red List ingredient that are not granted an Exception through this evaluation process, the project team must use the RL-001 General Red List Exception to use the product.

RL-002b Small Electrical Components

It is not necessary to seek ingredients information or ascertain Red List compliance for components meeting the definition of small electrical components as contained in the glossary and further detailed under Small Electrical Components clarifications. Instead, these products must be compliant with the regulations of the European Union's Restriction of the Use of Certain Hazardous Substances (RoHS) Directive 3, 2015, which establishes the following maximum concentration values for toxic chemicals tolerated by weight in homogeneous materials:

- Lead (0.1%)
- Hexavalent chromium (0.1%)
- Bis(2-Ethylhexyl) phthalate (DEHP) (0.1%)
- Butyl benzyl phthalate (BBP) (0.1%)
- Cadmium (0.1%)
- Dibutyl phthalate (BBP) (0.1%)
- Diisobutyl phthalate (DIBP) (0.1%)
- Mercury (0.1%)
- Polybrominated biphenyls (PBB) (0.1%)
- Polybrominated diphenyl ethers (PBDE) (0.1%)

Likewise, it is not necessary to seek ingredients information or ascertain Red List compliance for complex electrical or data products that are made up entirely of small electrical components.

Products in the Declare and LPC programs that contain Small Electrical Components must comply with the requirements of this Exception and use a Materials and Substances disclosure in order to clearly identify each component using this requirement. LPC product manufacturers must also state in the product description and case study whether a take-back mechanism for electrical components has been established and is available.

Date added: May 2013
Date updated: April 2022
Formerly named: I10-E2 5/2013 Small Electrical Components

RL-019 Innovative Materials Inventory

The Declare program requires that manufacturers publicly disclose a minimum of 99% of the product's ingredients. If a manufacturer is unable to obtain the disclosure levels required for participation in Declare due to claims of intellectual property by the supplier of an innovative material, the manufacturer may use the Innovative Materials Inventory Exception to demonstrate that it meets the intent of documentation requirements I08-1 3PV Declare Label and I08-2 GreenScreen List Translator Scores. The product

manufacturer must demonstrate the information withheld by the supplier is for an innovative material and considered intellectual property; that the supplier is unwilling to disclose innovative materials information after repeated requests; and that there are no alternate suppliers of the innovative material with appropriate disclosure to meet the Declare reporting requirements. This exception may only be used for one homogenous material in the product.

The manufacturer must:

- Conduct and demonstrate extensive research to identify alternative suppliers; herein defined as engagement of at least 10 suppliers (or the number of existing applicable suppliers, whichever is less)
- Provide a statement from leadership or R&D Department at the company pursuing certification, indicating that they are unable to purchase a material that meets both transparency and manufacturing needs
- Complete LPC I07-1 Product Inventory with all publicly available CAS Numbers.
    - They should also have their R&D team complete the inventory to the best of their ability based on extensive outreach and product knowledge.
    - Known versus suspected CAS#s should be differentiated visually in the submission.
- Screen all disclosed (known) and suspected CAS Numbers against the LBC Red List and demonstrate that the product is free of any Red List ingredients not covered by a temporary exception.
- Provide a Red List Free statement from the Supplier, to be confirmed by the approved Declare 3rd Party verifier, for any publicly undisclosed ingredients at or above 100 ppm within the innovative material.
    - If the supplier is unwilling to disclose chemistry to the verifier under NDA, the 3rd Party Verifier cannot confirm Red List Free and the manufacturer will have to conduct physical testing of the product by an approved testing party
- Provide the results of a toxicological assessment by an approved third party demonstrating that the material is free of any risk of exposure to Red List ingredients, as well as Carcinogens, Mutagens and Reprotoxics and Persistent Bioaccumulative Toxins at or above 100 ppm in the final product, as defined in the Transparent Material Health Imperative.
    - If the supplier is unwilling, after exhaustive attempts, to disclose sufficient compositional chemistry data for a toxicological review by an approved third party, the manufacturer may submit to ILFI for approval to contract an approved third party to conduct physical testing of the product to demonstrate that there are no Red List ingredients present in the final product. The manufacturer should submit for approval prior to testing the product to ensure that this approach is approved. The testing report should be accompanied by a narrative by the testing body to explain any assumptions and test parameters.
- Provide the supplier with a letter communicating the manufacturer will continue to seek additional disclosure and will also research alternate suppliers willing to provide the required level of disclosure.

For the product to be eligible for recertification through the Living Product Challenge the manufacturer must reassess alternate supplier options on an annual basis to obtain greater transparency. Documentation of annual research and outreach must be provided during the recertification process. If an alternate supplier with appropriate disclosure is identified, the product will no longer be eligible for the Innovative Material Inventory Exception at the time of recertification. If the manufacturer is unable to achieve required

transparency they must continue to physically test or confirm product chemistry on an annual basis.

RL-024 Product Failures – Grace Period for Red List Ingredients or Process Chemicals

After original Living Product certification, if the certified product line has an increased failure rate (demonstrated for example by increased warranty claims) due to a chemical substitution that enabled the product to meet the Red List requirements, under certain conditions, Red List chemicals may be used in the product for the purpose of remedying the failure, for a limited grace period. If the chemical is a product ingredient, a note will be added to the LPC label indicating it is no longer Red List Free.

ILFI acknowledges that depending on the product type and chemical's function in the product, different levels of effort may be needed for R&D and qualification of a Red List compliant product design, so the grace period will be determined on a case-by-case basis. The time allowance for the grace period must be discussed with, and approved by ILFI. ILFI expects the grace period to range from 6 months to 2 years depending on the product type and the chemical's function. The consequence for failing to substitute a safer alternative will be discussed at the time of determination of the grace period such as lowered LPC status or revocation of certification.

Conditions: The RL chemical either must not be a Category 1A or 1B carcinogen, mutagen, or reproductive toxicant, or there must be evidence of protection from exposure to the chemical for workers and product users.

The manufacturer must contact ILFI at lpc.support@living-future.org to initiate this process.

Documentation requirements –

- Identification of the product ingredient or process chemical and its associated hazards and its function in the product
- Description of the product failure mechanism, clear demonstration of the role of the substituted chemical causing the failure, and documented warranty claims rate over time
- Detailed description of chemical function in product, handling in facility, potential exposure routes and mitigation strategies
- Proposal for amount of time needed to qualify a Red List compliant product design
- Description of the hierarchy of controls used to protect workers and/or product users (as relevant) from the Red List chemical if it is a Cat 1A or 1B CMR.

Documentation Requirements

BASIC DOCUMENTATION

For a full explanation of how to obtain a 3PV Declare label, please refer to the Declare Manufacturers

Guide.

I08-1 3PV Declare Label

A valid LBC Red List Free or LBC Red List Approved 3PV Declare label for the product, demonstrating that the product is free of Red List Ingredients not covered by an existing Exception.

I08-2 GreenScreen List Translator Scores

GreenScreen List Translator score for each intentionally added substance present above 100ppm, including any proprietary ingredients.

I08-3 Packaging Documentation

Letter from the manufacturer stating that the product packaging is free of Red List chemicals.

I08-4 Manufacturing Byproduct and Emissions Documentation

Letter from the manufacturer stating that the manufacturing process does not produce any byproducts or emissions that are considered toxic, either as included on the Red List or as defined by the US EPA Toxics Release Inventory as TRI-Listed Chemicals, which are those that cause one or more of the following:

- Cancer or other chronic human health effects
- Significant adverse acute human health effects
- Significant adverse environmental effects

EXCEPTION DOCUMENTATION

Manufacturers that use Exceptions require additional documentation. The table below shows the documentation required for each Exception.

I08 EXCEPTION DOCUMENTATION SUMMARY TABLE		I08-a Exception Narrative	I08-b Technical Documentation	I08-c Advocacy Documentation
RL-002b	Small Electrical Components		X	
RL-019	Innovative Materials Inventory	X	X	X
RL-024	Product Failures - Grace Period for Red List Ingredients or Process Chemicals	X	X	

I08-a Exception Narrative

- A narrative describing the need for the Exception, the approach to and implementation of the alternative solution, and compliance with Exception requirements.

I08-b Technical Documentation

Documents or reports demonstrating compliance with Exception requirements, such as:

- Reports from independent third party toxicological or material testing firms
- Manufacturer or supplier provided statements of Red List compliance or ingredient and hazard disclosure
- Description of the product failure mechanism, clear demonstration of the role of the substituted chemical causing the failure, and documented warranty claims rate over time
- Detailed description of chemical function in product, handling in facility, potential exposure routes and mitigation strategies

I08-c Advocacy Documentation

- Documentation indicating outreach and continuous improvement efforts by the manufacturer.

Resources

RESOURCES

Red List Exception Form

This form may be used to request the creation of a new exception, expansion of an existing exception, or retiring an exception that is no longer needed.

Pharos

A chemical and materials database and research tool that allows side-by-side comparison of products and chemical formulations.
https://pharosproject.net/

Declare

The Declare database is free to the public and significantly reduces the time required for materials research. All Declare labels are inventoried at 100 ppm and all Red List Free and Red List Approved labels can be used without further documentation. The database includes a full ingredients list and identifies any Exceptions used, confirms emissions testing compliance, represents final point(s) of assembly, and end of life options for all Declare products with active labels. The database is searchable and can be filtered and sorted by Declaration Status, LBC Imperative Compliance, CSI MasterFormat Division, manufacturer, and more.
https://declare.living-future.org/

ToxNot

Toxnot is a software company with a mission to improve health and sustainability across the global supply chain by streamlining the chemical transparency process. Toxnot provides an efficient system for manufacturers to import chemicals data, provide insight into their hazard profiles, report on the results and create safer products.
https://toxnot.com

Chemical Abstract Services (CAS) Registry

CAS Registry is the most authoritative collection of disclosed chemical substance information. The registry covers substances identified from the scientific literature from 1957 to the present, with additional substances going back to the early 1900s. The registry is updated daily with thousands of new substances and FAQ documents.
https://www.cas.org/support/documentation/chemical-substances/faqs

GreenScreen List Translator

The GreenScreen List Translator™ provides a “list of lists” approach to quickly identify chemicals of high concern. It does this by scoring chemicals based on information from over 40 hazard lists developed by authoritative scientific bodies convened by international, national and state governmental agencies, intergovernmental agencies and NGOs. These GreenScreen Specified Lists include REACH categorizations and chemical hazard classifications by countries using the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). Each of the GreenScreen Specified Lists is mapped to hazard endpoints and a hazard level or range based on the GreenScreen Hazard Criteria.
https://www.greenscreenchemicals.org/learn/greenscreen-list-translator

Red List and Watch List CASRN Guide

A list of specific Chemical Abstracts Service Registry Numbers (CASRNs) within each general chemical group on the Red List and the Watch List.
https://living-future.org/declare/declare-about/red-list/#red-list-and-watch-list-cas-guide

APPLICABLE STANDARDS

California Air Resources Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings

Rule limiting the emissions of volatile organic compounds from the application of architectural coatings.
https://ww3.arb.ca.gov/coatings/arch/approved_2007_scm.pdf

Restriction on the Use of Certain Hazardous Substances (RoHS)

EU RoHS 2 (Directive 2011/65/EU)
The European Union regulation on the use of hazardous substances in electrical and electronic equipment.
https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:174:0088:0110:en:PDF

REACH

The European Community regulation on chemicals and their safe use.
https://echa.europa.eu/regulations/reach/understanding-reach

Southern California Air Quality Management District (SCAQMD) Rule 1168 for Adhesives and Sealants

Rule limiting the emissions of volatile organic compounds, toxic air contaminants, stratospheric ozone-depleting compounds from the application of adhesives, adhesive primers, sealants, and sealant primers used in architectural applications.
http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1168.pdf

Southern California Air Quality Management District (SCAQMD) Rule 1113 for Architectural Coatings

Rule limiting the content of volatile organic compounds of architectural coatings.
http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/current-activities-support-documents/rule-1113—-amended-june-3-2011-.pdf

The US Reduction in Lead Drinking Water Act

US S. 3874 (111th): Reduction of Lead in Drinking Water Act, effective January 1, 2014
https://www.congress.gov/111/plaws/publ380/PLAW-111publ380.pdf

I09 Transparent Material Health

TRANSPARENT MATERIAL HEALTH

09

HEALTH + HAPPINESS PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

Living Products demonstrate commitment to material health through optimization of their product's hazard profile and continuous improvement of

REQUIREMENTS

Living Products are safe for human exposure. Going beyond the avoidance of known problematic chemicals, manufacturers intentionally select chemicals and materials proven safe throughout their life cycle.

Manufacturers must conduct a risk and hazard assessment for all intentionally-added chemical substances in the product using an Institute-approved toxicologist. The analysis must demonstrate that the product does not create a reasonable risk of human or environmental exposure to Carcinogens, Mutagens and Reproductive (CMR) toxicants or Persistent Bioaccumulative Toxins (PBTs) for the manufacturer, installer or end user.

To limit assessment costs, manufacturers are allowed five percent of the product by weight to remain unassessed for initial certification; however, the product must be 100% assessed by the time of recertification.

The results of the Living Product Challenge Material Health Report must be transparent and publicly available.

CHANGES FROM LPC 1.1 TO 2.0

This Imperative has introduced new pathways to make achievement more feasible for those who have already undertaken hazard assessment for their products. The Red List Imperative (07) and Transparent Material Health (08) were also grouped in order to signify a stepwise approach of transparency and screening first under Declare, followed by a deeper hazard assessment to encourage optimization. The Transparent Material Heath Guide, which provides deeper philosophical and methodological guidance for this Imperative, has been updated to reflect these changes.

Clarifications

REQUIREMENTS CLARIFICATIONS

Chemical Hazard Assessment
Optimization Pathways in LPC
Approved Third Party Material Health Assessor
Reasonable Risk or Exposure
Publicly Available Reports

Recertification and Continuous Improvement
Assessment Continuous Improvement

Chemical Hazard Assessment

Chemical Hazard Assessment goes beyond screening versus lists of “known bad” ingredients to give a more comprehensive picture of the health impacts of a chemical. Methodologies look at multiple hazard endpoints and thorough reviews of the literature identify the level of confidence with which they can assign a hazard endpoint to a certain chemical or material. This provides the opportunity to determine not only whether a chemical is potentially problematic, but also to identify whether a chemical might be an endocrine disruptor, skin sensitizer, asthmagen, or other cause other potentially hazardous health concerns. This more complete picture also gives a manufacturer the ability to make more informed decisions about replacing chemicals with safer alternatives.

Optimization Pathways in LPC

The Transparent Material Health Imperative requires that manufacturers demonstrate a product meets an adequate level of health through conducting an assessment of the substances in the product inventory.

There are two pathways to achieve this:

1. Pre-approved Optimization Pathway: Demonstrate that the product has achieved one of the pre-approved material health certifications outlined in the documentation requirements, and that certification is valid at the time of LPC Certification.
2. LPC Transparent Material Health Pathway: Engage an approved third party Material Health Assessor (MHA) to conduct a review of a minimum of 95% of material ingredients represented on their valid Third Party Verified Declare label and demonstrate that there is no significant risk of exposure to the manufacturer, installer and/or end-user of the product (process outlined in the Transparent Material Health Guide) by working to eliminate all CMRs and PBTs in their product’s formulation. The percentage of product assessed is represented on the LPC Label.

Approved Third Party Material Health Assessor (MHA)

Manufacturers are required to work with ILFI-approved Material Health Assessors to achieve the I09 Transparent Material Health Imperative unless they are using another approved material health program as a pathway to meet the Imperative requirements.

The following Professional and Program qualifications are required for a firm to be able to act as an LPC Material Health Assessor:

Professional Qualifications (all)

- Be a GreenScreen Licensed Profiler or Cradle to Cradle Material Health Assessor; and
- Be an approved Declare Third Party Verifier; and
- Have attended the most recent ILFI Ecosystem Trainings for LPC Assessors (held annually in Seattle); and
- Hold a valid assessor contract with ILFI

Program Qualifications (all)

- Have all LPC Transparent Material Health reports and findings reviewed and approved by a Toxicologist or Industrial Hygienist (in-house or contracted); and
- Submit their first five Material Health reports to ILFI for review and approval

Current LPC MHAs are listed in the Transparent Material Health Guide.

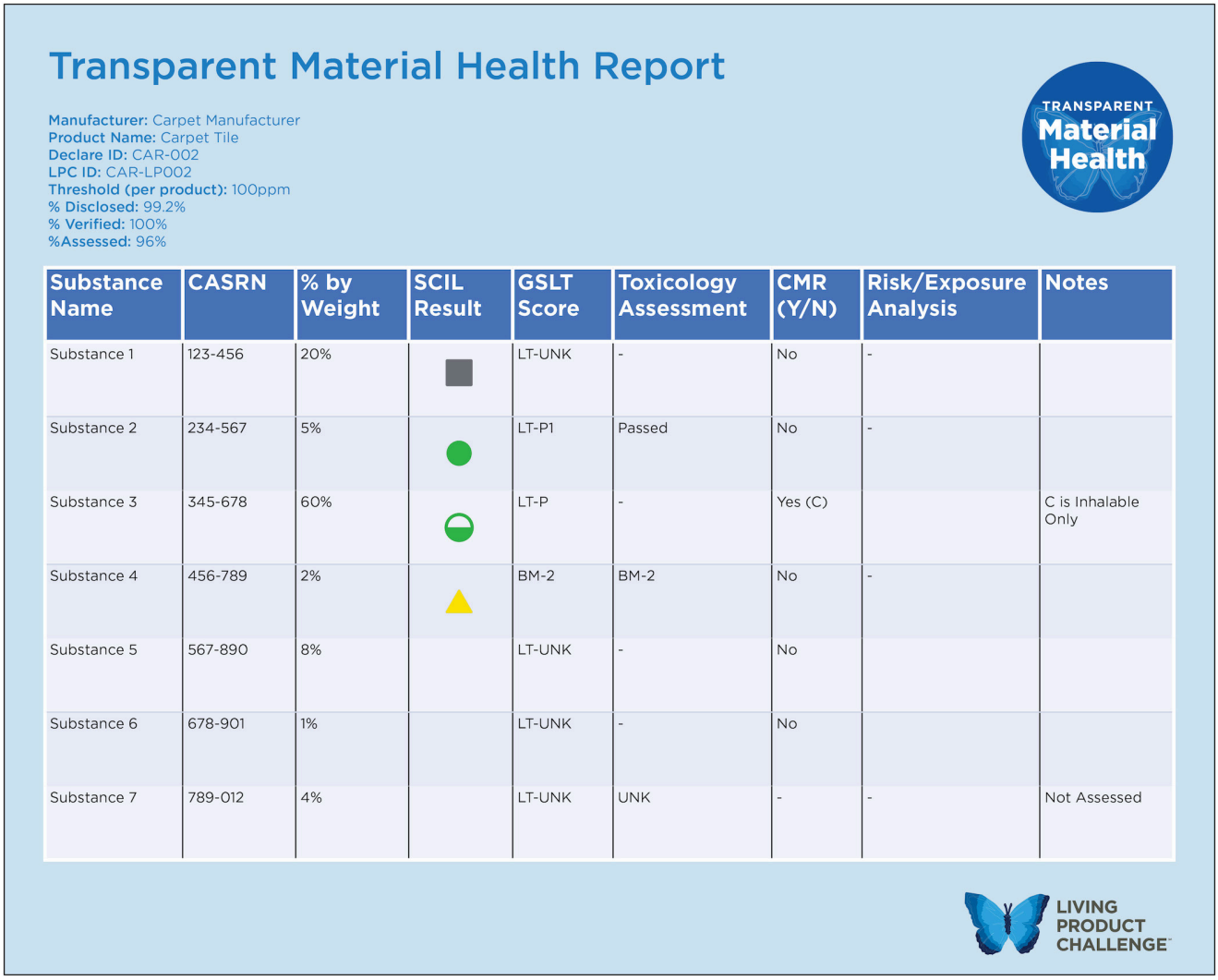
Reasonable Risk of Exposure

If any CMRs or PBTs are identified in the product, a risk and exposure analysis is conducted by the Material Health Assessor to look at the relevant exposure pathways, determine from there whether there is any reasonable risk to the manufacturer, installer or end user. If a risk of exposure to a potential hazard(s) exists to the final manufacturer, the installer or the end user of the product, and the hazard cannot be mitigated due to the use of proper personal protective equipment (PPE), the manufacturer will be required to make product formulation or manufacturing procedural changes in order to bring the product into compliance.

For more information on Risk and Exposure guidelines, refer to the LPC Transparent Material Health Guide.

Publicly Available Reports

Manufacturers must make the results of their assessment report publicly available, through a link in their case study, so that any risk and exposure determinations can be evaluated publicly. Confidential information may be redacted. Manufacturers who pursue Transparent Material Health using ILFI methodology, as opposed to a pre-approved program, will include a one page product overview, using the table below as an example.



Transparent Material Health Report

Manufacturer: Carpet Manufacturer
Product Name: Carpet Tile
Declare ID: CAR-002
LPC ID: CAR-LP002
Threshold (per product): 100ppm
% Disclosed: 99.2%
% Verified: 100%
%Assessed: 96%

TRANSPARENT Material Health

Substance Name	CASRN	% by Weight	SCIL Result	GSLT Score	Toxicology Assessment	CMR (Y/N)	Risk/Exposure Analysis	Notes
Substance 1	123-456	20%		LT-UNK	-	No	-	
Substance 2	234-567	5%		LT-P1	Passed	No	-	
Substance 3	345-678	60%		LT-P	-	Yes (C)		C is Inhalable Only
Substance 4	456-789	2%		BM-2	BM-2	No	-	
Substance 5	567-890	8%		LT-UNK	-	No		
Substance 6	678-901	1%		LT-UNK	-	No		
Substance 7	789-012	4%		LT-UNK	UNK	-	-	Not Assessed

LIVING PRODUCT CHALLENGE

The example above indicates 96% of the product has been assessed, meaning it would qualify for the initial certification. Furthermore, it results in 71% of the hazard assessment results being made public.

Recertification and Continuous Improvement

Certification under LPC is valid for 3 years, at which time, the manufacturer must demonstrate maintenance or improvement on any of the areas identified in their initial certification to maintain their status.

The two different pathways outlined in the certification requirements therefore have two different recertification processes:

Pathway 1: Preapproved Optimization Pathway

For the manufacturer to continue to pursue the pre-approved program pathway at recertification (3 years after certification), their certification for that program must continue to be valid at an approved level, or higher at the time of recertification.

Pathway 2: LPC Transparent Material Health Pathway

Those manufacturers who pursue the pathway outlined in the Transparent Material Health Guide must work with the approved Material Health Assessor (MHA) leading up to recertification to demonstrate that a product meets any continuous improvement requirements.

As noted above, initial certification allows 5% of the product to be unassessed (100% of the product is still required to be inventoried and show Red List compliance per the Red List Imperative). By recertification, the manufacturer should have worked with the MHA to assess the remaining 5% of the product to achieve 100% assessed at a 100 ppm threshold. If the manufacturer is unable to assess the remaining 5% a request to use RL-020 Continuous Improvement for Assessment may be considered.

The MHA is required to revisit any chemical assessments made over 5 years ago and determine whether the assessments are still valid or whether updates are required (i.e. a new GreenScreen is needed, or polymer data may need to be confirmed). If a substance has been recently reviewed by the MHA and they are confident that the results of that assessment stand, they should take that into account and focus efforts on new substances or truly out-of-date reviews.

For more information, review the Transparent Material Health Guide.

Exceptions

The following Exceptions apply to the Transparent Material Health Imperative.

RL-020 Assessment Continuous Improvement

RL-020 Assessment Continuous Improvement

Manufacturers contracting an approved Material Health Assessor under the Transparent Material Health Imperative who can demonstrate they are unable to assess the full final 5% of their product inventory, must demonstrate continuous improvement by assessing at least one new (and additional) substance at each recertification.

Manufacturers must submit their rationale for not reaching 100% Assessment, provide their valid Transparent Material Health Report and clearly indicate the new assessed substance.

Documentation Requirements

BASIC DOCUMENTATION

Pursuit of the Transparent Material Health Imperative requires either (1) demonstration that the product has met a pre-approved optimization pathway that demonstrates compliance with the Imperative requirements or (b) engagement of an ILFI-approved Material Health Assessor to complete the review.

I09-1 Transparent Material Health Report

Documentation that the product is free of risk from exposure to any Carcinogens, Mutagens or Reprotoxics (CMRs) and Persistent Bioaccumulative Toxics (PBTs) present above 100ppm. All ingredients present in the final product at or above 100ppm must be reviewed. Polymers require additional information outlined below:

- Polymer supplier
- Polymer trade name
- Monomer composition
- Monomer residual levels
- Polymer molecular weight

For a product's initial certification, the manufacturer is required to assess a minimum of 95% of the ingredients present in the final product at over 100ppm, allowing for up to 5% of the product to be unassessed. By the time of recertification, the manufacturer must have assessed the remaining 5% of the product content in order to maintain achievement of this Imperative, unless Exception RL-020 Assessment Continuous Improvement is used. This requirement carries across new LPC versions. The percentage threshold assessed will be listed on the LPC label.

Acceptable documentation includes:

- A complete LPC Transparent Material Health Report completed by an ILFI-approved material health assessor. An LPC Transparent Material Health Report may include a corrective action plan with an ILFI-approved timeline for any changes required as a result of assessment. This report must be made publicly available on the LPC website to promote transparency of ingredient assessment information.
- ToxFMD-LPC Report
- Cradle to Cradle Product Certification or Material Health Certificate at the V3 Silver Level and above
- GreenScreen Certification at the Silver 95%, Silver 100% or Gold level

I09-2 Process Chemicals Documentation

Description of all process chemicals used in the production of the product at the final manufacturing facility, as well as documentation that each process chemical is free of Red List ingredients. Acceptable Documentation Includes the following options:

- SDS representing 100% of the ingredients in the process chemical with GreenScreen List Translator scores for all ingredients; or
- HPD with all ingredients identified and screened for 100% of the ingredients in the process chemical; or
- Disclosure letter from a supplier confirming the product is free of Red List ingredients along with an MSDS Sheet or listing of ingredient names and CASRN and GreenScreen List Translator scores for all ingredients; or
- Cradle to Cradle Product Certification or Cradle to Cradle Material Health Certificate at the V3 Silver level and above
  If no process chemicals are used in the manufacturing process, a written statement to this effect from

the final manufacturing facilities manager will suffice.

I09-3 GreenScreen Assessment Reports

Copies of any valid, certified GreenScreen assessment reports

EXCEPTION DOCUMENTATION

I09 EXCEPTION DOCUMENTATION SUMMARY TABLE		I09-a Exception Narrative	I09-b Technical Documentation
RL-020	Assessment Continuous Improvement	X	X

I09-a Exception Narrative

A narrative describing the need for the Exception, the approach to and implementation of the alternative solution, and compliance with Exception requirements.

I09-b Technical Documentation

Technical documents or reports demonstrating compliance with Exception requirements, such as:

- GreenScreen assessments
- Updated material health report

Resources

RESOURCES

Transparent Material Health Guide

Provides further guidance and methodology for achieving the Transparent Material Health Imperative.

APPLICABLE STANDARDS

GreenScreen for Safer Chemicals Methodology

GreenScreen® for Safer Chemicals is a method for chemical hazard assessment designed to identify chemicals of high concern and safer alternatives.
https://www.greenscreenchemicals.org/learn/full-greenscreen-method

GreenScreen List Translator

The GreenScreen List Translator™ provides a “list of lists” approach to quickly identify chemicals of high concern. It does this by scoring chemicals based on information from over 40 hazard lists developed by authoritative scientific bodies convened by international, national and state governmental agencies, intergovernmental agencies and NGOs.
https://www.greenscreenchemicals.org/learn/greenscreen-list-translator

GreenScreen Certified

A certification program developed Clean Production Action based on the GreenScreen® for Safer Chemicals, a globally recognized tool that identifies hazardous and safer chemicals through a rigorous benchmarking scoring system.
https://www.greenscreenchemicals.org/certified

Cradle to Cradle (C2C) Product Certification

C2C is a multi-attribute, third party certified product certification. The standard assesses products in five categories, namely Material Health, Material Reutilization, Renewable Energy & Carbon Management, Water Stewardship, and Social Fairness.
https://www.c2ccertified.org/

I10-Human Thriving

HUMAN THRIVING

10

HEALTH + HAPPINESS PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

Living Products demonstrate commitment to human thriving at manufacturing facilities. Manufacturers commit to supporting the health and wellbeing of their frontline employees through health-based initiatives and connection to nature.

REQUIREMENTS

Living Products are made in facilities that contribute to an active, healthy lifestyle and are designed to nurture the innate connection between humans and nature.

Manufacturers must complete each of the following actions:

- Provide sufficient and frequent human-nature interactions for the employees who are manufacturing the product; connect them with nature directly and encourage an active, healthy lifestyle.
- Demonstrate that there have been no reported deaths or serious injuries related to the final manufacturing of the product within the last 12 months.
- Demonstrate that there are programs in place to support the health and well-being of employees who are manufacturing the product.
- Provide mechanisms for employees to offer feedback to improve facility conditions and collaboratively build a thriving environment for everyone.

CHANGES FROM LPC 1.1 TO 2.0

This Imperative did not change significantly. IAQ testing requirements were put into place at the facility level. Employee feedback mechanisms were expanded beyond just a survey option to reflect the different ways manufacturers may solicit input from their employees.

Clarifications

IAQ TESTING

Manufacturers seeking to demonstrate Indoor Air Quality must develop a Human Thriving IAQ Plan that addresses pollutant sources and protective and/or corrective measures to improve air quality (e.g. increased PPE, installed new HEPA filters, new scrubbers in recovery tanks). The plan must confirm that, at minimum, the facility meets all applicable OSHA requirements for ventilation and air contaminants sources relevant to the manufacturing of the product seeking LPC Certification.

If the facility is located in a state that has an OSHA-approved state plan, this supersedes general OSHA compliance and should be followed to demonstrate a responsible approach to air quality within the facility. There are twenty-eight OSHA-approved State Plans (and California has its own superseding Indoor Air

regulations), operating state-wide occupational safety and health programs. State Plans are required to have standards and enforcement programs that are at least as effective as OSHA's and may have different or more stringent requirements.

To demonstrate the ongoing implementation of IAQ measures, manufacturers must also provide one or more of the following:

- Results from an indoor air quality test performed within the last 12 months; or
- Compliance with an ILFI approved continuous monitoring standard, such as RESET; or
- A site specific IAQ implementation plan signed off by an industrial hygienist addressing the areas of highest contaminant concern where IAQ testing or monitoring may not be appropriate. The plan must be accompanied by photos, receipts, or construction documents confirming the plan's recommended measures are in place.

FACILITY VENTILATION

The manufacturer must demonstrate compliance with the American Conference of Governmental Industrial Hygienists (ACGIH)'s Manual for Industrial Ventilation for the manufacturing floor. Common areas and shared spaces, other than manufacturing zones, must demonstrate compliance with the ventilation rates stated in ASHRAE 62.1.

DEMONSTRATING SAFE WORKPLACES

The final facility should demonstrate that during the past year there have been no fatal injuries, and no injuries with greater than 0.5 Disability Adjusted Life Years (DALYs) over the expected duration of the injury. If the expected duration of the injury is permanent, use life expectancy in the applicable country.

EMPLOYEE COMFORT MEASURES

The manufacturer must demonstrate compliance in a minimum of two of the following areas:

- Occupant Thermal Comfort: the manufacturing zones, common areas, and shared spaces must be in compliance with ASHRAE 55- 2017.
- Occupant Noise Exposure: the manufacturing zones must be in compliance with OSHA 1910.95, Standard for Occupational Noise Exposure.
- Ergonomics: the manufacturer must document the relevant and implemented OSHA Controls for MSD Hazards.

SUFFICIENT AND FREQUENT HUMAN-NATURE INTERACTIONS

The facility must provide break areas, accessible for all employees manufacturing the product, meeting one or more of the following criteria:

- Break rooms with direct access to daylight and a view outside.
- In regions where climate allows access to outdoor spaces for a minimum of nine (9) months out of the

year [1], break room and lounge spaces may be provided outside and directly adjacent to the building. Outdoor spaces must be appropriately weather protected [2] and furnished with seating and tables in a quantity to appropriately accommodate all building occupants given access to the space.
- Facilities that cannot provide outdoor break rooms or move break rooms to those with a window wall must prove integration of biophilic design elements in their break room.

[1] Climate conducive to providing break room and lounge spaces outdoors is defined as having 273 days (average of 9 months) with a daytime mean temperature that has a PET thermal perception between slightly cool (10 C/50 F) and slightly warm (26oC/79oF). Conformance may be calculated using historical weather data and may be consistently calculated using daily, weekly, or monthly mean temperatures.
[2] Weather protection for outdoor spaces must include full protection from rain and partial protection from intense, direct sun or wind.

COLLECTING EMPLOYEE FEEDBACK

Manufacturers must demonstrate that they have mechanisms in place for employee feedback that gather input about how the facility does or does not meet the intent of Imperative 10, and identifies opportunities for improving support of worker health and happiness at the facility. For example, providing space and infrastructure for employees to access daylight and fresh air or biophilic elements is important, but manufacturers should be aware of how these resources are used and whether staff can actually take advantage of them in practice.

Exceptions

The following Exceptions apply to the Human Thriving Imperative.

HH-007 Appropriate Corrective Action

HH-007 Appropriate Corrective Action

In cases where a serious injury occurs associated with the product manufacture (resulting in lost days), the manufacturer may demonstrate that a root cause investigation was completed and adequate precaution put in place to prevent future injuries of a similar nature. This exception does not apply to deaths associated with product production during the performance period.

Documentation Requirements

BASIC DOCUMENTATION

All Basic Documentation is required for all products unless noted otherwise.

I10-1 Human Thriving Narrative

A 1-2 page report detailing compliance with Imperative requirements, including how the manufacturer provides sufficient and frequent human-nature interactions for the employees who are manufacturing the product to connect them with nature directly and encourage an active, healthy lifestyle. The report must address how the facility promotes:

- Access to fresh air and daylight; and
- Any health and wellness programs in place and employee use of these programs; and
- Any infrastructure in place to encourage interaction with nature and any biophilic design elements in place; and
- Indoor air quality, including identification of pollutant sources and control measures; and
- Employee comfort measures implemented.

I10-2 Facility Layout

A facility floor plan showing the location of workstations and access to fresh air and daylight. An absence of natural light and operable windows in any regularly occupied spaces should be addressed in I10-1 Human Thriving Narrative.

I10-3 Facility Photos

Photos clearly demonstrating how the facility encourages employee wellness and happiness and access to nature and incorporates any biophilic design elements into the space, such as meditation spaces, daylighting, communal garden areas, and walking paths.

I10-4 Employee Feedback Mechanism

Demonstration that there are sufficient opportunities at the facility for employee feedback, and active participation using these methods by employees, regarding worker health and happiness. This can be demonstrated through the results of a survey or other feedback mechanism. The mechanism should clearly engage employees around how the facility encourages an active healthy lifestyle and interaction with nature. Documentation provided must summarize the results of the survey and indicate how the manufacturer intends to use the results to continuously improve worker health and happiness in the facility.

I10-5 OSHA Confirmation or Equivalent

Written confirmation from the manufacturer that no deaths or serious injuries occurred during the twelve-month performance period based on Occupational Safety and Health Administration (OSHA) or international equivalent.

I10-6 IAQ Testing

Results of Indoor Air Quality testing, continuous IAQ monitoring, or site specific IAQ plan signed off by an industrial hygienist.

I10-7 Facility Ventilation Calculation

Calculations demonstrating compliance with the American Conference of Governmental Industrial Hygienists (ACGIH)'s Manual for Industrial Ventilation and ASHRAE 62.1.

EXCEPTION DOCUMENTATION

I10 EXCEPTION DOCUMENTATION SUMMARY TABLE		I10-a Manufacturer Statement	I10-b Safety Response Documentation
HH-007	Appropriate Corrective Action	X	X

I10-a Manufacturer Statement

A manufacturer statement describing the incident and outlining actions and precautions taken to prevent similar issues in the future.

I10-b Safety Response Documentation

Additional documentation demonstrating adequate response and preventative measures.

Resources

ASHRAE 55-2017

"Thermal Environmental Conditions for Human Occupancy"
https://ashrae.iwrapper.com/ViewOnline/Standard_55-2017

ASHRAE 62.1-2016

"Ventilation for Acceptable Indoor Air Quality"
https://ashrae.iwrapper.com/ViewOnline/Standard_62.1-2016

OSHA 1910.95

Standard for Occupational Noise Exposure
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.95

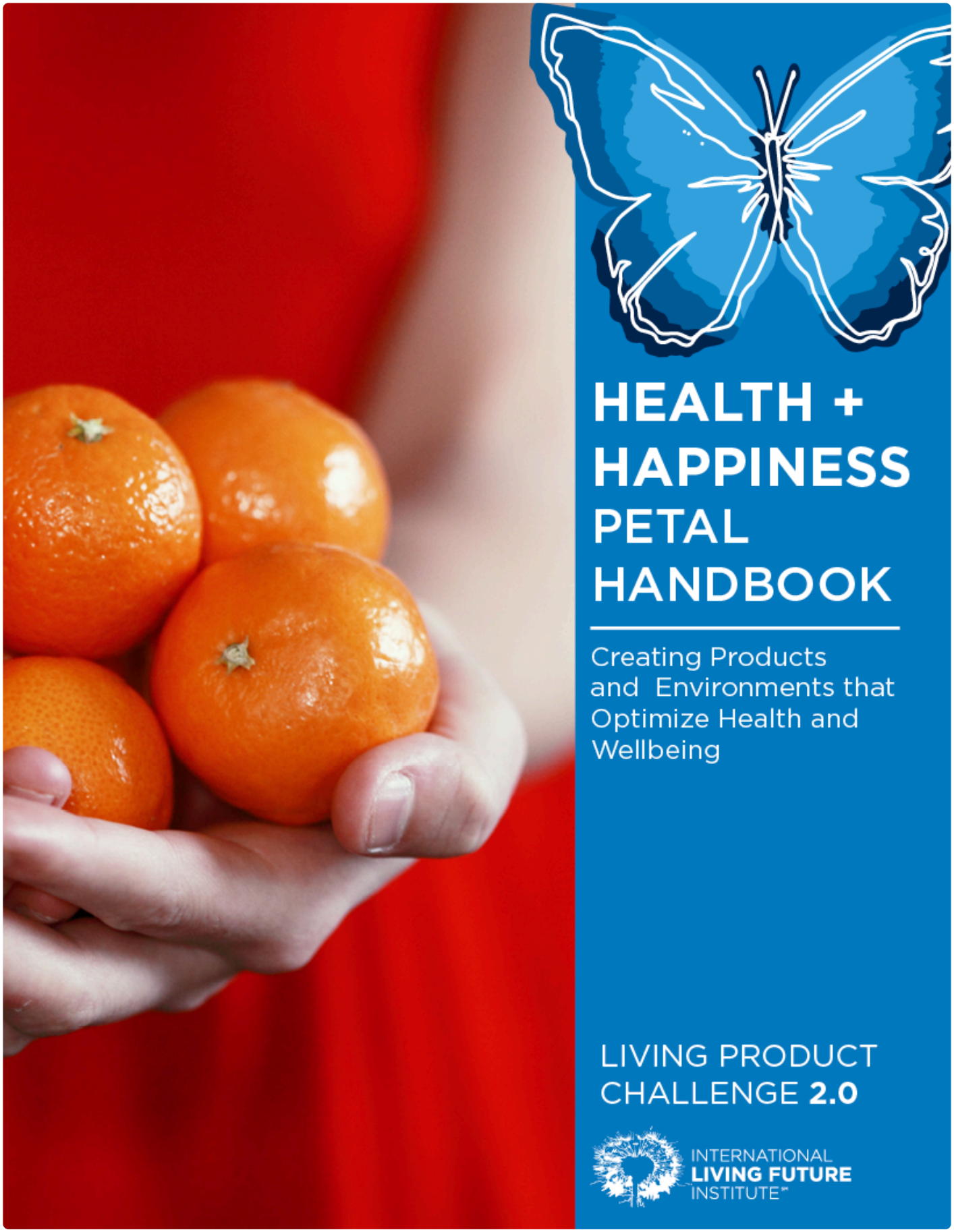
OSHA Controls for MSD Hazards

https://www.osha.gov/SLTC/ergonomics/controlhazards.html

Disability-Adjusted Life Years

Explanations and metrics for assessing health statistics
https://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/

Materials Petal


HEALTH +
HAPPINESS
PETAL
HANDBOOK
Creating Products and Environments that Optimize Health and Wellbeing
LIVING PRODUCT CHALLENGE 2.0
INTERNATIONAL LIVING FUTURE INSTITUTE

PETAL INTENT

The intent of the Materials Petal is to help create a materials economy that is healthy, ecologically restorative, transparent and socially equitable. Throughout their life cycles, supplies and materials are responsible for many adverse environmental issues, including illness, habitat and species loss, pollution, and resource depletion. The Imperatives found in this section aim to drive product designers, makers and users toward a truly responsible materials economy. Living Products should be intentionally made of materials that foster positive impacts throughout the product's life cycle by reducing the unnecessary extraction of virgin materials, sequestering carbon, utilizing regenerative materials, decreasing existing waste and avoiding the creation of new waste at the end of the product's life. When impacts can be reduced but not eliminated, there is an obligation not only to offset the damaging consequences associated with creating goods, but also to strive for corrections in industry itself. At present, it is impossible to gauge the true environmental impact of the materials economy due to a lack of product-level information. Still, the Living Product Challenge continues to shine a light on the need for transformative industrial practices.

IDEAL CONDITIONS + CURRENT LIMITATIONS

Ideally, true Living Products should move away from being composed of any virgin petrochemical inputs to renewable, recycled or bio-based inputs. In practice, this decision must be based on an understanding of both toxicological data and life cycle assessment to ensure that seemingly "green" substitutes do not actually have greater negative impact. Living Products should be made from regenerative materials that sequester carbon, helping to slow and eventually reverse climate change. However, these decisions must be balanced against recyclability, compostability, product lifetime, performance and life cycle impact. Living Products should always aim to use inputs and processes that lower their impacts and make use of available resources, or waste products that can be given a new life.

I11- Responsible Industry (Core)

RESPONSIBLE INDUSTRY

CORE IMPERATIVE

11

MATERIALS PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

The intent of this Imperative is to set a promote supply chain transparency, sustainable extraction and production.

REQUIREMENTS

Living Products support a responsible materials economy. In order to mitigate environmental and human health impacts throughout their supply chain, manufacturers must:

- Advocate for the creation and adoption of third-party certified standards, for sustainable resource extraction and fair labor practices wherever they do not already exist within their industry.
- Adhere to these purchasing requirements:
  - All wood-based materials or timber (including for all packaging uses) must be certified to Forest Stewardship Council (FSC) 100% labeling standards or from salvaged sources.
  - All dimension stone products must be certified to the Natural Stone Sustainability Standard – ANSI/NSI 373.
  - All agricultural inputs must be certified organic under the U.S. Department of Agriculture or an international equivalent.
  - All potential conflict minerals must comply with the Responsible Minerals Assurance Process (RMAP, formerly Conflict-Free Smelter Program) assessment protocols.
  - No ingredients may be derived solely or in part from any animal classified as near-threatened, vulnerable, endangered or critically endangered.

CHANGES FROM LPC 1.1 TO 2.0

This became a Core Imperative under LPC 2.0.

Clarifications

WOOD AND PAPER CLARIFICATIONS

Packaging Scope
Wood and paper-based components of product packaging must be responsibly sourced, by demonstrating that all the materials are FSC Certified or from salvaged sources. Packaging includes any paper, cardboard or wood used to protect and ship the product from the final facility.

FSC Certification Types
All FSC-certified material must be purchased from FSC-certified companies with the requisite claims included on the invoice. Two types of FSC Certification can be used to comply:

- Full Certification: All forest-based materials and products are valid FSC claim-contributing inputs (including wood that is FSC 100%, FSC Mix Credit, FSC Mix XX%, FSC Recycled Credit, FSC Recycled XX%, post-consumer reclaimed wood.)

Certain types of packaging may be difficult to source with FSC Certification, including corrugated cardboard. In these cases, manufacturers may apply to use Exception MT-009 Alternative Forestry Certifications for Product Packaging.

Salvaged Wood
Salvaged wood used in the product or packaging is not required to demonstrate FSC certification. Salvaged wood for products includes wood previously used in building or product applications that can be repurposed wholly in its current form or with slight refurbishment or alterations.

Organic Agricultural Inputs
Agricultural inputs to Living Products should be responsibly produced and farmed. Wherever possible, manufacturers should seek to source USDA organic agricultural inputs.

Exceptions are provided for commodity and bio-based products for which no USDA or international equivalent certification exists.

POTENTIAL CONFLICT MINERALS CLARIFCATIONS

Some minerals and metals that may be considered conflict minerals or metals do not have an applicable Standard for smelters and refiners that participate in the Responsible Minerals Assurance Process (RMAP). In this case, manufacturers should request that the smelter or refiner complete a Risk Readiness Assessment for the manufacturer “to promote a common understanding of good practices and a means to consistently assess risks in mineral supply chains.” Currently, the Risk Readiness Assessment covers the following metals and minerals: Aluminum, Alumina, Bauxite, Cobalt, Copper, Gold, Graphite, Iron Ore, Lead, Lithium, Mica, Molybdenum, Nickel, Palladium, Platinum, Rare Earth Elements, Silver, Steel, Tantalum, Tin, Tungsten, and Zinc.

Exceptions

The following Exceptions apply to the Responsible Industry Imperative.

MT-008 Bio-Based Commodity Products
MT-009 Alternative Forestry Certifications for Product Packaging

MT-008 Bio-Based Commodity Products

For some bio-based commodity products, USDA organic certification is not currently available. These products are exempt from the I-11 Responsible Industry requirements for USDA organic certification for agriculture inputs. Documentation of any alternative certifications held by the bio-based portion of the

product is required.

MT-009 Alternative Forestry Certifications for Product Packaging

Where FSC certification for wood-based packaging is not feasible for manufacturers due to prohibitive cost or lack of availability, SFI certification or 100% recycled packaging will be accepted provided the manufacturer can show due diligence to seek FSC products.

Documentation Requirements

BASIC DOCUMENTATION

All Basic Documentation is required for all products unless noted otherwise.

I11-1 Relevant Certifications

Documents demonstrating that the manufacturer has obtained the relevant certifications demonstrating that the product's material inputs are responsibly sourced per the requirements of I11 Responsible Industry.

Products that use wood-based materials or timber, including for all final product packaging uses:

- Receipts referencing FSC-certified wood acquisition and final chain of custody numbers
- Receipts from the seller/broker of all salvaged wood procurements

Products that use dimensional stone:

- Natural Stone Sustainability Standard (ANSI/NSI 373) or international equivalent certification

Products that use agricultural inputs:

- USDA (or international equivalent) organic certification

Products that use potential conflict minerals:

- The unique Smelter ID(s), established by the Responsible Minerals Initiative (formerly the Conflict Free Sourcing Initiative), that correspond to the smelter or smelters that provide the product's mineral ingredients that have an RMAP Standard developed and currently implemented.
- Receipts from the seller/broker of all mineral procurements

Products that use minerals and metals that may be considered conflict minerals or metals but do not have an applicable RMAP Standard for smelters and refiners (see Clarifications):

- Risk Readiness Assessment, established by the Responsible Minerals Initiative, from smelters, refiners and mining companies working with the following minerals and metals: Aluminum, Alumina, Bauxite, Cobalt, Copper, Gold, Graphite, Iron Ore, Lead, Lithium, Mica, Molybdenum, Nickel, Palladium, Platinum, Rare Earth Elements, Silver, Steel, Tantalum, Tin, Tungsten, and Zinc.
- Receipts from the seller/broker of all mineral procurements

EXCEPTION DOCUMENTATION

I11 EXCEPTION DOCUMENTATION SUMMARY TABLE		I11-a Manufacturer Statement	I11-b Due Diligence	I16-c Technical Documentation
MT-008	Bio-Based Commodity Products	X		
MT-009	Alternative Forestry Certifications for Product Packaging		X	X

I11-a Manufacturer Statement

Manufacturer may supply a brief statement indicating that no USDA or international equivalent certification currently exists for commodity and bio-based products.

I11-b Due Diligence

The manufacturer must present documentation indicating that obtaining FSC certification for the packaging is not feasible, and that three or more suppliers were contacted in an effort to source FSC packaging.

I11-c Technical Documentation

Documents demonstrating that the manufacturer has met the exception requirements and any requisite certifications for packaging.

Resources

FSC CERTIFICATION RESOURCES & COMPARISONS

FSC Become Certified

A description of the types of certification and links to more information.
https://us.fsc.org/en-us/certification/become-certified

FSC Steps to Certification

Steps required for companies to become FSC-certified.
https://fsc.org/en/page/become-certified

WWF Forest Certification Assessment Tool (CAT)

Comparison of FSC, PEFC and Malaysian Timber Certification Scheme (MTCS).
https://fsc.org/en/newsfeed/wwf-assessment-confirms-fsc-as-the-most-rigorous-and-comprehensive-forest-certification

FSC Handout

While FSC requirements for Living Building Challenge project teams differ in some ways from those of LPC manufacturers, this Handout may be useful still in understanding the requirements of sourcing FSC wood.
https://living-future.org/wp-content/uploads/2016/11/FSC-Sourcing-Guide.pdf

OTHER RESOURCES

Natural Stone Sustainability Standard (ANSI/NSI 373)

All dimension stone used in LPC products must be certified to Natural Stone Sustainability Standard (ANSI/NSI 373).
https://www.naturalstoneinstitute.org/programs/sustainability/

Responsible Minerals Assurance Process

The Responsible Minerals Assurance Process assessment protocols were created by the Responsible Minerals Initiative (formerly the Conflict-Free Sourcing Initiative) as a resource for companies from a range of industries to address conflict mineral issues in their supply chain.
www.responsiblemineralsinitiative.org

Sustainable Forestry Initiative (SFI)

https://www.sfiprogram.org/

USDA Organic

https://www.usda.gov/topics/organic

I12- Regenerative Materials

REGENERATIVE MATERIALS

12

MATERIALS PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

The intent of this Imperative is to encourage manufacturers to select optimal materials for human health and environmental attributes.

REQUIREMENTS

Living Products are designed to minimize the continued extraction of virgin fossil-fuel based inputs, decrease existing global waste and maximize the usage of natural, bio-based and carbon-sequestering materials. Manufacturers must demonstrate intentional selection of materials that confer positive impacts throughout the full life cycle of the product.

Regenerative Inputs

Inputs to Living Products should aim to have a positive impact from sourcing to the end of the product's life. Manufacturers must evaluate all material used in the product and prioritize the use of rapidly renewable, bio-based and carbon sequestering materials or non-toxic recycled or waste inputs whenever they have an overall better health and environmental performance based on toxicological and life cycle impacts.

Appropriate Lifetime

The product must be designed so that its durability, warranty and useful lifespan have a direct relationship to its environmental impact and embodied energy. Disposable or single-use products do not qualify unless 100% of the product contents are biodegradable within five years or are made from a material that is compostable or readily recycled within the country of intended use.

Responsible End of Life

The product, including its packaging, should be designed to consider impacts at
the end of its useful life as a functioning product. This means the product and its packaging must meet one of the following requirements:

- Be completely compostable within five years.
- Be able to be 100% recycled.
- Have a manufacturer take-back program available in the market where the products are sold.

Additionally, the product's packaging must not contain single-use plastic and must not pose a hazard to marine, bird or animal life.

CHANGES FROM LPC 1.1 TO 2.0

Regenerative Materials is a new Imperative in LPC 2.0. The Imperative brings together the Responsible End Of Life and Appropriate Life Time Imperatives from LPC 1.1 under an umbrella of selecting materials that

support an appropriate life time and end of life options.

The Imperative also adds this component of optimizing materials to encourage the creation of products that are not just Red List Free and recyclable, but that also consider sourcing materials for inputs. This Imperative encourages manufacturers to evaluate their product materials and identify whether they have optimized their products for recycled or renewable inputs, and/or end of life options such as recyclability and biodegradability.

Finally, this Imperative adds a requirement about avoiding single-use plastics in packaging in order to encourage dematerialization of product packaging, and disincentivize the use of petroleum-based plastics. Compostable and bio-based plastic are currently accepted.

Clarifications

SINGLE-USE PLASTICS

The intent of the requirement to remove single-use plastics in products and packaging, is to move manufacturers towards dematerialization of plastic materials and packaging, and away from the automatic use of disposable petroleum-based plastic in packaging that inevitably contributes to landfill and other environmental impacts. However, it is also important that these restrictions not inadvertently move manufacturers towards less desirable options.

To meet the single-use plastic packaging requirement a manufacturer must either avoid all plastics, or use plastic which meets the following specifications:

- Bio-based plastic that meets ASTM D6400 standard of compostable (preferred), or
- Plastics that do not meet ASTM D6400 should comply with the FTC Green Guide guidance on Compostable claims (specify where and how the product may or may not be composted)

TAKE BACK PROGRAMS

A program offered by a manufacturer or industry trade group that includes a mechanism both implemented and overseen by a manufacturer/trade group to assume physical responsibility of a product, product component, and/or packaging at the end of a product's useful life with the intent to reuse or recycle the items received into new useful goods.

CARBON-SEQUESTERING MATERIALS

Products may benefit from substituting a carbon-sequestering product for one that is carbon producing (e.g., wood vs. steel). At this time, the Institute recognizes Forest Stewardship Council (FSC) certification as an approved third-party sustainable harvesting standard with scientifically verified carbon-sequestering benefits for wood products beyond the sequestration of standard harvesting practices. Alternative certification programs or verification standards for carbon-sequestering materials must be submitted to LPC.Support@living-future.org for pre-approval.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

All Basic Documentation is required for all products unless noted otherwise.

I12-1 Regenerative Inputs Comparison

A narrative, in the form of writing or an LCA alternatives assessment that demonstrates material considerations for the product's five most environmentally impactful materials and describes how each material used was selected. Where possible, carbon-sequestering, bio-based and recycled materials should be prioritized.

I12-2 Durability Statement

A statement from the manufacturer affirming that the product is designed and tested to last as a useful, functioning product for at least the average lifetime for its product category, as documented in the Institute's online Product Life Database. Please include any relevant testing data.

Disposable or Single-Use Products Only:
A statement detailing the means by which 100% of the product will:

- Biodegrade within five years.
- Be fully compostable.
- Be recycled within the country of intended use.

I12-3 End-of-Life Narrative

A narrative statement detailing how the product and its packaging meets the Responsible End of Life requirements of I12 Regenerative Materials.

I12-4 List of Take Back Locations

A list of markets in which the product is sold and a list of corresponding locations of manufacturer take back programs, if applicable.

Resources

FTC Green Guides

https://www.ftc.gov/sites/default/files/attachments/press-releases/ftc-issues-revised-green-guides/greenguides.pdf

USDA Biobased Products

https://www.biopreferred.gov/BioPreferred/faces/pages/BiobasedProducts.xhtml

APPLICABLE STANDARDS

ASTM D6400

https://www.astm.org/Standards/D6400.htm

I13- Net Positive Waste

NET POSITIVE WASTE

HANDPRINTING IMPERATIVE

13

MATERIALS PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

Living Products efficiently use natural resources and generate zero waste during the manufacturing process by eliminating source waste, decreasing waste production and implementing ways to use waste in a closed loop cycle.

REQUIREMENTS

Living Products efficiently use natural resources and generate zero waste during the manufacturing process. By eliminating waste production and implementing ways to use waste in a closed loop cycle, manufacturers must do one of the following:

- Demonstrate that the waste stream from manufacturing the product is achieving 100% diversion from landfill.
- Meet a minimum overall diversion rate of 90% and create new waste Handprints outside the product waste stream that divert an equivalent amount of the remaining waste from the landfill.

CHANGES FROM LPC 1.1 TO 2.0

LPC 2.0 requires that manufacturers truly achieve zero waste from production, requiring that manufacturers either achieve 100% diversion from landfill, or achieve a minimum of 90% with the opportunity to make Waste Handprints to offset the final 10%+. Waste Handprints are a new opportunity for manufacturers to achieve the more stringent requirement of 100% waste diversion and encourage creativity outside of the waste Footprint of the product.

A new Exception recognizes the importance of increasing material efficiency in demonstrating waste avoidance in manufacturing.

Clarifications

MANUFACTURING WASTE SCOPE

This Imperative looks at waste production associated with the inputs required to produce the product seeking certification at the final manufacturing facility or facilities. Therefore, packaging for *supplied* materials, and the materials themselves are in-scope. Packaging used by the manufacturer to protect and ship the finished product is excluded from this calculation. Though Life Cycle Waste impacts may be calculated by the manufacturer, they are not required for this Imperative.

MAXIMIZING DIVERSION FROM LANDFILL

Manufacturers of Living Products must exhaust opportunities to decrease waste created and they must also

divert any unavoidable waste from landfills. This can either be achieved by maximizing the recycling of waste material created during the manufacturing process, or by increasing the efficiency of the manufacturing process to create minimal waste in the first place, or a combination of the two.

Recycling, reuse, and composting are considered acceptable methods of diversion from landfill. Incineration is not accepted under this Imperative. Waste-to-Energy will only be considered on a case by case basis per MT-011 Waste-to-Energy Exception.

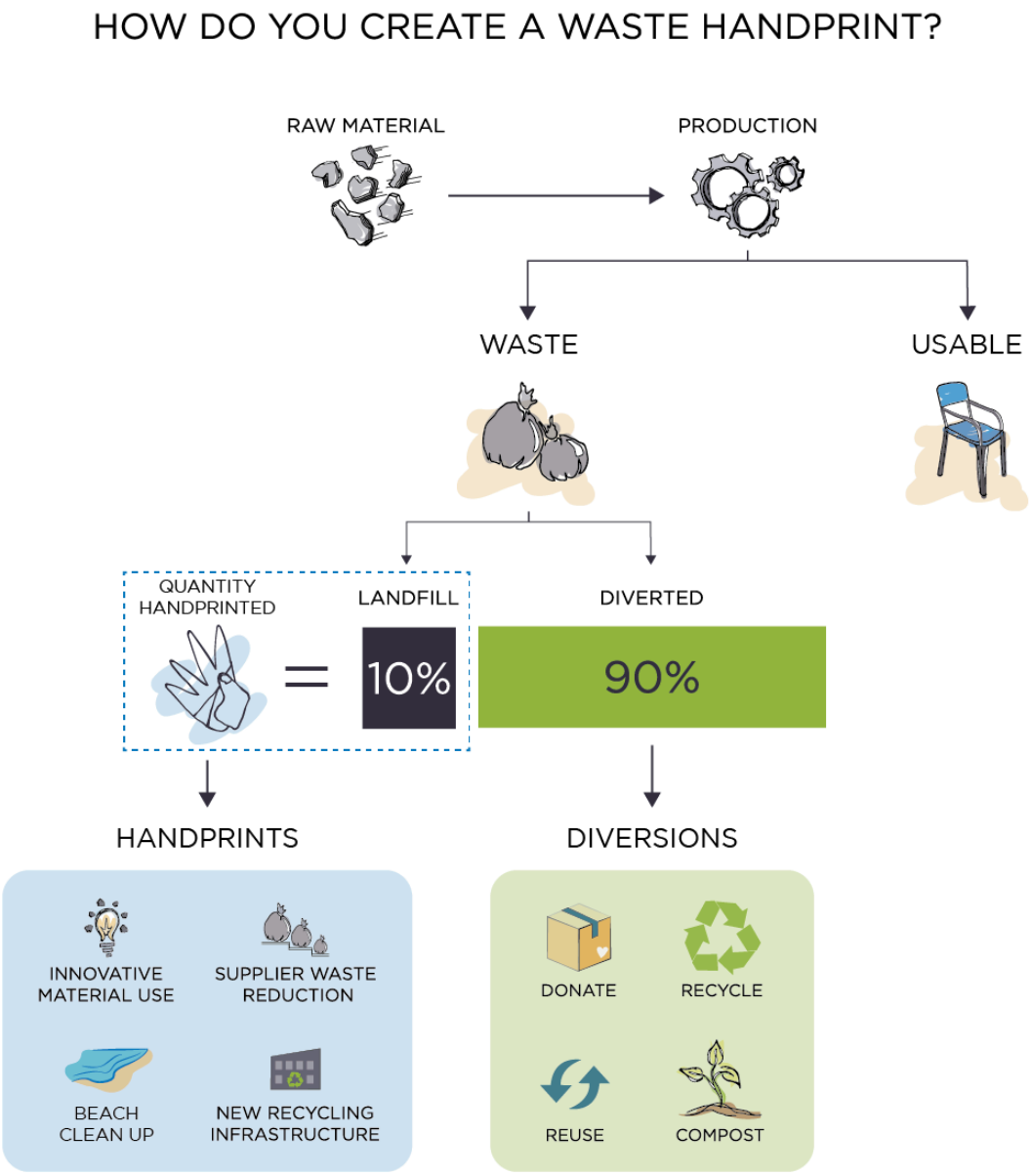
WASTE HANDPRINT SCOPE

Waste Handprints, like all Handprints, require action versus business-as-usual to create a measurable positive impact. Waste Handprinting in LPC is different from energy, water and carbon, however, because it is used to offset a mass of waste material based on only on-site impacts (not the entire life cycle). The mass of the waste Handprint should offset an equivalent of the mass which cannot be diverted from landfill. For example, if table production results in 1,000 kilograms of non-recyclable waste annually, the manufacturer must take action to create Handprints that result in the removal or diversion of at least 1,000 kilograms of waste elsewhere annually.

Key to the creation of waste Handprints, and Handprints in general, is the concept of ‘additionality’. This term indicates that the action taken results in the recycling or composting of materials that was otherwise unlikely to be recycled. In essence, the action creates new recycling streams within their facility, industry or the greater community. One example would be to initiate, or be a cause of, additional post-consumer collection of material for recycling. For example, putting recycling collection bins somewhere that recycling is not now taking place, ensuring that the collected material is recycled, and tracking and reporting the material amounts recovered.

The use of materials that are already readily recyclable, and are being recycled, for a different purpose, would not be considered a waste Handprint, because it is not necessarily causing additional landfill diversion than what would have otherwise occurred. For example, taking recyclable water bottles in a municipality with recycling infrastructure and using them for the creation of new materials is an inventive use of recycled material, but does not necessarily prevent landfilling of additional materials. However, installing recycling bins in an area that previously did not have recycling, could count.

The diagram below illustrates both the diversion requirements for this Imperative and the concept of Waste Handprints. For more information on Handprinting, refer to the Handprinting Guide.



Exceptions

The following Exceptions apply to the Net Positive Waste Imperative.

MT-010 Material Process Efficiency
MT-011 Waste-to-Energy Diversion

MT-010 Material Process Efficiency

Manufacturers with very high process efficiency may be unable to meet the minimum required diversion rate

outlined in the standard. Manufacturers unable to meet the diversion rate of >90% who have demonstrated that they have maximized their waste diversion must still document their diversion rate, and in addition:

- The product must meet a material efficiency of at least 99%. If the overall material efficiency rate falls below 100%, the manufacturer must complete I13-3 Waste Handprints.

$$Material\ Efficiency\ Rate = 1 - \frac{Total\ Product\ Landfill\ Waste\ Generated}{Total\ Product\ Materials\ Purchased} \times 100$$

MT-011 Waste-to-Energy Diversion

Manufacturing facilities located in regions/municipalities that restrict recycling opportunities for manufacturers may have to rely on waste diversion strategies that are not generally approved by the Institute. In these cases, waste-to-energy processes may be approved as a diversion method for select materials that have no other alternative.

To use this exception, the manufacturer must:

- Identify which specific material streams cannot be diverted in an approved method, and must instead use waste-to-energy; and
- Demonstrate efforts to maximize their material efficiency and therefore reduce the creation of waste by the time of certification, as well as efforts at continuous improvement by recertification; and
- Demonstrate that there are no alternative methods for waste disposal within the region or municipality where the facility is located; and
- If appropriate, advocate to the authority having jurisdiction (AHJ) for the creation of sufficiently robust public waste diversion systems to create diversion opportunities not limited to recycling and/or composting.

Documentation Requirements

BASIC DOCUMENTATION

All Basic Documentation is required for all products unless noted otherwise.

I13-1 Materials Conservation Management Plan

Completed Conservation Management Plan explaining how the manufacturer optimized materials in design, manufacture, use, and how they planned for source reduction of waste, as well as reduced waste at the product's end of life. The narrative must describe how the facility complies with diversion rates for either the Product Share, or, if applicable, the Whole Facility approach. The Plan must contain a section devoted to packaging, demonstrating how the manufacturer achieved a reduction or elimination of packaging waste.

Manufacturers that have achieved ILFI-approved zero waste to landfill certifications for the final facility are considered to comply with the Imperative requirements for any products produced in the facility and no

additional documentation for this imperative needs to be supplied beyond the certificate of achievement from the certifying body. ILFI-approved zero waste to landfill certifications include, but are not limited to:

- GreenCircle Certified Zero Waste to Landfill Certification
- NSF Landfill-Free Verification

I13-2 Diversion Table

Completed waste diversion table, in Excel spreadsheet format, showing percentages of waste diverted (by weight) in each category (Metals; Paper + Cardboard; Soil + Biomass; All Others (combined weighted average). The calculations must be based on tangible data that correlates to receipts provided.

The table must demonstrate that at least 90% of the waste generated through production of the product needs to be diverted from the landfill. If the overall diversion rate falls below 100%, the manufacturer must complete I13-3 Waste Handprints.

$$Waste\ Diversion\ Rate = \frac{Amount\ Recycled + Amount\ Composted}{Total\ Waste\ Generated}$$

I13-3 Waste Handprints

If the product does not meet one of the approved waste to landfill certifications identified in I13-1 and also falls short of 100% diversion in I13-2, the manufacturer may become Net Positive by completing waste diversion strategies outside the scope of the product pursuing certification. This can be done either through Enterprise level activities (those done by the company outside of production), or through other Handprinting actions like consumer or supplier engagement. The manufacturer should demonstrate that the amount of waste diverted through these other strategies offsets the amount sent to landfill and will continue to meet or exceed these requirements through recertification.

I13-4 Hauling Documentation

Copies of receipts, recycling percentage reports and provider names for all tipping fees, recyclers, and building materials salvage services. For the Product Share pathway, this only applies to non-hazardous waste streams associated with the product pursuing certification. For the whole facility compliance path, this extends to all facility waste streams.

I13-5 Photographs

Photographs of specific designated on-site areas for managing waste, as well as of waste containers on-site, to prove less than 2% contamination in outgoing containers.

EXCEPTION DOCUMENTATION

I13 EXCEPTION DOCUMENTATION SUMMARY TABLE		I13-a Manufacturer Statement	I13-b Efficiency Documentation
MT-010	Material Process Efficiency	X	X
MT-011	Waste-to-Energy Diversion		X

I13-a Manufacturer Statement

A narrative describing the product's need for the Exception, statement describing the manufacturer's maximization of the diversion rate, and compliance with Exception requirements.

I13-b Efficiency Documentation

Table demonstrating all inputs to production with associated weights and outputs.

Resources

Handprinting Guide

GreenCircle Zero Waste to Landfill Certification:

http://www.greencirclecertified.com/zero-waste-to-landfill

NSF Zero Landfill Verification

https://www.nsf.org/q-and-a-all/qa-detail/landfill-free

I14- Net Positive Carbon

NET POSITIVE CARBON

HANDPRINTING IMPERATIVE

14

MATERIALS PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT

The intent of this Imperative is to promote the creation of products that have a net positive impact on carbon, thereby actively reducing carbon in our atmosphere through their very production through carbon sequestration and Handprinting.

REQUIREMENTS

Living Products sequester or offset more carbon than they generate. Manufacturers must demonstrate that the carbon sequestering inputs of the materials used in the product exceed the greenhouse gas (GHG) Footprint of producing the product or generate a carbon Handprint larger than the product's Footprint.

Manufacturers must conduct a cradle-to-grave Life Cycle Assessment to assess and document the carbon Footprint and identify the five processes (key drivers) that make the largest contributions to the product's cradle-to-gate carbon Footprint.

Manufacturers may use an existing LCA or Environmental Product Declaration that follows the ISO 14044 standard for LCA used for third-party communication. Manufacturers must demonstrate that the carbon Footprint of the product is lower than the industry average for the product type.

Manufacturers must reduce the product's cradle-to-gate carbon Footprint by innovating within the supply chain of the product or within the manufacturing process to generate fewer GHG emissions. Manufacturers must then create a carbon Handprint greater than the Footprint to become carbon Net Positive through one or more of the following strategies:

- Incorporate carbon sequestering materials to ensure the product stores more carbon than was used in production.
- Engage with users to reduce carbon emissions through improved use of the product.
- Take action outside of the product's supply chain to reduce carbon emissions.
- Purchase a carbon offset equivalent to the cradle-to-gate GHG Footprint of the product after other options have been depleted.

CHANGES FROM LPC 1.1 TO 2.0

The only significant change to this Imperative is the removal of the 3-Year plan to become Net Positive, which allowed a 'ramp up' approach to creating Handprints larger than the Footprint. The Imperative now requires that manufacturers demonstrate at least a year of Net Positive Impact to be certified, and maintain that status throughout their certification.

Clarifications

VALID LCA

Carbon footprint data for products pursuing the Living Product Challenge come from LCAs completed to guidelines in ISO 14040 and 14044, or from Type III facility-specific or product-specific cradle-to-grave Environmental Product Declarations completed to a relevant Product Category Rule that are published by product manufacturers/declaration holders, or published by ISO 14025 program operators that have completed the third-party verification and registration of the EPD, as defined in ISO 14025, ISO 14044, and ISO 21930 and/or EN 15804. The LCA must have been completed and/or critically reviewed by an Approved LCA Practitioner and be made publicly available. The American Center for Life Cycle Assessment (ACLCA) maintains a list of active LCACPs.

An existing LCA may be used if it is still valid. However, manufacturers should note that they may have to further analyze the results or re-engage a consultant who created the LCA in order to discover required program information (e.g. Energy Hotspots) or to better reflect any Footprint reductions that have taken place.

INDUSTRY AVERAGE

Product manufacturers must demonstrate that their product's water footprint is below the industry average. Manufacturers can submit the industry average, industry-wide or sector LCA or EPD commissioned and completed by their industry or trade association(s). The sector LCA or EPD should reflect the same geography as the final facility, or the final facilities respectively. If a product-specific industry average LCA or EPD does not exist, manufacturers may use a broader product type LCA or EPD that still represents the product seeking certification. Industry average LCAs or EPDs should be used for comparison purposes and relative performance only and does not take place of any other documentation related to product environmental impacts.

DEMONSTRATING CARBON NET POSITIVE

LPC has no on-site Carbon requirements. Achieving this Imperative focuses on the life cycle impacts and achieving Net Positive Carbon through impact reduction, Handprinting and/or purchasing approved carbon offsets. There is no regional requirement for Net Positive Carbon.

Non-quantifiable impacts (e.g. social impacts) resulting from manufacturer Handprinting actions are highly encouraged, but are not required for achievement of the Imperative.

For more information on achieving Net Positive Carbon, see the Handprinting Guide.

CARBON OFFSETS

Approved carbon offsets must be procured to cover the cradle-to-gate carbon footprint of the product on an annual basis, once any efficiency measures for footprint reduction efforts or Handprinting actions have been

exhausted. Products that are calculated to have a net carbon-neutral or carbon-sequestering value based on their LCA are considered to comply with the intent of this Imperative and are not required to procure additional carbon offsets.

Approved Carbon Offsets

Carbon offsets must be certified by Green-e Climate or an equivalent program that ensures additionality, leakage prevention, permanence, and audited verification. Only Certified Emission Reduction (CER) and Verified Emission Reduction (VER) carbon credits are suitable for purchase; Renewable Energy Certificates (RECs) are not acceptable alternatives for carbon offsets.
Green-e certified carbon offsets must meet an endorsed program currently limited to Gold Standard, Voluntary Carbon Standard (VCS) or the Climate Action Reserve requirements for third-party verification. Other certification programs or verification standards must be submitted to the Dialogue for preapproval.

The types of CER and VER carbon offsets allowed are:

- Renewable energy projects. *Note that offsets must be from projects that meet the ILFI definition of Renewable Energy, which may be more narrow than definitions used by Green-e Climate or comparable programs.*
- Landfill gas-to-energy projects where the methane would otherwise be released to the atmosphere.
- Reforestation projects.

Carbon offsets may be sourced from any location in the world; consideration of local or community-based solutions is encouraged, but not required. Consideration of carbon offsets with additional ecological, cultural, human health or equity benefits is also encouraged, but not required.
Large-scale carbon sequestration assets or activities associated with the project owner must be audited through an approved third-party certifier in order to be claimed as a qualifying carbon offset. Such requests should be submitted to LPC.Support@living-future.org for pre-approval.

Prohibited Carbon Offsets

The carbon reducing function of on-site elements, such as native landscapes, may not be applied to the project as a carbon offset or otherwise accounted for in calculating the embodied carbon footprint of the project.

Although reforestation projects are allowed as offsets, forest management strategies, even those that have been shown to increase carbon capture, are not allowed as offsets under LPC because they do not increase the amount of forested area, or “have additionality.”

ESTABLISHING A FOOTPRINT BASELINE

The fossil energy Footprint baseline per functional unit should be established based on the most recent valid LCA data for the product. To establish the scale of fossil energy impact required to be offset through Handprinting, the manufacturer may use predicted sales volume for the three years of certification. If those values are too high or too low, the manufacturer may use the annual check-ins with their assessor to “true

up" Handprinting impacts if they are too low, or establish how much is in their Handprint bank.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

All Basic Documentation is required for all products unless noted otherwise. There is no on-site requirement for this imperative.

I14-1 Carbon Footprint

Documentation indicating the cradle-to-gate Carbon Footprint of the product and demonstrating that the Footprint is below the industry average for the product type.

I14-2 Hotspot Identification

The following data shall be provided, documenting the greenhouse gas (GHG) hotspots (key drivers) of the product's cradle-to-gate life cycle:

- A table of process contributions to cradle-to-gate lifecycle GHG emissions, listing at least the top 5 processes ranked in terms of GHG emissions.
- A brief narrative that interprets the results and identifies the 5 main drivers of the product's cradle-to-gate carbon Footprints, and their relevance.

I14-3 Net Positive Carbon Report

A report that describes how the manufacturer reduced the product Footprint, created Handprints, either through the nature of the product or through actions taken outside of the footprint of the product, thereby achieving Life Cycle Net Positive. For both Enterprise and Product Lifecycle Related Handprints the assessment should be done using a spreadsheet documenting input assumptions and references to relevant product category rules (PCRs) when available and/or appropriate.

For Enterprise and Product Lifecycle Related Handprints, the following information will be provided:

- A spreadsheet documenting all input assumptions and the resulting handprint impact calculations.
- A brief narrative explaining the Handprinting actions and their impacts.

I14-4 Carbon Offset Receipts

Receipt demonstrating that 100% of the remaining Life Cycle Carbon impacts after all handprints have been

applied have been offset. Acceptable forms of carbon offsets include Certified Emission Reduction (CER) and Verified Emission Reduction (VER) carbon credits. Carbon offsets must be certified by Green-e Climate, or an equivalent program. Other certification programs must be submitted for approval. The offsets do not have to be local, although local or community-based solutions that provide additional socioeconomic benefits are encouraged.

EXCEPTION DOCUMENTATION

None at this time.

Resources

Handprinting Guide

EPA Sustainable Materials Management (SMM) Prioritization Tools:

The SMM Prioritization Tools are life cycle-based tools that offer a starting place to establish priorities for environmental improvement, focus limited financial and human resources where action could offer greater holistic benefit, and consider key industries for collaboration. Currently there are two tools: a National Tool and an Organization Tool. The National Tool provides a big picture view of sustainability in the United States for those with a national focus, such as government, trade associations and NGOs. The Organizational Tool provides quick sustainability snapshots for organizations such as companies, small enterprises and their sustainability and procurement staff.
https://www.epa.gov/smm/sustainable-materials-management-prioritization-tools

APPLICABLE STANDARDS

Green-e Climate

Chain-of-custody certification for carbon offsets that requires project verification by Endorsed Programs (like the American Carbon Registry, the Climate Action Reserve, the Gold Standard, and the Verified Carbon Standard). Through the Green-e® Climate program, CRS takes oversight further by being the only program to monitor how offsets are transacted and advertised in the retail market, protecting both the buyer and the seller.
www.Green-e.org

Equity Petal

EQUITY PETAL HANDBOOK

Supporting a Just, Equitable World

LIVING PRODUCT CHALLENGE **2.0**

INTERNATIONAL **LIVING FUTURE** INSTITUTE℠

PETAL INTENT

The intent of the Equity Petal is to transform the material and product economies to foster true, inclusive manufacturing communities that are just and equitable regardless of an individual's background, age, class, race, gender or sexual orientation. Equity is a critical aspect of achieving true sustainability. A society—especially a modern, affluent, consumer society—that embraces all sectors of humanity and allows the dignity of equitable access and fair treatment is a society in the best position to make decisions that protect and restore the natural environment that sustains us. This Petal goes well beyond the notion of corporate responsibility; it gives companies the opportunity to be leaders in creating a world that is better for all people, everywhere.

There is a disturbing trend toward "us" versus "them" that inevitably gives way to power dynamics that allow people from certain economic, cultural or racial backgrounds to take disproportionate and oppressive control. Only by acknowledging this inequity and working collaboratively to eliminate it—by dismantling institutionalized systems and entrenched mindsets—can the greatest environmental and social problems be addressed. The Living Product Challenge aims to challenge the notion that factory ownership somehow implies owners can do whatever they like without consequence; this modus operandi often externalizes the negative environmental and health impacts of the owners' actions and imposes them onto others.

In particular, consider these situations: when a polluting factory is situated in close proximity to a low-income neighborhood, the environmental and social burdens of its operation are placed on the vulnerable populations who live nearby. The factory is limiting its neighbors' rights to clean air, water and soil, and it is likely profiting from this diminishment. Similarly, when a manufacturer knowingly creates a lower cost version of a product with lesser quality to increase profitability, they may be externalizing the negative health impact both to their workers and to those who use and interact with the product. Furthermore, when a company does business with another enterprise whose business practices are unfair and/or unsafe, all positive effects of a company's operation are undermined by this negative associated impact.

We must prioritize the concept of "citizen" above that of "consumer." The Equity Petal guides the creation of goods via fair manufacturing and business practices as well as true and intentional socially-responsible corporate oversight. It is essential that we recognize the business practices and welfare of the people that we support as we design and build our products, using manufacturing as a proponent for an equitable workforce and community development. JUST, the Institute's social justice label, provides a publicly accessible online database of organizations with transparent policies and practices that have an official connection to the Equity Petal. JUST provides a powerful forum for helping product innovators and manufacturers demonstrate they share the values of a responsible and equitable Living Future.

IDEAL CONDITIONS + CURRENT LIMITATIONS

The Living Product Challenge envisions consumer and industrial goods that allow equitable access and treatment for all people regardless of physical abilities, race, gender, sexual orientation, age or socioeconomic status. Current limitations stem from ingrained cultural resistance to profitable enterprises sharing their wealth; companies doing the right thing for their employees, their communities and the environment; and a corporate-societal structure that systematically places profit over people. The idea that

the rights of corporations are equal to or greater than the rights of people needs to be replaced with an ethic that corporations exist to serve all people and not merely their shareholders—that the common good must be safeguarded in the pursuit of the private good.

It is necessary to change corporate standards in order to protect the rights of individuals who work for, live near, or do business with manufacturing operations. At the same time, companies fortunate enough to realize profits must factor charitable giving into their normal expense budgets to recognize the public benefits they enjoy. A healthy, diverse, and equitable community is one that is supported by local enterprise and is organized in a way that protects the health of people and the environment. Ultimately, we champion a future in which product manufacturers are highly profitable and successful, but not at the expense of the environment or any particular population.

I15- Ethical Supply Chain (Core)

ETHICAL SUPPLY CHAIN

CORE IMPERATIVE
15

EQUITY PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT:

The intent of this Imperative is to examine a product's supply chain and identify and mitigate social and environmental risks.

REQUIREMENTS:

Living Products are made by manufacturers committed to responsible practices throughout their supply chains and across business operations. To demonstrate that the promotion of human rights extends to the workers and communities across their full supply chains, manufacturers must:

- Perform human rights due diligence for their top 10 priority suppliers, based on spending, through the Social Hotspots Database (SHDB) risk portal.
- Identify the most critical social risks associated with each priority supplier and the leading certification systems that address those risks by using the Standards Map website.
- Give preference to priority suppliers that either obtain the relevant certification or conduct a social audit to otherwise address the identified social risks.

CHANGES FROM LPC 1.1 TO 2.0

This is a new Imperative that seeks to address labor within product supply chains in order to ensure that living products are responsibly produced from extraction to disposal.

Clarifications

SOCIAL HOTSPOTS DATABASE CLARIFICATIONS

This Imperative requires that manufacturers "Identify the most critical social risks associated with each priority supplier and the leading certification systems that address those risks by using the Standards Map website."

Step One: Identify Top 10 Priority Suppliers
List the top 10 ("priority suppliers") of all Goods and Services either to the facility or to the business unit containing the facility, based on total annual spending. Manufacturers must provide an approximate percentage of total annual spending allocated to each of these top 10 suppliers, and do not need to disclose spending amounts in dollars.

Step Two: Social Hotspots Database
Next, for each priority supplier, Manufacturers should use the Social Hotspots Database (SHDB) to identify the social risks associated with the industry sector and the country of production where the majority of production of the material supplied to the Manufacturer occurs. For example, the primary metal hardware

supplier for the Manufacturer may provide most of the metal hardware from operations in Thailand, where this industry may have significant negative impacts on women's health outcomes, whether directly or indirectly. The supplier may operate in multiple countries; the manufacturer should simply name the country from which the highest share of input from this supplier to the manufacturer originates.

Manufacturers must identify the 1, 2, or 3 (as many as is returned by the SHDB) most critical social risks for this country-specific sector. The most critical risks are identified by having a highest contribution to the social hotspot index for that country-specific sector. List these risks for each of the top 10 suppliers.

Step Three: Identify Global Trade Analysis Project (GTAP) Sectors
Manufacturers must then indicate which of the 57 sectors identified by the Global Trade Analysis Project (version 9) the supplied material falls within for each of the top 10 priority suppliers. Following this, the Manufacturer may continue on to the Standards Map (see Standards Map Clarifications).

STANDARDS MAP CLARIFICATIONS

Once a list of socially vulnerable GTAP sectors associated with each of the top 10 suppliers has been collected, the manufacturer should use the Standards Map to identify certifications related to each Product/ Sector and Producing Country identified for each supplier. Manufacturers must then share this information with the top 10 suppliers and advocate that they prioritize certified material inputs in their supply chains that are proven to encapsulate social dimensions of raw material extraction and refining.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

I15-1 Supplier Identification

Identification of the top suppliers:
List the top 10 suppliers of all Goods and Services either to the facility or to the business unit containing the facility, based on total annual spending.

Specify the (approximate) percentage of total annual spending allocated to each of these top 10 suppliers. Manufacturer does not need to disclose spending amounts in dollars. For each of the top 10 suppliers:

- Indicate the country in which production of the largest share of this input sold to the manufacturer occurs. The supplier may operate in multiple countries; if this is the case, the manufacturer should simply name the country from which the highest share of input from this supplier to the manufacturer originates.

- Indicate which of the 57 GTAP sectors, as indicated in the Social Hotspots Database, the largest share of this input sold to the manufacturer falls within. A list of the 57 GTAP (version 9) sectors can be found here.

I15-2 Risk Identification

For each of the top 10 suppliers identified in I15-1, identification of the 1, 2, or 3 most critical social risks for this country-specific sector, using the Social Hotspots Database risk portal. The most critical risks are identified by having a highest contribution to the social hotspot index for that country-specific sector. List these risks for each of the top 10 suppliers.

For each of the most critical risks for each of the top 10 suppliers, use the Standards Map database to identify one or more certification systems that address the critical risk for the given country and sector. Information about the most critical risks and one or more relevant certification systems that address them must be shared with each of the top 10 suppliers, and copies of the correspondence sent sharing this information must be submitted.

Or, if there are no products/services identified for the Manufacturer's suppliers that are represented in the Standards Map. If this is the case, manufacturers should:

- Document this gap in standards/ certifications so that it can be addressed in the map for future certifications; and also
- share this information with the suppliers and ask that they share any information related to social audits they have conducted, or if they have not yet conducted one, advocate that they do using either ISO 26000 (for guidance) or SA 8000 (for guidance and/or certification)

I15-3 Supplier Preference Statement

Provide a statement from the manufacturer explaining how the manufacturer will give preference to suppliers that either obtain the relevant certification or conduct a social audit to otherwise address the identified social risks.

Resources

Standards Map Website

Hosted by the International Trade Centre, the Standards Map module offers comprehensive, verified and transparent information on standards for environmental protection, worker and labor rights, economic development, quality and food safety, and business ethics.
www.standardsmap.org/identify

Social Hotspots Database

The Social Hotspots Database, a risk portal that identifies country- and sector-specific risk levels, aims to foster greater collaboration in improving social conditions worldwide by providing data and tools necessary

for improved visibility of social hotspots in product supply chains.
www.socialhotspot.org

Global Trade Analysis Project (GTAP)

The Global Trade Analysis Project (GTAP) is a global network of researchers and policy makers conducting quantitative analysis of international policy issues. The GTAP sector classification allows commodity items to be associated with 1 of 57 trade sectors, allowing for analyses of global economic and social issues associated with specific trade sectors.
https://www.gtap.agecon.purdue.edu/databases/default.asp

Aguiar, A., Narayanan, B., & McDougall, R. (2016). An Overview of the GTAP 9 Data Base. Journal of Global Economic Analysis, 1(1), 181-208. doi:dx.doi.org/10.21642/JGEA.010103AF

https://jgea.org/resources/jgea/ojs/index.php/jgea/article/view/23

APPLICABLE STANDARDS

Social Accountability 8000 (SA8000)

The SA8000 Standard is the world's leading social certification program. It provides a holistic framework allowing organizations of all types, in any industry, and in any country to demonstrate their dedication to the fair treatment of workers. The SA8000 Standard is based on internationally recognized standards of decent work, including the Universal Declaration of Human Rights, ILO conventions, and national laws. SA8000 applies a management-systems approach to social performance and emphasizes continual improvement—not checklist-style auditing.
https://sa-intl.org/programs/sa8000/

ISO 26000:2010, Guidance on Social Responsibility

ISO 26000:2010 provides guidance to all types of organizations on social responsibility and can be used to inform public policy activities. ISO 26000 is intended as guidance, and not for any certification.
https://www.iso.org/standard/42546.html

I16- Equitable Investment

EQUITABLE INVESTMENT

16

EQUITY PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT:

The intent of this Imperative is that Living Products contribute to the financial health and well-being of their local communities.

REQUIREMENTS:

Manufacturers must give back through product and monetary donations to ensure that economic success from product sales contributes more broadly to the well-being of the whole community. For every dollar of gross profit generated annually by the sale of the product, manufacturers must donate one-quarter of one cent, or the equivalent value in product donation, to a charity that promotes human health and well-being. When relevant, manufacturers must offer building products to Affordable Housing projects at price parity with similar products in its category.

CHANGES FROM LPC 1.1 TO 2.0

This Imperative now allows for distribution of costs across multiple types of donations (time, money, and product) . This approach better aligns with other philanthropic initiatives that manufacturers may be pursuing, and makes donations more scalable when taken on for Platform Certifications.

Clarifications

APPROVED DONATIONS

The charity receiving donations for this Imperative must be located in the country of either the final assembly or the source country for a major ingredient or component, and it must be a registered charity or 501©3 organization.

CHARITABLE ORGANIZATIONS

The recipient of a manufacturer’s donation must be a registered charity or 501©3. Manufacturers are encouraged to support organizations in the same local region as the manufacturing facility or facilities that are part of the certification scope, and may also split the donation as desired among multiple charities.

Manufacturers may donate to international charitable organizations that are based in a different country than the manufacturing facility or facilities, as long as the organization in question is active in the facility’s local region. If the selected organization has the option to designate funds by region, the manufacturer must designate its donation to the facilities’ respective regions.

EXISTING DONATIONS

Existing donations may be used to cover the Equitable Investment Imperative requirements, as long as they are given within the fiscal year prior to certification. To do so, the manufacturer must document which donations are being attributed to the sales of this product, and ensure that they are not being double counted for other LPC Certifications.

Calculation requirements are as follows:

- Monetary donations must all be converted to the same currency used to calculate the required donation.
- Product donations must be calculated using the list price of the product. Discounts may not be counted toward the donation, only the complete donation of product.
- Volunteer hours may be counted toward this Imperative. Manufacturers must use the US national average for hourly value of volunteer time, as calculated by Independent Sector in the Value of Volunteer Time tool to calculate the monetary value of the volunteer time donated.

Donations of money, time, or product must meet the following criteria:

- A minimum of 50% of the donation must be money
- Up to 50% of the donation may be contributed through volunteer hours
- Up to 25% of the donation may be made through product donations.

If the existing annual investments made by the manufacturer do not fully cover the required donation amounts for each product seeking certification, the remaining must be supplemented by additional efforts and documented accordingly.

DONATION TIMING

While the Imperative requires annual giving, timing of charitable contributions is flexible provided that the manufacturer issues the total calculated donation required for the 3-year certification period prior to the time of the product recertification. When budgeting for annual giving, manufacturers may use the performance period (i.e. the fiscal year prior to initial certification) to set predictions for annual giving, and at each annual check-in may “true up” to ensure that donations meet the requirement. Donations that had already been made during the performance period to qualifying charitable organizations may be counted toward the total calculated donation required.

Manufacturers that do not make a donation covering all 3 years by the time of certification must offset at minimum the donation amount calculated from the first year of sales, and calculate the donation amount required of the total 3-year certification period to demonstrate awareness and commitment to meeting these donation requirements per the Standard.

Calculations

Example Equitable Investment Calculation:

Gross profit for sales of LPC product in 2019 totals $500,000 USD.
2020 gross profit is $550,000 USD
2021 gross profit is $750,000 USD

Requirement is ¼ cent per dollar of gross profit annually.

$500,000 × .0025 = $1,250 USD
$550,000 × .0025 = $1,375 USD
$750,000 × .0025 = $1,875 USD

The total donation amount therefore over these three years is therefore $4,500 USD.
A minimum of 50% of this donation must be financial, up to 50% may be met through human and equity-focused volunteer time by the organization, and up to 25% may be met through product donations to approved organizations.

Therefore the manufacturer must donate a minimum of $2,750 USD through financial means.
They may meet the rest through volunteer time up to $2,750 USD, and may use a maximum of $1,125 USD to contribute to the total donation.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

I16-1 Profit Statement

A statement detailing the gross profit generated by the sale of the product through the 12-month performance period, as well as projected profit over the next three years. Manufacturers may use the performance period (fiscal year prior to certification) to set these predictions, and at each annual check-in may “true up” to ensure that donations meet the requirement. Manufacturers who do not make a donation covering all 3 years by the time of certification must offset at minimum the first year of sales, and identify the costs of the total certification period to demonstrate awareness and commitment to meeting these donation requirements per the standard.

I16-2 Offset Calculations

Calculations demonstrating the amount that the manufacturer will donate to an approved organization to comply with I16 Equitable Investment.

The manufacturer is required to donate ¼ cent per dollar of gross profit. To meet this, the manufacturer:

- Must make a minimum of 50% of this donation amount through financial contribution to a selected organization(s)
- Up to 25% may be made through volunteer hours
- Up to 25% may be made through product donations/installation

I16-3 Program Selection Narrative

Brief description of the program purpose, how it functions and why it was selected for the donation.

Resources

Value of Volunteer Time Tool

Independent Sector annually updates the Value of Volunteer Time Tool, allowing organizations and others to estimate a monetary equivalent of the value that volunteers provide.
https://independentsector.org/value-of-volunteer-time-2018/

I17-Just Organizations

JUST ORGANIZATIONS

17

EQUITY PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

IMPERATIVE INTENT:

The intent of this Imperative is to contribute to a more just and equitable society through the transparent disclosure of the business practices of the company pursuing certification.

REQUIREMENTS:

Manufacturers must obtain a JUST label and send JUST program information to at least five of their major suppliers as part of an ongoing advocacy effort.

CHANGES FROM LPC 1.1 TO 2.0

None at this time.

Clarifications

JUST ELIGIBILITY

Manufacturers must have five or more employees to be eligible to participate in the JUST program. Manufacturers that employ fewer than five people at the time of certification are exempt from the requirements of the JUST program, but must perform and submit a JUST self-assessment.

VALID JUST LABEL

A JUST-labeled organization has completed not only the self-assessment, but has also had their documents reviewed by ILFI. To meet this Imperative requirement, the JUST label must be current at the time of certification audit.

Exceptions

The following Exceptions apply to the Just Organizations Imperative.

EQ-007 B Corporations

EQ-007 B Corporations

Manufacturers that are a Certified B Corporation achieve many of the same performance indicators of social performance, public transparency and legal accountability as is required of JUST organizations. Manufacturers with a valid B Corporation Scorecard indicating an aggregate B Corp score of at least 41

points in total across the three categories of Workers, Community and Governance may meet this exception.

Documentation Requirements

BASIC DOCUMENTATION

I17-1 JUST Label

An active, published JUST label for the product manufacturer, or a JUST self assessment if the manufacturer has fewer than five employees.

I17-2 Advocacy Letters

Copies of at least five letters to major suppliers advocating for their participation in JUST.

EXCEPTION DOCUMENTATION

I17 EXCEPTION DOCUMENTATION SUMMARY TABLE		I17-a B Corp Scorecard
EQ-007	B Corporations	X

I17-a B Corp Scorecard

Valid B Corp scorecard indicating an aggregate B Corp score of at least 41 points in total across the three categories of Workers, Community and Governance.

Resources

APPLICABLE STANDARDS

B Corporation

https://bcorporation.net/

JUST Program

https://living-future.org/just/

I18- Social Co-Benefits

SOCIAL CO-BENEFITS

HANDPRINTING IMPERATIVE

18

EQUITY PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT:

The intent of this Imperative is to develop multi-dimensional Handprints and leverage externalities of the manufacturing process to create positive localized social impacts both in immediate neighborhoods of facilities and through the product supply chain.

REQUIREMENTS:

Living Products give back to society. Looking beyond strictly environmental metrics to consider social impacts of their actions, manufacturers can create positive social change through their Handprinting actions, known as social co-benefits.

Manufacturers must demonstrate that at the time of certification, and for at least the next three years of production, they will work within the broader ecosystem of suppliers, workers, customers and key stakeholders to harness social co-benefits from their environmental Handprint strategies by:

- Providing a narrative describing how their environmental Handprinting strategies are designed to also generate social co-benefits.
- Creating a plan to measure and assess the social co-benefits over the next three years, and creating a process to re-evaluate their results.
- Gathering brief narratives from any organizations the manufacturer partners with to bring about social co-benefits.

CHANGES FROM LPC 1.1 TO 2.0

This is a new Imperative based on ILFI's work with innovative LPC Manufacturers. The idea is to encourage consideration of the context of Handprints and how to create the most positive impact per measurable action, by considering how to maximize socio-economic impacts of Handprinting.

Clarifications

SOCIAL CO-BENEFITS VS. SOCIAL HANDPRINTING

Social Life Cycle Assessment (LCA) is a comprehensive methodology, seeking to complement environmental LCA, and filling gaps in identification of the human impacts of activities. Therefore, Social Handprinting involves identifying the social Footprint of an action or entity, working to reduce any negative impact and working to create Handprints that create positive social impact.

In contrast, Social Co-Benefits are additional socio-economic benefits of an *environmentally-focused Handprint action*. These may happen naturally, or may be considered in the creation of Handprints to engineer actions that do more than just create the requisite number of kilowatt-hours or gallons of potable

water. Handprints can do more than offset Footprints. They can result in education, job training, community support and more if we consider the context and ripple effects of our actions.

PERCENTAGE REQUIREMENT FOR IMPERATIVE

To achieve this Imperative, manufacturers must demonstrate that at least 75% of one of the relevant LCA impact areas in LPC (Energy, Water or Carbon) is associated with a strategy that results in tangible social co-benefits. Manufacturers are encouraged to keep positive impacts as local as possible.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

I18-1 Social Co-Benefits Narrative

A 1-2 page narrative shall be provided, written by the applicant, demonstrating that the Handprinting actions taken to offset at least 75% of the product's Footprint in at least one impact area (water, energy or carbon) result in clear social co-benefits, and describing those benefits in detail, including any measurements of impact.

I18-2 Handprinting Partner Statement

Statement from any collaborating partners on Handprints on their involvement in the action and impacts.

I18-3 Additional Documentation

Additional evidence in the form of photographs, narratives, testimonies, surveys, etc., that demonstrate the impact of the Handprinting actions and clear connection to social co-benefits.

Resources

Handprinting Guide

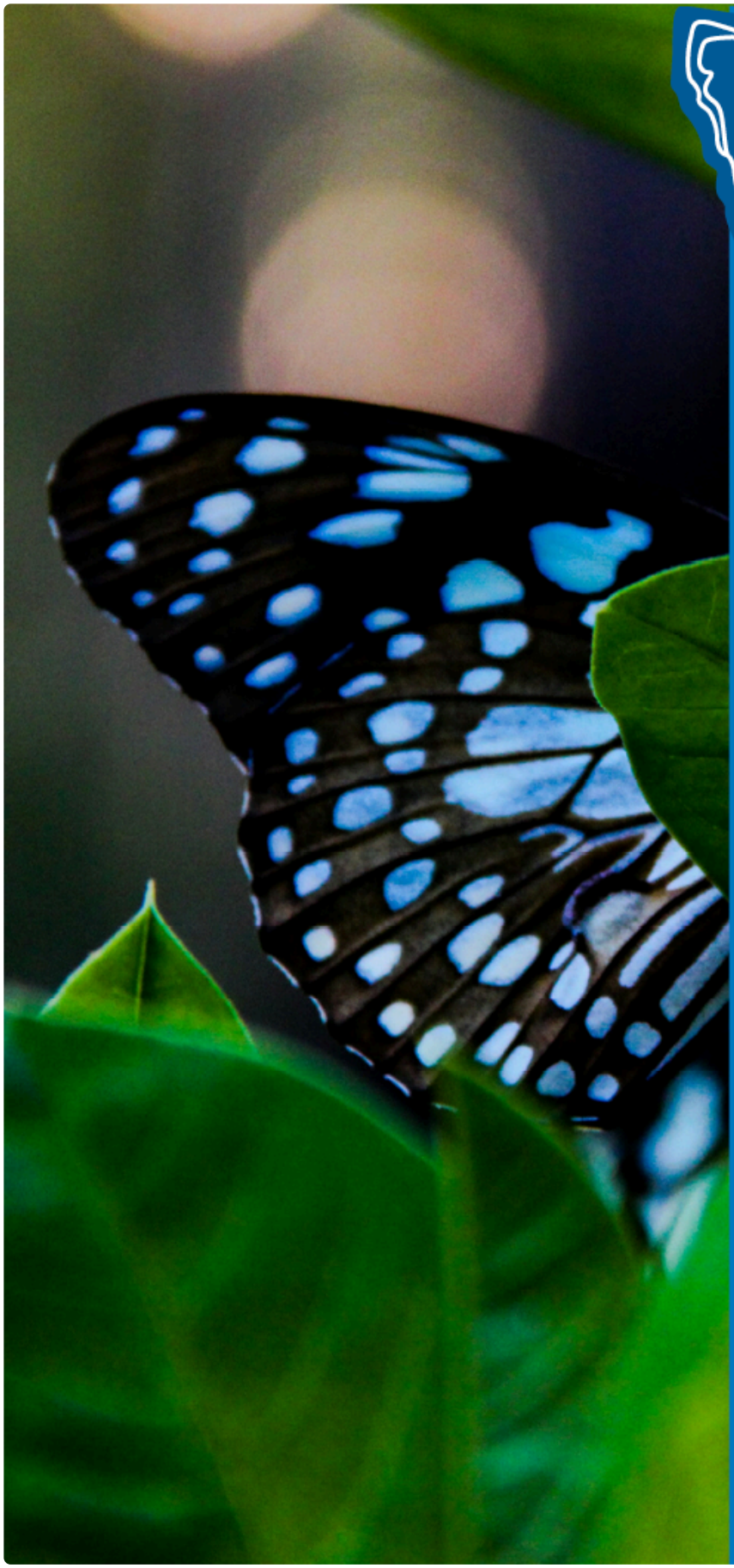
The LPC 2.0 Handprinting Guide contains more information about Handprinting philosophy and methodology, including how to create Social Co-Benefits.

Social Hotspots Database

The SHDB is a project centered at NewEarth B, a U.S. based not-for-profit focused on information systems for sustainability. The project aims to give users full transparent access to information about working

conditions and impacts in global supply chains, and also about the hundreds of sources draw upon as well as the methods used to characterize risks within the SHDB.
https://www.socialhotspot.org/

Beauty Petal



BEAUTY PETAL HANDBOOK

Celebrating Design that Uplifts the Human Spirit

LIVING PRODUCT CHALLENGE **2.0**

INTERNATIONAL LIVING FUTURE INSTITUTE℠

PETAL INTENT

The intent of the Beauty Petal is to recognize the need for beauty to enrich our lives and to honor the impacts of the things we make. As a society, we are often surrounded by ugly and inhumane material things that are manufactured and consumed with little thought to the short- or long-term environmental impacts of their life cycles. If we do not care for the things we use every day, then why should we care about our communities and the natural world?

Beyond an aesthetic aspiration for products, this Petal recognizes the beauty of human connection and the power of the Living Product Challenge as a tool for education and inspiration. It calls upon manufacturers to use their platforms to educate, inspire and engage others. As individual actors, we will always fall short of the radical and rapid change required to create a Living Future. The vast network of companies and individuals required to bring a product to market are all potential collaborators for Handprinting and transformation. Inspiring others to take action and collaborate opens up endless possibilities for infinite positive potential.

IDEAL CONDITIONS + CURRENT LIMITATIONS

The Living Product Challenge envisions product design and packaging that elevates our spirits and inspires us to be better than we currently are. Defining beauty is, by definition, an impossible task. And yet, the level of discussion and, ultimately, the results are elevated by attempting to achieve beauty. In this Petal, the Imperatives are based on genuine efforts, thoughtfully applied. We do not begin to assume we can judge beauty and project our own aesthetic values on others. But we do want to understand manufacturer’s objectives and know that an effort was made to enrich people’s lives with each physical thing we contribute to the world, whatever its size or intended use. This intentionality of good design and graceful execution must carry forth into a program for educating the public about the environmental qualities of each Living Product they create.

At the enterprise level, manufacturers should aim to make positive impacts beyond the scope of certification; they should create ripple effects of positive change by inspiring competitors and consumers alike to engage in the pursuit of regenerative manufacturing. Each Living Product is a tool for learning, an example of what is possible and a beacon of change.

There are no current limitations to this Petal other than our imaginations and what we as a society choose to value.

I19- Inspiration and Education (Core)

INSPIRATION + EDUCATION

CORE IMPERATIVE

19

BEAUTY PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

INTENT:

The intent of this Imperative is to provide educational materials about a product and the manufacturing process with employees, customers and the broader public in order to share innovations, solutions and catalyze broader change.

REQUIREMENTS:

Living Products serve as success stories and motivate others to make positive changes. So that others can understand how a product achieved the Living Product Challenge, manufacturers must publicly share educational materials about the product's design, manufacturing, use and disposal, including:

- Featuring information about the Living Product on their website for as long as the product is manufactured and sold.
- Installing interpretive signage explaining the Living Product manufacturing process at the facility.
- Offering an ongoing training program to educate workers at the manufacturing facility and to the company's sales team about the Living Product Challenge.
- Allowing the public to tour areas of the manufacturing facility that aren't sensitive or secure at least one day a year.
- Completing a Living Product case study that will appear on the Living Future Institute's website.

CHANGES FROM LPC 1.1 TO 2.0

No changes.

Clarifications

CASE STUDY CONTENT

All manufacturers must provide detailed case study information for each Imperative being pursued. At the time of certification, the case study information for each Petal and Imperative achieved will be uploaded to the Institute's website. These case studies are a means to celebrate Living Product Challenge (LPC) Certified projects and to educate other manufacturers and the public about the successful implementation of the Living Product Challenge framework.

INTERPRETIVE SIGNAGE

To satisfy this requirement, it is necessary to have permanent, on-site signage that educates occupants and visitors about both the facility's operation and the product's manufacturing, as it relates to achieving the Living Product Challenge. Ideally, the signage should tell a story that helps visitors to understand, as they move through the building, how each Imperative is addressed.

Digital tools, such as a video display or a website accessible via smartphone, can enhance the education offered by interpretive signage, thereby contributing to the project's compliance with this requirement. However, a single display or mobile digital tools cannot entirely replace permanent, non-digital signage.

EDUCATION FOR CONTRACT MANUFACTURING

Manufacturers who do not own the manufacturing facility, and are unable to influence the facility owner to install signage on site and/or conduct a public open house may submit to the LPC Dialogue with a request to install signage or hold tours at another location relevant to the product such as a main showroom or company headquarters.

OPEN HOUSE (PUBLIC TOUR)

The intent of the open day is to ensure that all buildings, even secure facilities, host visitors at least once annually so the public may learn about the process of manufacturing a Living Product. The required open day must be publicized to the community at large.

Regular Public Tour
As an alternate compliance path, manufacturers may host regular tours, open and advertised to the public, at least quarterly, in lieu of one annual open day. Tour staff may charge a nominal fee for this service, provided that the fee does not represent a barrier to entry for those wishing to view the facility.

Secure Spaces and Facilities
Secure facilities are not exempt from the open day requirement, though project owners may restrict access to certain spaces at their discretion.

It is not necessary to allow open access to every area of a building. Manufacturers may restrict access to spaces as they see fit for security purposes, provided that the building tour still imparts a comprehensive understanding of the strategies used to comply with Living Product Challenge requirements.

WEBSITE

The educational website requirement is to allow those that are not able to visit the facility in person to access information and photographs, so that they can still learn about the design, performance, and manufacturing of the product, as well as the process that went into achieving the certification.

ONGOING TRAINING PROGRAM

Manufacturers should train their employees regularly on the Living Product Challenge in order to engage the company in sustainability initiatives and to inspire conversations between those employees and the public, customers, and the supply chain. Manufacturers should document the existence of at least one annual training for employees at the facility and demonstrate the integration of sustainability education and Living Product Challenge achievements into that training. This training may also be an opportunity to solicit or implement feedback and ideas for continuous improvement.

Exceptions

None at this time.

Documentation Requirements

BASIC DOCUMENTATION

I19-1 Case Study Questionnaire

A complete ILFI Case Study Questionnaire, which will be posted for public viewing on the ILFI website.

I19-2 Signage

Photo documentation of educational/interpretive signage installed in the facility that teaches visitors and occupants about the product and manufacturing facility and pursuit of LPC.

I19-3 Open House

Letter stating manufacturer intent to hold at least one annual “open day” to educate the public about the manufacturer, the facility and its achievements. This “open day” shall be publicized to the community at large.

I19-4 Website

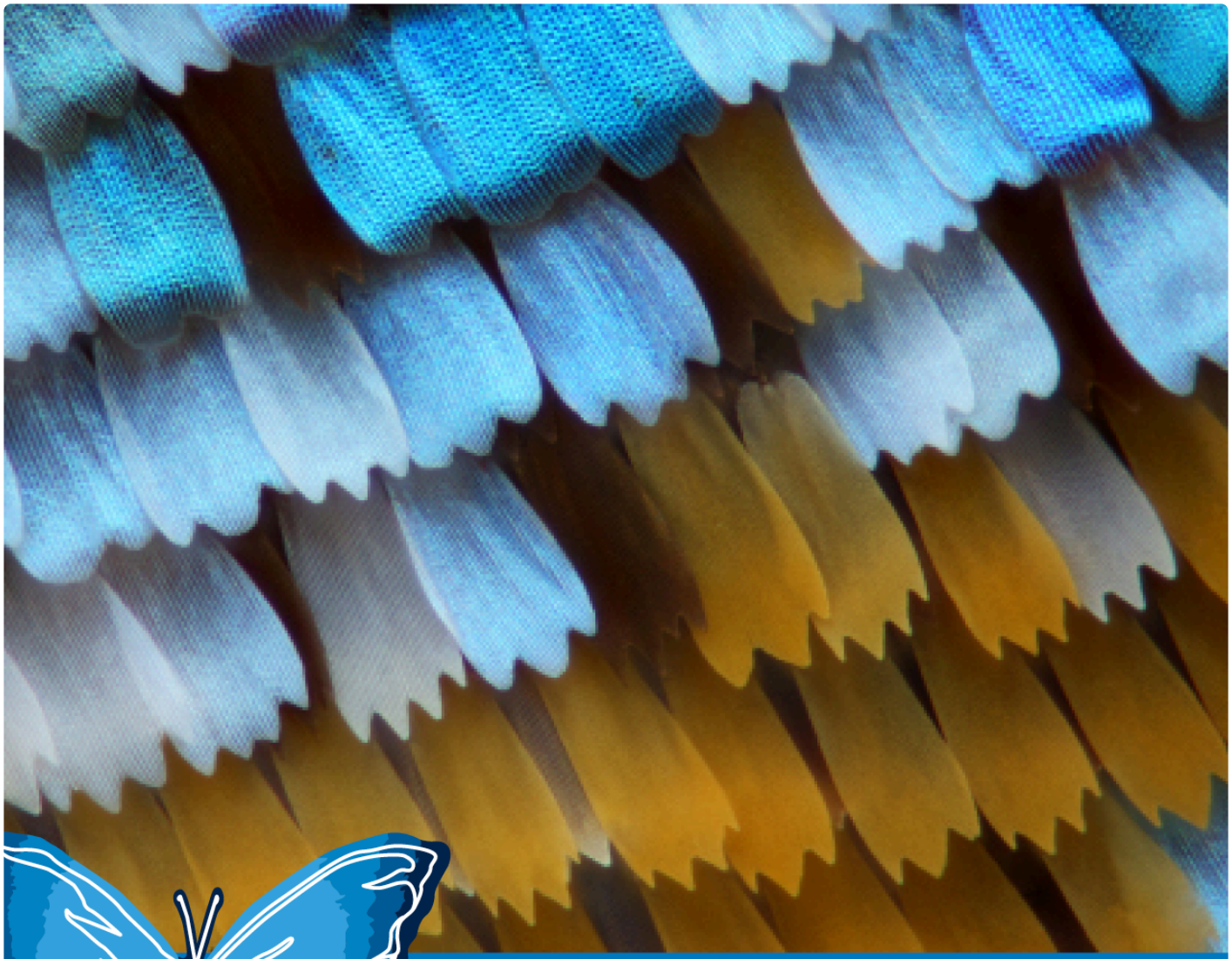
Educational website (URL to be provided at submission) sharing information about the design, manufacture, and performance of the product. Performance metrics are encouraged to be included.

Resources

LPC CERTIFIED PRODUCT CASE STUDIES

Narrative and graphics case studies from certified projects.
https://living-future.org/lpc/case-studies/

I20- Beauty and Spirit



BEAUTY + SPIRIT

20

BEAUTY
PETAL

LIVING PRODUCT CHALLENGE 2.0

Imperative Overview

IMPERATIVE INTENT:

The intent of this Imperative is to encourage meaningful integration of biophilia and biomimicry into the design of products, and consider the impact of those products on the way that users interact with the built environment and the natural world.

REQUIREMENTS:

Living Products contain design features intended solely for human delight and the celebration of culture and spirit appropriate to their function. Manufacturers must demonstrate how:

- The product's primary use will not further disconnect people from nature.
- The product has the potential to transform people's relationship to the natural world or to others in their community through the manufacturing process, design or use of the product.
- The product was informed by the natural world and if nature was used as a model, mentor or measure, or if biomimicry provided inspiration.

CHANGES FROM LPC 1.1 TO 2.0

None at this time.

Clarifications

FACILITY INTEGRATION OF PRINCIPLES

Products that are not visible or easily accessible in a building are less likely to be designed with human delight in mind, but still must be designed with the user in mind and an intent to make the installation and/or use of the product beneficial for humans. Where place, craft and cultural significance are difficult to reasonably integrate into a product of this nature, the manufacturer may submit to the Dialogue to intentionally integrate biophilia and biomimicry into the manufacturing facility, thereby benefiting the workers and those who occupy the space.

SOLELY FOR HUMAN DELIGHT

Design features intended solely for human delight must either be additional to the product or facility's function or must satisfy a functional requirement in a novel and stimulating manner. It is not sufficient to assert that the product or building's form or proportion in itself is beautiful; rather, textures, details, and other design elements must be intentionally included to infuse the project with beauty and meaning above and beyond the demands of installation or use of the product; or for the facility, structure, shelter, function, or code.

This requirement is meant to acknowledge the impact of small details and big efforts that have become less common as societies have moved away from handcrafted buildings and materials.

CELEBRATION OF CULTURE, SPIRIT, AND PLACE

The celebration of culture, spirit, and place is required to acknowledge and encourage the development of place-based relationships. A celebration of culture and spirit might incorporate or explore art, intellectual achievement, vernacular design, or the customs, social institutions, and/ or accomplishments of a particular nation, people, or other social group that are in some way connected to the product's manufacture, its use or its origins. A celebration of place might integrate or reflect local nature, geography, history, or materials related to the product. The intent is to deliberately create a product that contributes to the user's and worker's sense of place through a connection to a specific location.

BIOPHILIC DESIGN ELEMENTS AND ATTRIBUTES

In Biophilic Design: The Theory, Science, and Practice of Bringing Buildings to Life, Stephen Kellert defines six elements and over seventy attributes for engendering a biophilic experience through building design (see Table 19-1). These elements and attributes cover the range of biophilic expression from the basic need for natural light and fresh air to our more complex emotional yearning to connect with our cultures, our histories, and the natural environment.

Table 20-1 Biophilic Design Elements and Their Corresponding Attributes
The following terms found in this table are defined in the glossary: biomorphy, geomorphology, biomimicry, and fractals.

BIOPHILIC DESIGN ELEMENTS AND THEIR CORRESPONDING ATTRIBUTES		
Environmental features • Color • Water • Air • Natural ventilation • Plants • Animals • Natural materials • Views + vistas • Façade greening • Geology + landscape • Habitats + ecosystems • Fire	**Natural shapes + forms** • Botanical motifs • Tree + columnar supports • Animal (mainly vertebrate) motifs • Shells + spirals • Egg, oval, and tubular forms • Arches, vaults, domes • Shapes resisting straight lines + right angles • Simulation of natural features • Biomorphy • Geomorphology • Biomimicry	**Natural patterns + processes** • Sensory variability • Information richness • Age, change, and the patina • of time • Growth + efflorescence • Central focal point • Patterned wholes • Bounded spaces • Transitional spaces • Linked series + chains • Integration of parts to wholes • Complementary contrasts • Dynamic balance + tension • Fractals • Hierarchically organized ratios + scales
Light + space • Natural light • Filtered + diffused light • Light + shadow • Reflected light • Light pools • Warm light • Light as shape + form • Spaciousness • Spatial variability • Space as shape + form • Spatial harmony • Inside-outside spaces	**Place-based relationships** • Geographic connection to place • Historic connection to place • Ecological connection to place • Cultural connection to place • Indigenous materials • Landscape orientation • Landscape features that define building form • Landscape ecology • Integration of culture + ecology • Spirit of place • Avoiding placelessness	**Evolved human-nature relationships** • Prospect + refuge • Order + complexity • Curiosity + enticement • Change + metamorphosis • Security + protection • Mastery + control • Affection + attachment • Attraction + beauty • Exploration + discovery • Information + cognition • Fear + awe • Reverence + spirituality

Exceptions

None at this time.

Documentation Requirements

Basic Documentation

I20-1 Beauty Narrative

A one- to two-page narrative written by the product designer describing how the product meets the intent of the Imperative. The essay must be accompanied by photographs, diagrams and drawings that illustrate major ideas. The narrative should also describe:

- The product's potential to transform people's relationship to the natural world through the manufacturing process, design or use of the product
- How the product was informed by the natural world and if nature was used as model, mentor or measure, and/or biomimicry was used as an inspiration
- Evidence that the product's primary use will not further disconnect people from nature.

I20-2 Survey + Results

One or both of the following:

- Survey and results from customers. Survey must state the Imperative requirements, inquire of respondents whether they think the product has succeeded, and include additional questions related to the beauty of the product based on the designer's narrative. Survey respondents must comprise a representative sampling of product users. Surveys may be administered online or in person.
- Focus group feedback specifically detailing compliance with Imperative requirements.

Resources

Biophilia

Edward O. Wilson explains the concept of biophilia and makes the case that humanity's natural affinity for life unites us as a species.
Edward O. Wilson (Cambridge, MA: Harvard University Press, 1986).

"Biophilic Design: An Opportunity to Regenerate Life"

Amanda Sturgeon, advocates for a more widespread inclusion of biophilic design, in order to reconnect people and nature through the built environment.
Amanda Sturgeon (Trim Tab Issue 30, August, 2016)
https://trimtab.living-future.org/trim-tab/biophilic-design-an-opportunity-to-regenerate-life/

Biophilic Design: The Theory, Science, and Practice of Bringing Buildings to Life

This book covers the theory, science, and benefits of biophilic design, as well as implementation strategies

and processes.
Stephen R. Kellert, Judith Heerwagen, and Martin Mador (Hoboken, NJ: Wiley, 2008).

Biophilic Design Guidebook

This guidebook was developed to help LBC 3.1 project teams develop more biophilic projects and comply with the requirements and intent of LBC 3.1 Imperative 09, Biophilic Environment. An updated Guidebook, specific to LBC 4.0 Imperative 19, Beauty + Biophilia is forthcoming.
https://www2.living-future.org/l/464132/2019-03-25/ghpnlf?RD_Scheduler=BD

Biophilic Map

Examples of projects around the world that have effectively incorporated biophilic design elements.
https://maps.living-future.org/

Building for Life: Designing and Understanding the Human-Nature Connection

Book explaining Stephen R. Kellert's paradigm of "restorative environmental design" as an architectural model of sustainability.
Stephen R. Kellert (Washington, DC: Island Press, 2005).

Creating Biophilic Buildings

Through the use of historical and modern examples, this book provides imagery, methodologies, and lessons learned was well tools and resources as a starting point on the pathway to creating truly biophilic buildings.
Amanda Sturgeon, FAIA (Seattle: Ecotone Publishing, 2017).

Encyclopedia of Vernacular Architecture of the World

Three-volume collection exploring the concepts and examples of vernacular architecture, which gives a sense of belonging that is unique to the locality.
Paul Oliver, Ed. (Cambridge University Press, January 13, 1998).

Handprinting Guide

Introduction: Net Positive Potential

Creating the scale of change necessary to combat the climate crisis and support human and environmental health will require us to think bigger than simply reducing our individual Footprints. Whether we are looking to offset the life cycle impacts of manufacturing, or to achieve a building that creates more energy and water than it uses, Handprints offer a new paradigm of “more good” that encourage people to lean further into sustainability. We can never arrive at a Footprint of zero, and the size of our Footprint delimits how much impact we can have through efforts directly solely at reducing our own Footprint. The concept of Handprints, or positive impacts we cause versus business-as-usual scenarios, allows us the incredible potential to actually give more than we take from the earth and society.

This Guide describes the principles and methodology of Handprinting, and how to generate and calculate Handprints in order to address each of the Handprint-related Imperatives within LPC. While one purpose of this guide is to support those in pursuit of the Living Product Challenge, another goal is to inspire the work and actions of practitioners far beyond the reach of LPC. Handprints are intended to be created anywhere and everywhere by everyone. It is ILFI’s intent that describing the guiding principles and philosophy behind Handprinting, with ideas for implementation, will help to inspire ownership of this concept by every individual, organization and group looking to create more good in the world.

An Introduction to Handprinting

Origins

The concept of Handprinting arises as a response to, and an extension of, the ideas, methods, and perspectives in footprinting. ILFI’s programs and this guide reflect in particular on an approach to Handprinting that is grounded in, and extends, the methods of life cycle assessment (LCA). This approach to Handprinting emerged within the LCA classes of Greg Norris at Harvard University in the early 2000s, and was presented to the wider public during a webcast meeting with His Holiness the 14th Dalai Lama in 2011.

What is a Footprint?

A Footprint is a measurement of what you “take” from the world. The Footprint of an organization or even a person is the sum total of negative impacts caused by the processes that sustain that organization or person. The Footprint of a product is likewise the sum total of negative impacts created through the processes necessary to manufacture that product, deliver it to a user, enable it to be used throughout its life, as well as the impacts resulting from actions taken to manage the product materially at the end of its life. This full life cycle scope is referred to as cradle-to-grave, and sometimes as cradle-to-cradle. In the Living Product Challenge we also refer at times to a portion of the product life cycle that is “cradle-to-gate,” which includes the manufacturer’s operations and all processes across the manufacturer’s supply chains

necessary to enable production of the product.

While reducing a product's cradle-to-gate Footprint is important, it falls short of what manufacturers can achieve. A small Footprint is still a Footprint. Continuing to dedicate effort to Footprint reductions will only result in diminishing returns, as a product can never have zero or no Footprint. Instead, designers of Living Products begin with shrinking a product's negative Footprint and then go further, using human creativity and ecological inspiration to design products that create positive impacts, or Handprints.

Before starting to create Handprints, it is important to first understand what is driving the product's Footprint. This is because reductions in the greatest impacts from production provide some of the biggest potential leverage for both Footprint reduction and Handprint creation. Manufacturers use Life Cycle Assessment to generate these insights. and to identify their product's LCA Hotspots: those processes across the product's life cycle which make a significant contribution to the product's footprint.

What is a Handprint?

A Handprint is a measure of what you give to the world—specifically, how you change the world for the better, relative to business as usual, measured in footprint-related impacts. In addition to reducing the cradle-to-gate Footprints of its product(s), can a manufacturer also help others reduce their Footprints? Can a manufacturer create positive impacts that are measured in the same units as Footprints?

ILFI began building the concept of Handprinting into its holistic product certification, the Living Product Challenge in 2014, and more recently incorporated Handprinting as a pathway for project teams to meet aspects of the Living Building Challenge. As awareness and adoption of Handprinting continues to grow, and integration of this methodology expands, this appendix serves as an important resource to establish the rules and parameters of Handprinting in the Living Product Challenge, bringing rigor to its implementation, while inspiring creativity.

A Net Positive Foundation: Creating Change Beyond Your Footprint

The concept of Net Positive Production in the Living Product Challenge is based on a simple premise: create Handprints outside the scope of a product's cradle-to-gate Footprint that exceed the Footprint, so that the net impacts of producing the product are positive. Of course, behind this premise are many measurements and calculations as well as some general guidelines for accounting and scope. But this overarching concept of Net Positive as "Handprint > Footprint" is important to frame the discussion and work.

As mentioned, Handprints are a direct result of actions taken by an actor — in the case of LPC, a product manufacturer. But a manufacturer should not think of Handprinting possibilities solely within its supply chain or its business sphere of influence. Ample opportunities to create positive impact are available within the immediate community surrounding the manufacturing facility, or within the social networks of the company's employees — and those are just two examples. ILFI encourages product manufacturers to think big when identifying opportunities for potential Handprints in their pursuit of the Living Product Challenge.

What are Social Co-Benefits?

When product manufacturers think of their different spheres of influence, especially those outside of their direct business functions, the potential for social co-benefits can add additional dimensions of impact to their investments or actions related to creating Handprints. Consider a staff and community day dedicated to biking or alternative transportation, such as a Bike-to-Work Day. Perhaps it happens on a monthly basis. If the manufacturer provided tools and supplies to encourage employees and community members to participate monthly, and perhaps even weekly, all participants may experience and report an increase in happiness and health outcomes. These benefits are realized in addition to the quantified Handprint that we can associate with the manufacturer and that result in the reduction in fuel consumption and GHG emissions compared to a situational, business-as-usual baseline, where most of the participants likely would have been driving in single-occupancy vehicles.

Social co-benefits may be quantifiable and/or qualitative. Either way, they are co-benefits that are realized alongside an action taken by an actor to create a Handprint If the positive impacts are measurable in footprint units, they are handprints; if they are not measurable in footprint units, they are co-benefits.

An important subset of *social co-benefits* are ***social justice co-benefits***. These are social co-benefits that accrue largely to populations who currently or historically have been subject to exploitation, oppression, or other restrictions/suppressions of their opportunities to thrive. ILFI encourages manufacturers to identify opportunities to create social justice co-benefits and align their organizations with wider social and environmental justice conversations and tools to combat the climate crisis.

Becoming Net Positive in LPC: Two Scales

The Living Product Challenge calls on manufacturers to create Net Positive impact at two different scales: Site scale (final manufacturing facility), and Life Cycle scale (with Handprints exceeding the cradle-to-gate Footprint). Note that the LPC currently requires Net Positivity at different scales for different impact areas, as shown in the table below. For waste, only site-level Net Positivity is currently required. For Carbon, only life cycle net Positivity is required. And for water and energy, Net Positivity at both scales is required.

	Water (I05)	Energy (I07)	Waste (I13)	Carbon (I14)
On-Site	Handprinting Allowed Regionally			
Life Cycle				

Table 1: LPC looks at multiple impact areas implicated in production of products and requires that manufacturers offset (become Net Positive for) either the final manufacturing production impacts, the cradle-to-gate life cycle impacts, or both. The above table indicates which scope is required for each impact area within LPC 2.0. Note that social co-benefits in I18, explained here, are not the creation of environmental Handprints but rather are socio-economic benefits, associated with the production of Handprints.

Site Net Positive: Walk the Talk

First, the Challenge asks manufacturers to walk the talk of restorative sustainability by making their own on-site operations Net Positive with respect to the impact categories of water, energy and waste. This means, for example, creating more on-site energy through renewable means, or capturing more water on-site than is used in the production process at the final manufacturing location. Ultimately, these improvements also result in life cycle Footprint reductions, thereby reducing the size of Handprint required to then become life cycle Net Positive.

Product Share vs. Whole Facility Site Compliance

When considering the inputs to include in Footprint calculations, the impact of workers and ancillary functions within the facility need not be included **unless the product(s) pursuing certification exceed 75% of the total value of production for the facility**. This production-focused offsetting approach is known as the **Product Share Pathway**.

If the total value of the product is over 75%, the manufacturing processes in addition to the impact of workers from the entire facility must be included within the scope of Net Positive calculations. This is known as the **Whole Facility Pathway**. If the manufacturer opts to make the entire facility Net Positive for an impact category, then all products produced at that site will be considered Net Positive at the Site scale for that impact category.

In identifying actions and changes that can be realized at the facility scale to reduce on-site impacts and move towards Net Positive, here are some useful considerations that can be applied to each idea that the manufacturing team proposes.

Cost Feasibility

Some on-site impact reduction opportunities may be associated with significant cost increases. Among competing priorities, it is important to identify which efforts can be successfully incorporated into time and monetary budgets, and which efforts are best reserved for longer-term sustainability strategies. However, it is also important to explore the problem from multiple angles and engage employees at the facility to get creative. In one case, the perceived need for larger, expensive infrastructural changes to source captured water for production uses was avoided through a simple input connection that brought in rainwater, put in place by a resourceful facility manager.

Physical Feasibility

Impact reduction opportunities related to the production site may only be feasible at certain scales of production or at facilities of a certain size. They may also be site-specific between multiple final manufacturing sites for the same product. Where some facilities may have ample roof surface area or parking canopies for solar panel installation, others will have to dig deep in process efficiency efforts to reduce the site impacts within a limited building footprint. Understanding physical limitations with facilities managers and product managers will additionally narrow the list of impactful on-site footprint reduction

opportunities. Keep in mind that LPC has off-site opportunities for both water and energy Net Positive solutions if you are unable to manage on-site installation.

Decision-Making Feasbility

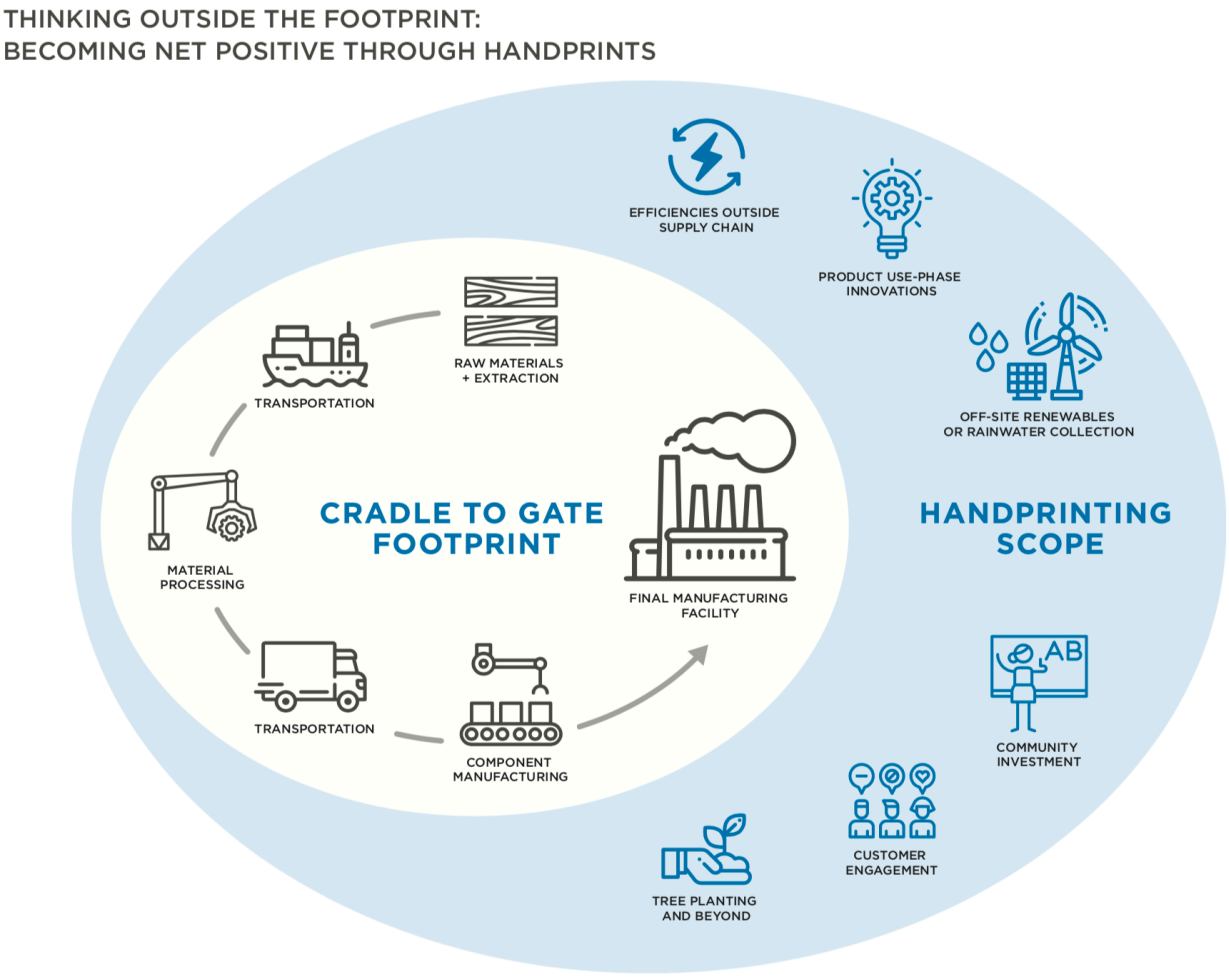
Lastly, it is often the case that a manufacturer is not necessarily the sole owner of a facility used to produce its goods. In many situations, companies employ contract manufacturing. Once again, while on-site Net Positive is a program requirement, in cases where due diligence is demonstrated but it is ultimately not feasible to influence a building owner to put renewable infrastructure into place, manufacturers are invited to propose alternative actions that create an equivalent amount of impact. In some cases, for example, renewable energy installations that cannot be placed at a facility, may actually do more good at a local school or community center. Manufacturers should refer to specific water and energy exceptions in the LPC Guide for feasibility.

Life Cycle Net Positive: Lead the Way

Site scale Net Positive is an ambitious and challenging goal that demonstrates a manufacturer's commitment to "walking the talk" of sustainability within their own operations. However, the final manufacturing facility only represents some of the impact of manufacturing, and often pales in comparison to the scale of impacts represented by extraction, transportation, processing and more, within the cradle-to-gate Footprint scope. The "cradle-to-gate" scope of a product includes the manufacturer's operations as well as all of the processes in the supply chains of all the inputs of energy, materials, equipment and even services needed by the manufacturer in producing the product.

If our "Footprint" is the impact that we cause in the world, then we know that simply achieving net positivity on-site at one facility on its own falls far short of what humans are capable of achieving and what the planet needs to heal. Knowing this, the Living Product Challenge also asks manufacturers to also look beyond the final manufacturing facility at the full product Life Cycle and create products that are Net Positive across three cradle-to-gate impact categories: water consumption, fossil fuel depletion and global warming. These impact categories are the same as those often considered when defining impacts of product footprints: "carbon footprints" (in relation to emissions of greenhouse gases), water footprints (in relation to the consumption of freshwater resources), fossil energy footprints (in relation to the consumption of non-renewable, fossil energy resources), and so on. Impacts in one category are not additive with impacts in another category, so Net Positive is pursued one impact category at a time.

As noted above, for a vast majority of products, most of the cradle-to-gate Footprint is caused by impacts that occur upstream of the product manufacturer, in the supply chains of the inputs to final production. Alternatively, for products that require or influence the consumption of energy or materials during use or unfortunately end up in landfill, a major portion of the impacts occurring across the entire "cradle-to-grave" life cycle may actually arise "downstream" of the manufacturer, during the product use or end-of-life phases.



In order to achieve Net Positive within the Living Product Challenge consideration is given to both a product's cradle-to-gate Footprint and production (final manufacturing facility) impacts. Ideally, Living Products should achieve Net Positive for both scales across all impact areas. Currently in LPC 2.0, manufacturers are required to offset the production impacts, the cradle-to-gate impacts, or both. These requirements are clearly called out in each Imperative and denoted with symbols. Manufacturers may have to consider that a product not only has to be Net Positive within the "production" scope (final manufacturing facility), but also the "cradle-to-gate" scope. Handprints can take place anywhere outside of the cradle-to-gate Footprint, and can come from influencing upstream impacts, downstream impacts or from generative actions outside the scope of traditional LCA.

From Negative to Positive: Reducing the Footprint and Implementing Handprints

Footprints: Measuring and Reducing Impact

Measuring Your Business as Usual (BAU) Scenario

The first step toward becoming Net Positive is to determine the cradle-to-gate impact of production, or Footprint. To qualify and quantify measurable change that results from the creation of Handprints, we need to determine the baseline — "business as usual, or BAU — Footprint scenario for comparison. For well-established products with a sales history, a simple and reasonable BAU scenario is responding to this year's demand for the product with last year's version of the product and its cradle-to-gate production processes. For new products, such as from a start-up company or from new product development at an established company, BAU reflects the processes and decisions that would have been incorporated without interference or updates to typical protocols.

Calculating the BAU Footprint is accomplished by developing a life cycle assessment (LCA) model that reflects BAU production. While manufacturers may have already introduced improvements and efficiencies in the past, production protocols can and do change often, so it is important to use an accurate representative baseline as the BAU reference. Some manufacturers use internal resources to complete LCAs, while others will look to consultants or other partners for this service.

The LCA should be completed to cradle-to-grave scope, which identifies and quantifies associated impacts from the point of raw materials extraction to final disposal and end-of-life of the product. The LPC then asks manufacturers to create Handprints that are greater than the cradle-to-gate portion of this life cycle, the product's cradle-to-gate Footprint. **Three LCA midpoint impact categories are considered for the Water, Energy and Materials Petals of LPC: water consumption, fossil fuel depletion and global warming**. Impacts in one category are not additive with impacts in another category.

Cradle-to-Gate Impact as Footprint

The Footprint of a product is calculated at the scale of a defined functional unit, and is determined as part of the LCA model. The functional unit is a quantified description of the performance requirements that the product or product system fulfills. For example, this may be the carbon Footprint of 1 chair with a warranty of 15 years, or the water Footprint of a square meter of carpet with a life expectancy of 50 years. The impact per functional unit multiplied by production volume, which is generally calculated or predicted annually, provides us with the Footprint. It is this Footprint that must be offset in order to achieve life cycle Net Positive within the requirements of the Living Product Challenge. Net Positivity in relation to the cradle-to-gate scope means that the positive impacts in the world that are created by producing the product exceed the negative impacts caused by producing it.

Identifying and Implementing Opportunities for Impact Reduction

Once an LCA has been completed, and the relevant product Footprints have been identified, we would caution those seeking Net Positive impact to not skip over the next two steps to start Handprinting. Handprinting before you try to increase efficiency and reduce your Footprint is like installing solar panels for an energy-guzzling building: it is costly and wasteful. Naturally, many manufacturers that have been working

on sustainability for years will have identified many impact reduction opportunities by the time they take on LPC, but these opportunities should also be reviewed again for the potential to further decrease the size of the Handprint.

Producing an LCA is an investment and should be leveraged to “activate” the information provided to shrink a product’s Footprint and realize production efficiencies and cost savings. Many LCA practitioners and sustainability firms specialize in identifying these opportunities and working with manufacturers to take meaningful action.

Hotspots as Reduction Levers

Whether using an existing LCA or conducting a new one, LPC asks manufacturers assessing their cradle-to-gate impacts to go beyond only quantifying a Footprint value by working with the LCA creator to identify “hotspots” or key drivers of impact. These Hotspots make major contributions to one or more impact categories. Upstream processes may be the best places to start looking for improvement opportunities, such as more efficient use of water or energy. Promoting or enabling actors in the product’s supply chain to implement such innovations is a powerful way to reduce a product’s Footprint. It should also be noted that when the innovation also affects the impacts of other manufacturers, these benefits outside the scope of the manufacturer’s Footprint become part of a product’s Handprint (Handprint accounting is described in more detail in the next section).

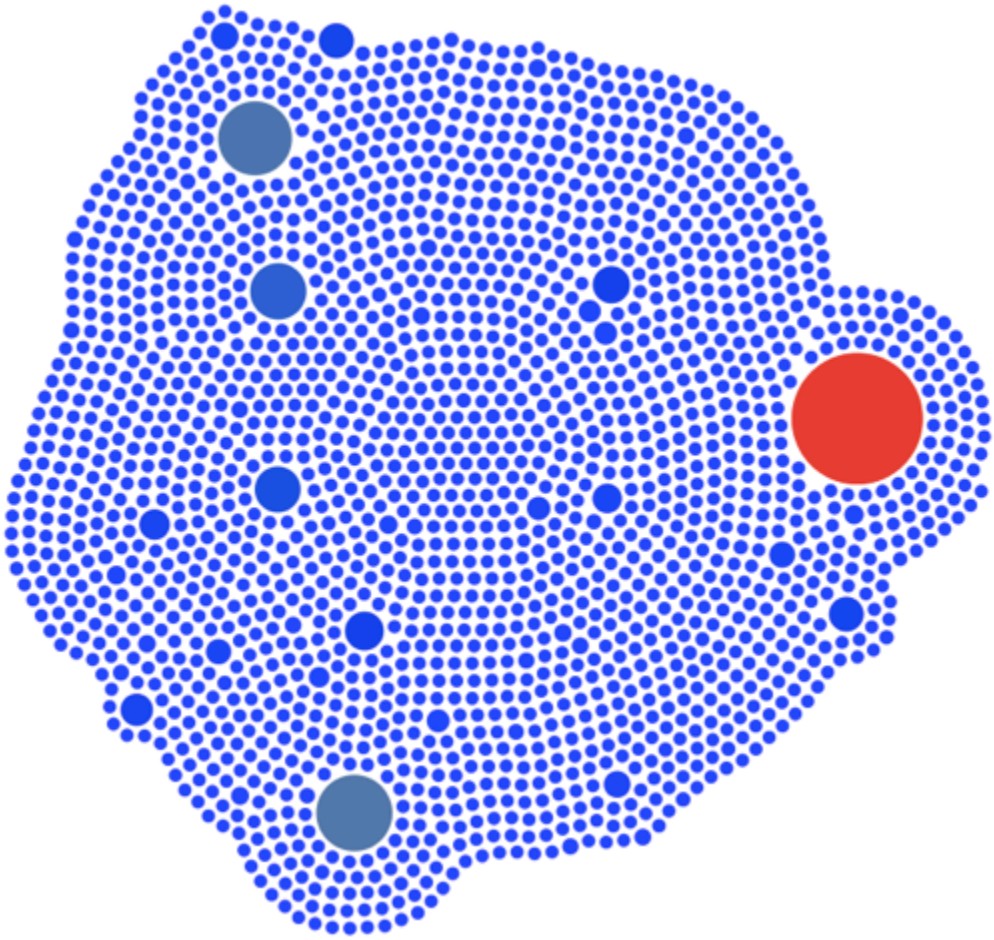
Case Study: Bureo Skateboard Hotspots

As an example of hotspot identification, the figure below models the climate change (or carbon) Footprint of a Bureo skateboard, composed primarily of NetPlus+ Material, a plastic input made from recycled fishing nets. Bureo ultimately chose to more broadly certify its NetPlus+ Material rather than just the skateboard, but this case study represents the pilot exploration of the skateboard’s climate Footprint.

The figure illustrates the relative influence of supply chain processes in relation to the climate change impact category. The highest single contributing process to climate change impacts is the red circle, representing the manufacturing of (virgin) Nylon 6 with glass fiber reinforcement. The next two largest circles are each for the combustion of coal to provide electricity, which is used in recycling of the fishing nets and the manufacturing of the boards. The large contribution of impact from these hotspots suggests that they may directly or indirectly offer key opportunities to reduce the product’s Footprint and create a Handprint.

In light of this information, Bureo introduced additional product design innovations that enabled the use of 100% recycled feedstock, further reducing its environmental Footprint
and increasing the demand for recycled fishing nets. Also, given the importance of electricity
used in the recycled plastic processing and new product manufacturing, Bureo pursued changes to manufacturing processes which increase electricity use efficiency. Both of these changes reduced the product Footprint, moving it closer to Net Positivity.

Product manufacturers can repeat this process through the lens of different impact categories to continue minimizing their overall Footprint.



Modeling the life cycle of a Bureo skateboard, the figure (an analytical output of the open-source openLCA software) illustrates the relative influence of supply chain processes in relation to the climate change impact category. The red circle represents the manufacturing of (virgin) Nylon 6 with glass fiber reinforcement, which is the skateboard's highest single contributing process to climate change.

It should be noted that while LCA models may identify certain materials or processes as hotspots of one or more impact areas, these may not be the best opportunities for creating meaningful Footprint reductions. For example, for a bio-based product, an agricultural material may be identified as one of the key drivers of water use, but this material is integral to the success of the product, or it has multiple other positive benefits that cannot be seen within the water footprint. This is of course the reason that LCA professionals advocate for looking at environmental impacts holistically, rather than extracting one number in isolation.

Additionally, as noted previously, changes that reduce the Footprint in one impact area may have the additional benefit of reducing other Footprints, but it can also be the case that reducing one Footprint within the life cycle can come with Footprint increases to another impact area. Ultimately, these situations become judgment calls for the manufacturer and LCA experts to make if tradeoffs cannot be avoided. The context of where a material is extracted, processed or produced may of course influence how one interprets the LCA results. Higher water impacts in a rainfall-rich area could be a preferable impact to high carbon emissions or biodiversity consequences.

Once the manufacturer has determined its impact category Footprints, identified and implemented reduction opportunities, it is left with new Footprint values wherever they have taken impact. The value of these updated Footprints is what is used to identify the scale of Handprint required to become measurably Net Positive in LPC.

Handprints: Building Net Positive Impact

Leading the way with calculating the Footprint and identifying opportunities to reduce it is just the start. A reduced footprint is still a Footprint, and it is ultimately impossible to achieve a Footprint of zero, so we need a framework to go beyond negative impact reduction in order to explore the endless positive potential that exists outside of the Footprint.

To support truly transformative manufacturing, LPC provides companies with the methodology to measure the positive impacts they actively cause (Handprints) in direct relation to their product's negative impacts (Footprints). Using the same underlying LCA data and modeling, the positive impacts that result from a Handprint are calculated and expressed in the same units as the Footprint categories they correspond to. Within LPC, Life Cycle Net Positive is currently required to achieve the Net Positive Water, Energy and Carbon Imperatives. Where the manufacturer can claim to have created Handprints greater than its products' respective Footprints on an annual basis, the manufacturer can consider its impact to be measurably Net Positive for those impact categories.

Enterprise Handprints

While many Handprints are product-related, companies also create Handprints through actions that generate impacts outside the scope of the life cycles of products that they sell. These can be considered *"enterprise" Handprints* instead of product-based Handprints. In the case of enterprise Handprints, the question arises of whether and how such impacts outside the scope of a product's Footprint might be properly assigned or allocated to one of its products.

Product Net Positivity and Enterprise (or Organizational) Net Positivity are different things. Organizations, as actors, are Net Positive when their Handprints are larger than their Footprints for a given impact category. Products, as inanimate objects, are Net Positive in cases where their use and end-of-life management can be shown to create more good than harm, or to reduce or prevent more negative impacts than they cause. As an example, a photovoltaic panel's use phase displaces (and thus prevents the generation of) electricity from fossil fuel combustion. LCA can show that this prevents more negative impacts than are caused by its production and end-of-life.

To be given credit for having a Net Positive life cycle, it must be shown that the product's use truly does displace more harm than its production causes. If the photovoltaics are used to supply electricity that would not otherwise be supplied without their production, then the Net Positivity of the life cycle is in doubt. A product that *could be* used in a Net Positive way has Net Positive life cycle potential; a product that *is* used in this way has a Net Positive life cycle.

Identifying and Vetting Handprint Ideas

So how does one create a Handprint? At its simplest, there are two ways to think about how Handprints are made:

1. *Preventing or avoiding Footprints that would otherwise have occurred*, which includes reducing the magnitude of Footprints that occur, relative to what their magnitude would otherwise have been; and
2. *Creating positive benefits which would not otherwise have occurred, which are measurable in Footprint units.*

These positive impacts exist outside of the business-as-usual scenario described previously and improve upon it. Handprints measure the impacts that manufacturers can generate across the product life cycle relative to BAU, such as harvesting more water and generating more energy than was required to make it. Manufacturers can create Handprints through their own product manufacturing processes, as well as by influencing positive impacts in their upstream supply chains. The possibilities for what makes a positive impact are many, and manufacturers are encouraged to explore widely to identify opportunities to create the greatest potential benefits using scarce resources.

Opportunities for Handprinting can be found both inside and outside of the scope of the life cycle of the product pursuing certification. Looking upstream, if the manufacturer helps to cause reductions of impacts at hot spots in its supply chain, this will certainly bring Footprint reductions, but it could also bring additional Handprints beyond the scope of the cradle-to-gate footprint. How so? Most companies sell their goods and services to more than one customer, so this will be true for most hot spots in the supply chain of Living Products. If the manufacturer of the Living Product works to reduce the Footprint of one of its key suppliers, the reductions to the supplier's Footprint that occur outside the scope of the Living Product Footprint (e.g., that occur in the scope of the goods or services sold by the supplier that are used to produce other products) all count as Handprints for the manufacturer of the Living Product.

When manufacturers achieve Footprint reductions by reducing the on-site impacts of product manufacturing, they can also leverage these Footprint reduction steps into possible Handprints. For example, manufacturers can switch to greener or lower-impact materials and/or energy source inputs to make the product, and/or use these material or resource inputs more efficiently.
After realizing this success, manufacturers can share successful and proven sustainable innovations (Footprint reductions) within its supply chain network and potentially even beyond supply chain actors to include businesses in its regional economy, businesses in its industry, or consumers at large.

Downstream life cycle phases, including distribution (transportation, wholesaling and retailing), the use phase and end-of-life management, also present opportunities to create Handprints. Customer engagement and the use phase, for example, can create massive ripple effects as customers spread behavioral changes inspired by the manufacturer to the people they interact with, and as customers' engagement with Handprinting grows from one action to many.

When looking downstream, it is important to not accidentally skip over the distribution phase. For some products, such as furniture and food, the distribution phase can make a surprisingly large contribution to total life cycle burdens—and offers a key place to look for Handprint opportunities. With its end-of-use

management, can a company increase recycling of its product, and perhaps of similar products manufactured by others? The benefits of doing so will contribute to its Handprint.

Ultimately, Handprints have the potential to create real and demonstrated ripple effects that spread beyond the boundaries of the life cycles of the Living Product itself.

Though ILFI encourages exploratory thinking and iteration to imagine the most impactful footprint reduction actions possible, there are some identified constraints that, if considered early in the planning process, can inform and focus efforts toward achieving Net Positive Life Cycle impacts and of course, LPC certification. At this point, it is best to establish some of these parameters and prompting questions to set the process up for success.

Handprinting Parameters and Considerations

Handprinting Parameters

To be recognized in ILFI's programs, Handprints must be ***measurable, performance-based, additional and recent***. Defining each of these attributes specifically for LPC provides us with useful boundaries for identifying what was, is and will be a Handprint.

Measurable and Performance-Based: *able to be theoretically measured and compared to the project or product "Footprint" and be trackable in practice*

- **Measurable**: his term points to the ability to measure the Handprint and compare it to the project or product 'Footprint'. In other words, can you determine, in the same units as the Footprint, what the impact of an action is? Gallons of water used (Footprint) must be comparable to gallons of water saved or avoided (Handprint).
- **Performance-based:** this aspect supports the rigor of Handprinting. Can you actually track the impact? Without performance-based metrics it's difficult to know if you're really having the intended impact. It's also important to determine if there are any unintended consequences of putting a Handprint into place (e.g. water-efficient fixtures like showerheads could theoretically cause occupants to feel they need to leave water on for longer to get the same results like removing shampoo).

The combination of these two requirements is important because many Handprints may be theoretically measurable, but in practice the action might not be directly trackable or measurable, or the company simply might not have the means or mechanism to track the Handprint impact.

Additional and Recent: *represent positive change caused by the Handprint actor versus a business-as-usual scenario*

- **Additional**: this term is used to represent actual impact versus a business-as-usual scenario.
- **Recent**: this serves to further define what makes a Handprint additional, by defining the business-as-usual scenario. Handprints must have taken place within three years prior to Certification in order to

be considered additional. Actions taken more than 3 years ago are considered to form part of the business-as-usual scenario. In addition, when a product-related Handprint has been created through innovation in the product's design, we need to determine the number of years of sales for which the innovation brings a Handprint relative to BAU. That is, the innovation typically affects the life cycle performance of the product that is then sold for several years in a row. We call this period of time the Innovation-Relevant Time Horizon (IRTH). The IRTH should generally be set to reflect the period of years between typical product re-design or innovation cycles for the chosen product category.

For example, implementing a facility-wide food composting scheme at the manufacturing site may absolutely have significant impacts to waste, energy, and water, but after 3 years that is no longer considered 'recent' – and becomes part of the business-as-usual scenario of the facility. Once again, it may serve to reduce the Footprint of the facility, but we must identify a 'cutoff' point for Handprints. In LPC we consider the appropriate timeframe to be three years. Handprints have to be new and additional to have real impacts – if we take credit for what we did in the past, we will cease to do anything actually additional- even as our Footprint continues to create negative impact over time. If we don't keep creating new Handprints, we cannot continue to be Net Positive.

All this can be summed up to say: did you really create the positive change required to offset your real Footprint, and can you prove that it wouldn't have otherwise happened?

To illustrate why these are important, consider a company that proposes a series of educational videos that promote the use of energy efficient lighting to help decrease others' energy Footprints in their homes. This is of course a great idea! However, whether it is a true Handprint depends on the boundaries outlined above.

- Measurable + Performance-Based: The Handprint must be measurable in the same units as the Footprint. If the Footprint is measured in kWh, the manufacturer cannot just provide the number of viewers to demonstrate impact. Once the units are sorted, manufacturers should track that the intended impact has actually taken place. If the video asks viewers to swap out one old lightbulb for an LED in their home, how do they know this has taken place?
- Additional + Recent: How much better is the new lightbulb, if we consider the old bulb to be the BAU scenario? Did the homeowner already plan to switch over their lighting or was it caused by the video?

The case studies outlined in the final section of this guide each take Handprinting actions taken by LPC manufacturers and look at them through these lenses of measurability and additionality.

Additional Handprinting Considerations

Beyond the absolute requirements of Handprinting, there are additionally some considerations that manufacturers should take into account when considering the creation of Handprints in order to be successful in the short and long-term:

Affordable: Creating positive impact through Handprinting often incurs some level of cost. Manufacturers should consider how to build this cost (which can be thought of as previously unaccounted for externalities of production) into the product's long-term success, or into the larger organizational business structure.

Relevant: Are the actions contextual, and local or regional where needed? Do they tie back to materials or production? Do they tie into the story of the company and its larger mission? Are they authentic to the company? Getting the marketing team on board may help with this! Could the actions be tied into other initiatives at the company, i.e. Carbon Reduction goals or employee engagement? This can make it easier to sell to leadership.

Multi-dimensional: Manufacturers should consider whether a positive energy Handprint could have any positive, or negative, outcomes in other impact areas.

Scalable: the manufacturer must be able to continue to create Handprints to match the product's ongoing Footprints, as well as match any increases to the annual Footprint that might come from growth in sales, in order to continue to achieve net Positivity.

This ties in many of the other considerations. Can the Handprint action(s) be grown to the required scale (the ongoing Footprint), whether they are still affordable at-scale, whether they can continue to be tracked at-scale; could the action(s) be applied to other products to achieve broader Net Positive achievement?

Ripple Effects: Are the actions capable of generating and self-generating positive impacts beyond the manufacturer's initial actions? Sometimes an action can be engineered (or may naturally happen) to amplify an initial Handprint action. For example, where Handprints result in savings alongside energy reduction impacts for customers, those savings may be used to purchase materials for another customer to Handprint and so on thus generating impact far beyond the initial funding required.

Manufacturers should also keep in mind that there is no one way to Handprint, nor only one or a couple actions that comprise a Handprint — it can represent the effects of multiple actions and multiple strategies that may themselves have multiple impacts.

Handprinting Framing Questions

Bringing together Handprinting requirements and the additional considerations laid out above to further prompt navigation of Handprinting exploration, we offer some questions that manufacturers can consider at this stage:

Have we done all we can do right now to reduce the product Footprint? This is the most cost-effective place to start!

Does our Handprint idea also create changes outside the scope of our product's cradle-to-gate Footprint? Often manufacturers first suggest ideas for Handprints that bring Footprint reductions. This is great, as Footprint reductions make your achievement of Net Positivity a lighter lift. Reducing your Footprint means reducing the quantified impact of a process or decision that the manufacturer has direct control over, where it is the "actor" behind the "action," and corresponds to the cradle-to-gate portion of the product life cycle. It may also result in improvements to a company's triple bottom line!

Is the Handprint idea measurable? In units that you can compare to your Footprint? If you can't measure

it, you can't compare it to your Footprint, so it may be real but it won't count within LPC. Also, you want to be sure that your action has had its intended effect.

Is it additional or business-as-usual? Consider if this is something that your company has already implemented that the action is just continuing. That's business-as-usual. Is this you taking new action that will result in change that wouldn't have been seen otherwise? That's a Handprint. The recycling program you implemented 5 years ago? It's awesome, but at this point it's BAU. Handprints are not a 'one and done' effort. To maintain Net Positive, you have to keep creating them.

Have you considered the Footprint of your Handprint? Be sure to examine the 'Footprint' of your Handprinting action – if you're installing energy efficient lightbulbs, you must also consider the Footprint of manufacturing that lightbulb and subtract it from Handprinting impacts. Often it won't significantly reduce your Handprint, but we want to be accurate here!

Does your Handprinting action have any unintended consequences or increase your Footprint elsewhere? Footprints and Handprints generally create impacts across all LCA impact areas, so consider when you explore Handprinting to become Net Positive for Water if it unintentionally increases your Energy Footprint. This doesn't mean you can't use that action, but it could make it harder to achieve Net Positive Energy.

Can the action scale to offset your Footprint? Some ideas seem cool and exciting in theory, but they don't have the impact you thought they would in practice. You can put into place as many Handprinting actions as you want, but efficiency and cost matters. Which brings us to the next question:

What will it cost to put into action? Related to the above, will the cost become an insurmountable obstacle when scaling to the level required to offset the Footprint? Is some of that funding better utilized in implementing process improvements to first decrease the Footprint? Is there a way to tell an exciting story about your Handprint, but offset some of your impacts with more cost-efficient measures?

Does the action have a story, or reason for engaging in this manner? Think ahead to your story at the end. Why did you do this action? What does it mean? Why does giving back in this way matter? Does it tie into the story of your company or the product somehow? Who or what has been impacted by this work?

For some manufacturers, the calculations that demonstrate a Net Positive impact may be enough and context isn't required to achieve Net Positive Water, Carbon or Energy; but for some manufacturers the stories and the qualifiable impacts can resonate with leadership, employees, customers, internal and external stakeholders and beyond. Get your marketing team involved!

Does it align with any other goals you have? For example: United Nations Sustainable Development Goals, corporate carbon neutrality goals, internal employee engagement, etc. Aligning your Handprints with company-level goals can help with cost and leadership buy-in.

Is that implementation the best use of that Handprint? Context is important to consider; for example, does saving water in a rain-heavy area matter or introduce appreciable positive impact? Do waterways need cleaning up? Is water quality a significant issue in a region? If you're going to put in the work, you should

consider how to create the most positive impact per gallon.

Who will put the Handprint into place? Who will track its impact? It's smart to think comprehensively, and long-term. Consider how to build Handprinting impacts, as well as any funding required for those actions, into your business structure. Can you build water Handprint costs into the product price without significantly increasing cost? Consider which employees or departments can make sure that Net Positive is not a one time achievement, but a way of doing business. Also consider who will track the impacts, and how.

Who have you consulted to get ideas for Handprints? LPC and the requirements for Handprinting are rigorous, but they are also opportunities to get creative and build employee engagement. Some of the best ideas for sustainability will come from your colleagues in all areas of the business- from marketing, to facilities management, to engineering and beyond.

Are there opportunities for collaboration? Consider if there are like-minded companies out there who might be interested in taking action with you. It'll be both of your Handprints if you do (Handprints represent shared credit, just like Footprints represent shared impact). Perhaps other tenants of a building may be able to help convince building management to install solar or renewable systems? Could you partner with a school to install renewable energy and have your efforts go further and support the local community?

Are there opportunities for ripple effects? Manufacturers can also consider how Handprints can be designed to create further positive impacts beyond an initial action — designed for ripple effects. With clever program design, a single initial investment or action can lead to exponentially growing ripple effect Handprints. For example, capturing a portion of the economic savings that result from increased energy efficiency and re-investing them in the purchase of more energy efficiency measures in other homes — If the savings from each investment are greater than the initial investment, this can lead to self-amplifying ripple effects, as one investment leads to two more which can continue impacting more investments. An initial Handprinting investment creates abundance, some of which is harnessed to create more abundance, and so on. Because all the follow-on investments are co-caused by the initial investment, the impacts of these follow-on investments are part of the initial investment's Handprint.

Are there opportunities for social co-benefits? For social justice co-benefits? When considering and identifying potential impacts resulting from Handprinting actions, companies may also want to think about how to position their business as an agent of positive social change. What potential, or duty, does a manufacturer have to intentionally design actions that benefit the local community, disadvantaged or disenfranchised groups, people with lower socioeconomic status?

Summary of the Net Positive Process

While it may feel like there is an overwhelming amount of information to consider in the process of Handprinting, the intent is to ultimately create the most positive impacts and benefits to people and the planet, while allowing manufacturers to leverage their sustainability and climate solutions as part of their business and core mission. With that in mind, we can refer to this as a summary of the steps discussed previously to become life cycle Net Positive:

- Measure your cradle-to-grave product Footprint using LCA
- Identify hotspots, drivers of impact, in the cradle-to-gate Footprint scope
- Take action to reduce the Footprint as much as you can before implementing Handprinting
- Determine your annual calculated or predicted impacts by multiplying the cradle to gate* Footprint by production volume
- Identify Handprinting ideas and make sure they are measurable and performance-based, additional and recent
- Consider additional best practice for Handprints (cost, holistic impacts, alignment, etc), identify mechanisms for tracking impact and make sure you have a robust plan to maintain Net Positive impact for at least the duration of the certification, ideally indefinitely
- Implement Hanpdrinting actions and tracking and maintain Net Positive impact annually and for recertification
- Learn, modify, replicate, expand

Becoming Net Positive in LPC: Program Requirements

The LPC has Net Positive performance requirements in three categories related to LCA impact: water, energy and carbon (or climate). With LCA tools and data, and the results of an LCA model as the baseline Footprint, manufacturers can model potential Handprinting actions, understand additional possibilities realized through scaling, and calculate the suite of actions required to become Net Positive in any or all impact categories. The requirements correspond to Imperatives 05, 07 and 14 of the standard.

	Water (I05)	Energy (I07)	Waste (I13)	Carbon (I14)
On-Site	Handprinting allowed regionally		Handprinting can be used to offset up to 10% of production waste	
Life Cycle				
Social Co-Benefit Opportunities				

LPC looks at multiple impact areas implicated in production of products and requires that manufacturers offset (become Net Positive for) either the final manufacturing production impacts, the cradle-to-gate life cycle impacts, or both. The above table indicates which scope is required for each impact area within LPC 2.0. Note that social co-benefits in I18, explained further here, are not the creation of environmental Handprints but rather are socio-economic benefits, associated with the production of Handprints.

The full requirements and pathways to achieve each Imperative, including clarifications and exceptions, can be found in the linked sections of the LPC Guide. This section serves to illustrate how manufacturers were able to achieve Net Positive impact for their products in different impact categories.

I05 Net Positive Water

This Imperative requires manufacturers to operate within the water carrying capacity of their facility locations and work in harmony with the natural water flows of their sites. Manufacturers must achieve the Net Positive requirements for water within both their own site operations and the full life cycle of the product. See the Net Positive Water Clarifications for additional information.

On-Site Net Positive:
100% of the product's manufacturing water needs at the final manufacturing facility must be supplied by captured rainwater or another natural closed loop water system. Manufacturers can also recycle industrial water. In addition:

- All water used must be purified as needed without the use of harmful chemicals.
- All stormwater and water discharge must be treated on-site and managed either through reuse, a closed-loop system or infiltration.
- Excess stormwater can be released onto adjacent sites under certain conditions.

Life Cycle Net Positive:
Manufacturers must reduce the product's cradle-to-gate water Footprint through on-site and supply chain innovations to conserve or capture water, and then create a water Handprint greater than the Footprint to become water Net Positive through one or more of the following strategies:

- Innovate to conserve or recapture more water across the life cycle of the product compared to the base case.
- Engage with customers and other product users to achieve water conservation and/or restoration.
- Work outside of the supply chain to reduce potable water consumption or harvest potable water.

I07 Net Positive Energy

This Imperative requires that manufacturers become Net Positive for energy within both their own site operations and the full life cycle of the product. See the Net Positive Energy Clarifications for additional information.

On-Site Net Positive:
105% of the energy used to produce the product at the final manufacturing site must be generated from renewable energy produced on-site on a net annual basis.

Life Cycle Net Positive:
Manufacturers must first reduce the product's cradle-to-gate fossil energy Footprint through on-site and supply chain innovations to use less combustion-based energy. They must then create an energy Handprint greater than the product's fossil energy Footprint to become Net Positive through one or more of the following strategies:

- Innovate to conserve energy or generate renewable energy across the life cycle of the product.
- Engage with users to achieve energy conservation through improved use of the product.
- Work outside of the supply chain to reduce energy consumption or generate renewable energy.

I13 Net Positive Waste

This Imperative requires the efficient use of natural resources and zero waste generation during the manufacturing process. By eliminating waste production and implementing ways to use waste in a closed loop cycle, manufacturers must do one of the following:

- Demonstrate that the waste stream from manufacturing the product is achieving 100% diversion from landfill.
- Meet a minimum overall diversion rate of 90% and create new waste Handprints outside the product waste stream that divert an equivalent amount of the remaining waste from the landfill.

This Imperative does not have a life cycle requirement. See the Net Positive Waste Clarifications for additional information.

I14 Net Positive Carbon

This Imperative requires manufacturers to demonstrate that the carbon sequestering inputs of the materials used in the product exceed the greenhouse gas (GHG) Footprint of producing the product or generate a carbon Handprint larger than the product's Footprint. This Imperative does not have an on-site requirement. Refer to the Net Positive Carbon Clarifications for additional information.

Manufacturers must first work to reduce the product's cradle-to-gate carbon Footprint by innovating within the supply chain of the product or within the manufacturing process to generate fewer GHG emissions. Manufacturers must then create a carbon Handprint greater than the Footprint to create acarbon Net Positive product through one or more of the following strategies:

- Incorporate carbon sequestering materials to ensure the product stores more carbon than was used in production
- Engage with users to reduce carbon emissions through improved use of the product
- Take action outside of the product's supply chain to reduce carbon emissions
- Purchase a carbon offset equivalent to the cradle-to-gate GHG Footprint of the product after other options have been depleted

I18 Social Co-Benefits

This Imperative requires that manufacturers look beyond strictly environmental metrics and consider social impacts of their actions. Manufacturers can create positive social change through their Handprinting actions, known as social co-benefits.

Manufacturers must demonstrate that at the time of certification, and for at least the next three years of production, they will work within the broader ecosystem of suppliers, workers, customers and key stakeholders to harness social co-benefits from their environmental Handprint strategies by:

- Providing a narrative describing how their environmental Handprinting strategies are designed to also generate social co-benefits.
- Creating a plan to measure and assess the social co-benefits over the next three years, and creating a process to re-evaluate their results.
- Gathering brief narratives from any organizations the manufacturer partners with to bring about social co-benefits.

To achieve this Imperative, manufacturers must demonstrate that at least 75% of one of the relevant LCA impact areas in LPC (Energy, Water or Carbon) is associated with a strategy that results in tangible social co-benefits. Manufacturers are encouraged to keep positive impacts as local as possible.

Transparent Material Health Guide

Introduction to the TMH Guide

The Living Product Challenge asks manufacturers and consumers alike to think beyond the paradigm of less bad and instead imagine what the world would look like if every product you bought made the world a better place. The program provides manufacturers a platform for receiving credit for the good work they're already doing, and pushes them to go further to create Net Positive products. It is the only certification in the market to incorporate both life cycle assessment and material health assessment using a transparent framework, to spark dialogue, collaboration and the transformation of products and companies.

A major goal of the Living Product Challenge is to leverage the work companies are already doing and embrace existing, effective approaches to determining material health, not recreate them. Therefore the program accepts other industry-accepted rigorous evaluations of material health and offers multiple pathways to achievement of the Transparent Material Health Imperative that allow manufacturers to demonstrate the same level of health and rigor, but at lower costs.

At the same time, Living Product Challenge program achievements are aligned with multiple green building certifications, including the Living Building Challenge, the WELL Building Standard, and LEED, as well as responsible purchasing programs such as the US EPA Comprehensive Procurement Guideline Program. This harmonized approach allows a manufacturer's efforts to be recognized within as many platforms as possible.

Part of what allows the Living Product Challenge to achieve this harmonization is transparency of the standard and public disclosure of ingredients and life cycle information, as these pieces can then be evaluated and transferred appropriately between programs. Transparency is a fundamental component of all of ILFI's programs, and ILFI holds itself to these same values. Therefore, our standards are publicly accessible, and this guide lays out the rationale for our approach and the specific process for evaluating material health in the Living Product Challenge.

Transparency: A Foundation for Change

The Living Product Challenge program calls for public disclosure of product composition in order to ensure an open and honest conversation in industry and facilitate a collective effort toward safer products for humans and the environment.
Many manufacturers are wary of sharing trade secrets that they believe afford them a competitive advantage, and instead make proprietary claims about specific product contents. Through engagement with hundreds of manufacturers and thousands of products through the Declare program since 2012, ILFI has found that proprietary claims are often exaggerated or an unnecessary business-as-usual practice. In fact, manufacturers report greater engagement with customers and a better understanding and control over their supply chain through embracing transparency and disclosure.

The Precautionary Approach

This market transformation is necessary because the chemicals market has historically undervalued human and environmental health in favor of the more traditional attributes of price, performance and aesthetics. Regulatory bodies often lack the ability to require chemical manufacturers to regularly produce and disclose data on the toxicological impacts of chemicals, resulting in a growing data gap. As a result, consumer-facing manufacturers face significant barriers to learning the toxicological impacts of their products from their supply chain.

Complex, often global product supply chains, competition, and concerns about intellectual property further cloud an already opaque flow of chemical information. These barriers mean that we lack (a) basic information about chemicals already in commerce, (b) the power to mandate disclosure of chemical and hazard data, and therefore © the knowledge to accurately prioritize where to take action, which hinders the ability for us to incentivize the creation of better chemical and material alternatives.
In addition to this, regulation of chemicals often places too heavy a burden on environmental authorities to prove causation between chemicals and health/toxicity issues. Proving this causation definitively is difficult as well as time-consuming, which often results in inaction and significant time lapse between problems of use and exposure, and regulation.2 In the intervening time period, chemicals with strongly suspected and known impact to human and environmental health are released into their environment and can be persistent and continue to cause harm well into the future when the hazard becomes better known.

In order to prevent this dangerous delay in action, ILFI and its programs adhere to the Precautionary Principle. By asking manufacturers to voluntarily adopt a Restricted Substances List, such as the Red List, ILFI advocates that its users avoid use of any chemicals believed to be problematic. The Precautionary approach states that “when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.” The pre-cautionary approach is now widely accepted and has even been adopted into law in some regions of the world such as the Restriction on the Use of Certain Hazardous Substances Law in the European Union.

Living Building Challenge, The Red List and the Watch List

The Living Building Challenge

In 2006, ILFI launched the Living Building Challenge, a holistic green building certification, in an attempt to push the leading edge of the industry far beyond what was thought possible in sustainability at the time. One of the numerous ways in which the program addressed human and environmental health was through the avoidance of toxic chemicals in building products. LBC project teams pursuing the Materials Petal are required to avoid a defined list of substances, known as the Red List.

The LBC Red List

The LBC Red List represents the “worst in class” materials, chemicals, and elements known to pose serious risks to human health and the greater ecosystem. The Red List identifies chemical and material groups (CMG), each of which is composed of a number of individual substances, represented by unique identifiers, known as Chemical Abstract Service Numbers (CASRNs). A list of the currently identified on the Red List along with their descriptions can be found on the Declare website, along with a spreadsheet containing the list of all substances that must be screened for.

The LBC Watch List

Over time, the number of substances identified as harmful in a particular group (CMG) typically expands as we learn more. In order to keep up, ILFI must periodically update the Red List to add new substances. To allow for more regular updates to the Red List, as well as encourage dialogue and engagement with green chemistry experts as well as manufacturers, ILFI released the LBC Watch List in 2019. The Watch List identifies substances that are not yet on the Red List, but are being reviewed by ILFI as candidates in the future. To show the priority of review, some of these chemicals are identified as “Priority for Red List Inclusion”. Only once a chemical has this designation can it be added to the Red List a minimum of 12 months later. This time allows for additional research and gives manufacturers time to prepare for any changes to their Declare label, or any research and development to update their products.

Declare: The Ingredients Label for Building Products

The Declare program was developed in 2012 to increase content transparency in the materials marketplace and to directly aid LBC project teams in identifying which products meet the Red List requirements. The Declare program now serves as a tool for project teams to better understand and select healthy building products and as a platform for manufacturers to demonstrate leadership in transparency and toxic chemical avoidance.

While Declare is a standalone program, it has also been incorporated into the Living Product Challenge. This approach allows manufacturers who have participated in the Declare program to naturally build upon their existing work, and cements ingredient transparency as one of the foundational principles of the Living Product Challenge. Declare labels completed as part of Living Product Challenge certification are required to be verified by a third party (3PV) to ensure that product content is accurately represented. This creates a higher level of accountability on which manufacturers and consumers can evaluate with confidence the chemicals and materials present in the product. The Declare database makes this information publicly available to improve the ease with which project teams find healthy products that are compliant with LBC requirements.

For more information on Declare and how to participate in the program, please review the Declare Manufacturer’s Guide. To see products in the Declare database, go to living-future.org/Declare.

Transparent Material Heath: Beyond the Red List

Public ingredient disclosure and screening against the Red List through the Declare program offers an efficient, scalable approach to capturing a snapshot of product content and communicating it to the market. However, without better research and data, list-based screening approaches to material health are not the end-game solution to ensure the safest products.

Existing research and data is not sufficient to know all potential hazards associated with all chemicals in commerce, therefore it is impossible for authoritative hazard lists to capture all problematic chemicals. This presents the danger of regrettable substitutions, in which a chemical with known hazards (i.e. one on the Red List) is replaced with an alternative that doesn't turn up on pertinent hazard lists, but with further research, ultimately turns out to have similar, or worse impacts. One well-known example of a regrettable substitute is bisphenol S (BPS), which quickly replaced bisphenol A (BPA) in many plastic bottles and food containers, both designed to make plastic hard and clear. Scientific studies now suggest that BPS behaves similarly to BPA in the human body, so the replacement does not necessarily make the product safer. To avoid these situations and promote informed selection of materials, a deeper approach to exploring material health through full chemical assessment of ingredients with unknown hazards is advisable.

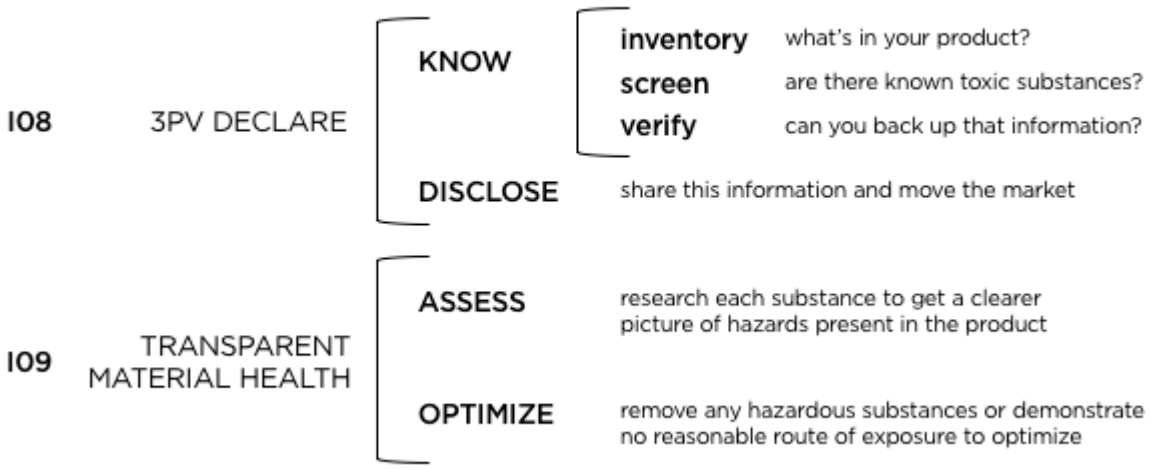
The Transparent Material Health Imperative in LPC therefore goes beyond Declare to require full assessment(s) of all of the chemicals identified through the Declare process, where the hazards are not fully established. The Imperative requires elimination of all ingredients identified as carcinogenic, mutagenic, or reprotoxic (CMR), or persistent, bioaccumulative, toxic (PBT) substances, that present a risk of exposure to workers in the final manufacturing facility, the product installer, and/or the end user, and any reasonable end of life scenarios. These results are made transparent so that the program can be publicly evaluated and questioned, encouraging conversation and improvement.

Pathway to Safer Materials

The Living Product Challenge material health framework was designed to present manufacturers with a pathway for engaging with and optimizing the material health of products. For some, participating in the Challenge will be their first introduction to this manner of understanding their product ingredients and supply chain. Others manufacturers will be much further along this pathway, with company-wide proactive approaches to the creation of healthy products from safe materials. The program is designed to be able to meet manufacturers where they are and push them further, as well as provide market recognition for the hard work they have already done.

The process used in LPC aligns with industry-accepted pathways for optimizing material health, and can be best described as a framework of "Know, Disclose, Assess and Optimize". All products that pursue LPC are required to first identify the ingredients in their product and screen for any Red List substances; then verify and disclose that information to the public to obtain a Third Party Verified Declare label. Beyond that, manufacturers may elect to work with a Material Health Assessor (MHA) to pursue Transparent Material

Health; going deeper to assess how each substance performs against multiple hazard endpoints, and working to optimize the product content and demonstrate that it is safe for use and disposal. These steps are illustrated below and further in this section, as they pertain to the specific requirements of the Living Product Challenge program Imperatives 08 Red List and 09 Transparent Material Health.



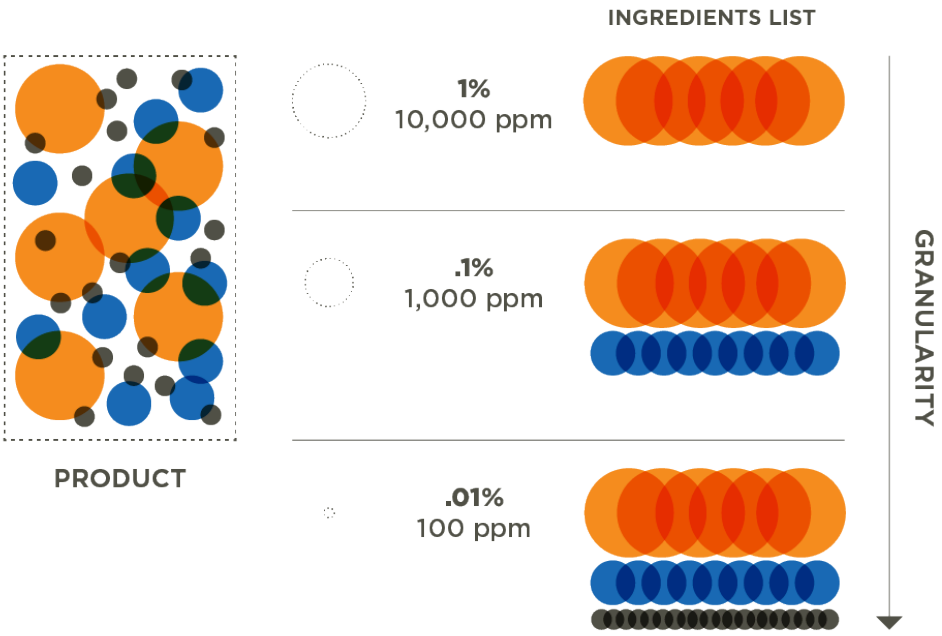
Know, Disclose, Assess, Optimize

KNOW: INVENTORY, SCREEN AND VERIFY CONTENTS

Before considering how to make improvements to a product, it is most crucial to confidently understand what is in the product.

INVENTORY

Creating a complete material ingredient inventory is a foundational step in understanding what is in a product and how to make it healthier. Conducting an inventory requires supply chain collaborations to share proprietary and confidential information between suppliers and manufacturers. Manufacturers are required to document which materials and chemicals are present in their product at a certain threshold, or level of detail. For a Declare label, manufacturers are required to inventory 100% of the ingredients present above 100ppm (.01%) in the final product.



DECLARE ASKS FOR 100 PPM THRESHOLD BECAUSE INGREDIENTS PRESENT IN SMALL QUANTITIES ONLY "SHOW UP" WITH A MORE GRANULAR THRESHOLD

SCREEN

Once the ingredients are identified within the product to the appropriate 100ppm threshold, the next step is to screen against the Red List, by matching the unique identifier for each chemical though its Chemistry Abstract Service Registry number to identify any Red List chemicals in the product. Level of disclosure and results of screening are used to determine if a product should be marked as Red List Free, LBC Compliant or Declared. Only Red List Free and LBC Compliant labels are able to proceed with pursuit of the Living Product Challenge program. Manufacturers can work to move their product up a Declaration status through removal of Red List Ingredients or obtaining additional disclosure. For more information on Declaration statuses, please refer to the Declare Manufacturer's Guide.

VERIFY

The Living Product Challenge requires that the material ingredient composition of all Living Products be verified by an ILFI-approved independent 3rd Party Verifier to ensure compliance with program requirements. The Declare program has a proprietary ingredients exception that allows manufacturers to withhold up to 1% of the product inventory present at or above 100ppm. However, the assessor must be able to confirm that the undisclosed 1% is indeed free of Red List ingredients, even if the information is withheld on their label.

Verification provides an unbiased evaluation of accuracy according to the Declare and/or Living Product

Challenge Standard, adding rigor to the process and enhances confidence in company claims and communication with consumers. Verification also means that companies can confidently take next steps to look more deeply at the materials and any hazard implications, knowing that they won't be missing information.

DISCLOSE: PUBLIC ACCOUNTABILITY THROUGH TRANSPARENCY

Once the material ingredient inventory has been completed and verified, public ingredient disclosure using a 3rd Party Verified (3PV) Declare label is a requirement of International Living Future Institute's Living Product Challenge program. Declare labels are required to be available on the Declare Database, but can also be made public on the manufacturer's website.

ASSESS: BEYOND LIST-BASED APPROACHES

The resulting Third Party Verified (3PV) Declare label can then become the basis for a deeper evaluation of the ingredients in the product. Products pursuing Living Product Challenge I09 Transparent Material Health Imperative must undergo a more rigorous assessment for carcinogenic, mutagenic, and reprotoxics (CMRs), as well as Persistent, Bioaccumulative, Toxic (PBT) chemicals.

The LPC Material Health Assessment goes beyond screening of chemicals to provide analytical information about human and environmental health hazards of ingredients across the value chain where hazard may not be known or yet clearly identified. Each assessment uses scientific literature and modeling tools to determine how a given chemical performs against multiple hazard endpoints (i.e. neurotoxicity, carcinogenicity), as well as environmental toxicity and fate of the chemical.

This deeper evaluation of chemicals with hazards that are as of yet unknown allows for greater scrutiny of the materials in a product and allows manufacturers to make comparisons between substitutes to determine how they perform along those same indicators. This is especially useful for identifying alternative ingredients that do not have unintended consequences (thereby avoiding regrettable substitutions), and truly have a more positive material health benefit.

OPTIMIZE: LEVERAGING KNOWLEDGE FOR SAFER MATERIALS

Once a manufacturer has determined the detailed composition of its product, has screened these chemicals against the Red List, verified and disclosed the ingredient information, and has gone deeper to individually assess the chemicals and materials for material health, the last step is to thoroughly evaluate and act on that information.

If the Material Health Assessor determines that no CMRs or PBTs are present in the product, the product is considered optimized.

If there are CMRs or PBTs present, the Assessor will conduct a risk and exposure analysis, to look at the exposure pathways and determine whether there is risk of exposure to human health and the environment. If a risk of exposure exists to the final manufacturer, the installer or the end user of the product, the assessor must then determine whether that risk can be reasonably mitigated. If the risk cannot be mitigated,

and the assessor determines that the product is not in compliance with Imperative requirements, the manufacturer will be required to make product changes in order to bring the product into compliance.

LPC Material Health Methodology

The following section outlines in greater detail the process for compliance with the specific Imperatives 08 Red List and 09 Transparent Material Health.

Imperative 08: Red List (Know + Disclose)

Standard Language

Living Products are free of Red List materials or chemical substances. Through a Red List Free or LBC Compliant Third Party Verified Declare label, manufacturers must demonstrate that neither the product nor its packaging contain any Red List materials or chemical substances. Additionally, the manufacturing process may not produce byproducts or emissions that are considered toxic or included on the Red List.

Note: manufacturers who already possess a 3PV Declare label may submit their product inventory and Declare label as documentation of compliance, along with GreenScreen scores for the product inventory. The only additional requirement of this Imperative is to gather supplier confirmation that the product packaging is free of LBC Red List substances.

Methodology

The Declare program is a foundation of the material health approach in LPC. Obtaining a Third Party Verified Declare label provides manufacturers with a platform to transparently represent the contents of their products and demonstrate compliance with the Red List. Manufacturers must work with an ILFI-approved verifier to assemble and verify the submission. An *abbreviated* summary of the Declare label requirements and 3PV Review methodology is listed in this guide; for more detailed information, manufacturers and verifiers should refer to the Declare Manufacturer's guide.

Overview:

1. Obtain and publish your 3PV Declare label:
    a. Refer to the Declare Manufacturer's Guide for the full set of rulings surrounding the Declare program.
    b. 3PV process requirements can be found here.
2. Using your product inventory of all CASRNs present at 100ppm obtained through Declare, screen all CASRNs using GreenScreen List Translator and provide as documentation the associated scores.

KNOW: INVENTORY, SCREEN + VERIFY

Inventory: Identify Product Content

Identify all substances, including residuals, present at or above a threshold of 100 ppm in the final product with name, associated CASRN and percentage presence to build your materials inventory. This information may be collected from public documentation in rare cases; in most cases supplier outreach, either through direct contact of suppliers, or through use of platforms like ToxNot and the HPD that streamline outreach, will be required to get complete substance information.

A minimum of 99% of the substances present in the final product by weight must be publicly represented on the label, with an associated CASRN, if applicable. Manufacturers are allowed to keep up to 1% by weight proprietary, though they must confirm that proprietary content is free of Red List ingredients.

For some ingredients, a CASRN does not exist. In these cases, the manufacturer should reference the list of Special Conditions listed within the Declare Manufacturer's Guide to determine whether their ingredient falls under one of these and proceed as instructed. If the ingredient does not fall within one of the existing Special Conditions, the manufacturer and assessor should contact the Institute for a ruling.

Compile backup documentation in accordance with the Declare Manufacturer's Guide for 3PV Declare, for verification. This will include supplier contact information, purchase orders and ingredient information (not limited to Health Product Declarations, MSDS and SDS and supplier communication). Trade names of materials and supplier contact information are not publicly disclosed, but must be made available for verifier review.

Screen: Identify hazards using the Red List and GreenScreen List Translator

Use the ToxNot platform to submit the ingredient inventory to ILFI and screen all substances against the Red List to determine whether the product is free of all Red List ingredients (unless an ingredient is covered by an existing exception). A list of current Red List exceptions applicable to the Declare program can be found in the Declare Manufacturer's Guide. Any CASRNs entered into ToxNot that correspond with one found on the Red List will be flagged in Red.

If any Red List ingredients are present that do not fall under an existing exception, the manufacturer must work to remove or replace those materials or ingredients in the product. While rare, if market realities prevent the removal of certain Red List ingredients from material or product applications, ILFI may consider the creation of a temporary exception that allows the manufacturer to obtain LBC Compliant status.

Living Product Challenge requires that manufacturers go a step beyond determining Red List compliance for their product, by also obtaining supplier confirmation that the product packaging is free of Red List Ingredients, with ingredient disclosure if possible.
The inventory must also be screened using the GreenScreen List Translator to compare ingredients against a much broader list of restricted substances lists and authoritative hazard lists. GreenScreen List Translator screening generally results in a designation of LT-1, LT-P1 or LT-UNK. A spreadsheet documenting the results of this screening must be provided.

Verify: Ensure accurate information

The Living Product Challenge requires that a third party verify the inventory and Declare label content for two reasons: first to ensure that manufacturer claims about product content and program alignment are accurate; second, in order to ensure that the content inventory used to provide a basis for chemical hazard assessment and optimization is accurate and complete.

Once the Product Inventory is complete, manufacturers will work with the approved Third Party Verifier to verify the accuracy of the information.

Verifiers are required to review the product inventory and all associated back-up documentation gathered in order to determine whether there are any remaining data gaps and to confirm that there are no Red List ingredients in the product that are not covered by an existing exception. The Verifier will cross reference the inventory with internal documentation such as Bill of Materials and SDS/MSDS and supplier communication to ensure that all materials are accurately inventoried and screened.

If any gaps or inconsistencies are found, the Verifier will work with the manufacturer to fill these and bring the product into compliance with the Declare requirements.

DISCLOSE

Now that the Third Party Assessor has confirmed what is in the product and has screened content to ensure that it is free of Red List ingredients present at or above the 100 ppm threshold, the next step is to disclose this information on a Third Party Verified Declare label.

All Declare labels and product ingredient lists are published by ILFI on the Declare database. This free and public database allows product specifiers to understand the ingredient make-up for a product in order to select transparent and healthier products.

The manufacturer and assessor should gather all information required for a Declare label beyond the product inventory, including manufacturer name, product name, end of life options for the product, etc. A full list of label requirements is outlined in the Declare Manufacturer’s Guide.

Manufacturers will work with the Third Party Verifier through the ToxNot platform to upload the content inventory template to the Declare website to generate and publish a Declare Label.

Product information and content inventory is reviewed by ILFI before being published on the database. As noted earlier, manufacturers may keep up to 1% of final product inventory proprietary using the proprietary ingredients exception.

Existing Declare Labels that go through the verification process will have the Declare third-party verified mark added to those labels and listed in the database as “Third-Party Verified”. New Declare Labels will be created with the 3PV mark showing they have been assessed by an ILFI approved third-party assessor to en¬sure the accuracy of the manufacturer’s supply chain, purchasing, and ingredient claims.

Imperative 09: Transparent Material Health (Assess + Optimize)

Standard Language:

Living Products are safe for human exposure. Going beyond the avoidance of known problematic chemicals, manufacturers intentionally select chemicals and materials proven safe throughout their life cycle.

Manufacturers must conduct a hazard assessment for all intentionally-added chemical substances in the product using an Institute-approved toxicologist. The analysis must demonstrate that the product does not create a present a reasonable risk of exposure to Carcinogens, Mutagens and Reproductive toxicants or Persistent Bioaccumulative Toxins for the manufacturer, installer or end-user. To limit assessment costs, manufacturers are allowed five percent of the product by weight to remain unassessed for initial certification; however, the product must be 100% assessed by the time of recertification. Exceptions in Imperative 09 may allow for more gradual progress to achieve 100% assessed.

The results of the Living Product Challenge Material Health Report must be transparent and publicly available.

Methodology Overview

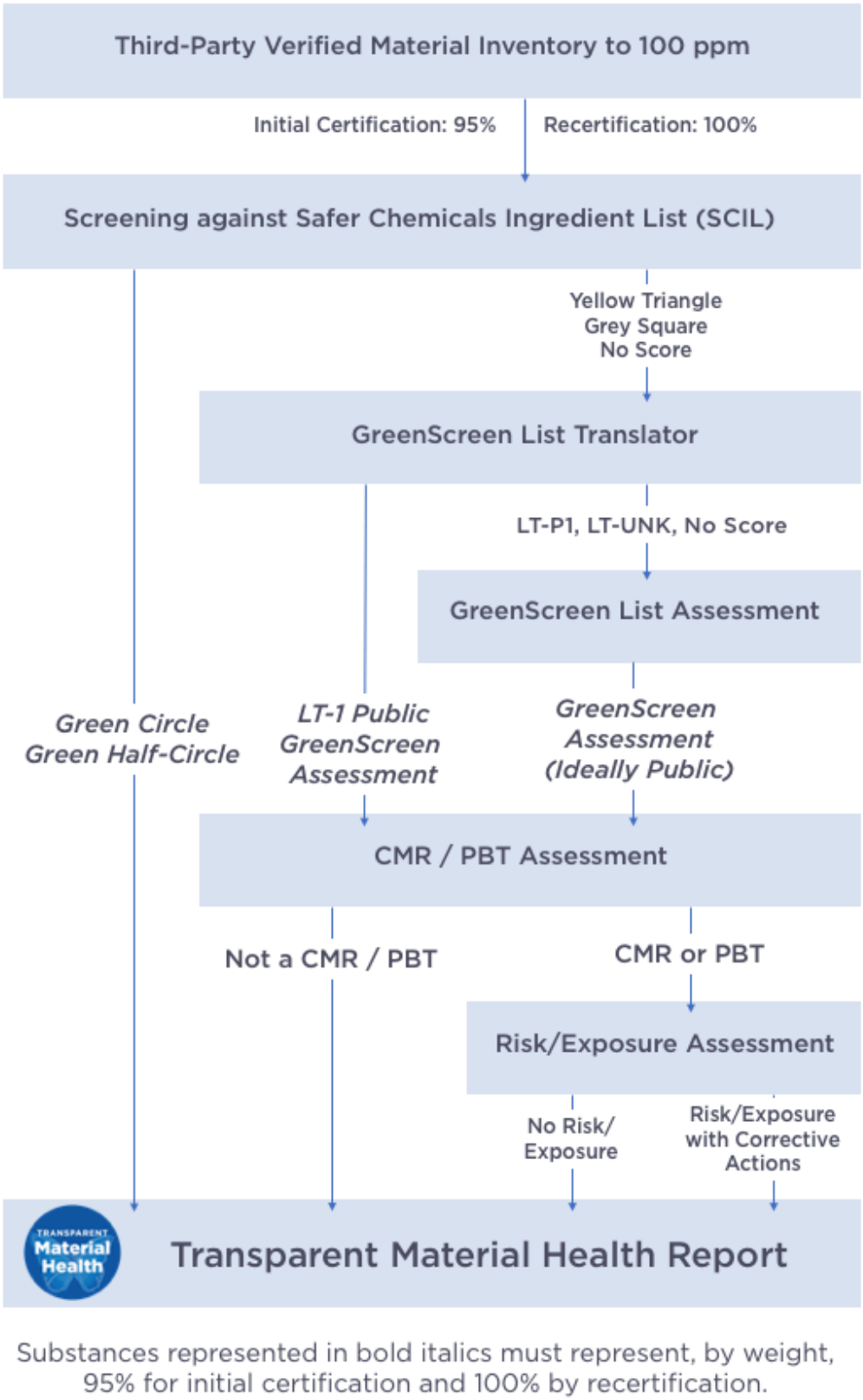
Based on the inventory and backup documentation gathered as part of the achievement of I08, the manufacturer will work with an ILFI-approved Material Health Assessor (MHA) to achieve the Transparent Material Health Imperative. The Third Party Verified Declare label and associated documentation is used by an ILFI-approved Material Health Assessor to conduct an assessment of the ingredients. The objective of this Imperative is to eliminate any chemicals and ingredients identified as Carcinogens, Mutagens and Reprotoxins (CMRs) or Persistent Bioaccumulative Toxics (PBTs) that have been determined to be a risk to the final manufacturer, the installer or the end user of the product.

During the initial certification period (the time until the product is certified), the contracted MHA must assess a minimum of 95% of the product ingredients present above the 100ppm threshold by weight. The manufacturer then has 3 years (until recertification) to assess the remaining 5% of the product to achieve full assessment of all chemicals present above 100ppm in the final product. This allows the manufacturer to spread out assessment costs, while requiring improvement of data and materials over time.

Any Third Party Verified (3PV) Declare labels not claiming the proprietary ingredients exception can be used as documentation for the Transparent Material Health Imperative since external verification of the information has already been completed. A 3PV Declare label using the proprietary ingredients exception must produce ingredient and CASRN information for any proprietary ingredients so that the MHA can use this in their evaluation. If polymers are present in the formulation, some additional data may be required, and is noted below in the outlined methodology.

The following flowchart provides an overview of the assessment process conducted by Material Health

Assessors:



Substances represented in bold italics must represent, by weight, 95% for initial certification and 100% by recertification.

Transparent Material Health Review:

1. Inventory Review

Material Health Assessors will review the verified product inventory through the Declare program in the ToxNot platform, and determine if any additional information is necessary for the assessment, such as additional polymer information, use and installation instructions for exposure assessments, or ingredient-specific information for products without CAS numbers.

2. Hazard Assessment

Assessors determine the material health hazards of the product content using three tools: the Safer Chemicals Ingredient List, the GreenScreen List Translator, and the GreenScreen for Safer Chemicals methodology:

1. **Safer Chemicals Ingredient List (SCIL) Screening**: the SCIL is a list of chemical ingredients, arranged by functional-use class, evaluated by the US EPA Safer Choice Program, which can help manufacturers quickly and economically find safer chemical alternatives to ingredients. These ingredients have been determined to be safer than traditional chemical ingredients.
    a. Ingredients with a designation of green circle, half green circle, and yellow triangle do not require additional assessment.
2. **GreenScreen List Translator Screening**: compares the ingredient CASRN with authoritative hazard lists to identify any known hazards. GreenScreen List Translator screening generally results in a designation of LT-1, LT-P1 or LT-UNK.
    a. LT-1 chemicals require a summary by the assessor, including a CMR/PBT assessment, but do not require a full GreenScreen assessment to be performed.
    b. Any chemical with an existing, publicly available GreenScreen Benchmark Score does not require additional assessment.
3. **GreenScreen for Safer Chemicals Hazard Assessment**: goes beyond screening against the Red List or using the GreenScreen List Translator by looking to scientific literature to determine where in the life cycle a chemical presents certain hazards, to what degree, and which pathways (dermal, inhalation, etc.) present this impact.
    a. The assessment process results in a final hazard assessment for each chemical in terms of Benchmark scores 1-4, with one (1) being the lowest and targeted for elimination, and four (4) being the safest. Chemical ingredients are assessed based on 18 hazard endpoints.
    b. GreenScreen Assessment Benchmark scores (BM-1 to BM-4) need to be made publicly available so that at least 75% by weight of the product's hazard assessments are publicly available, calculated by summing the percent weight of the product that meets the SCIL requirements in part (a), LT-1 scores, and publicly available GreenScreen Assessments. Upon recertification, the amount required to be publicly available needs to be 95% of the weight of the product.
        i. If the product can achieve the required public disclosure amount utilizing the screening requirements of parts (a) and (b), at least one publicly available GreenScreen Assessment shall be performed (unless all assessment information for the product inventory is already publicly available).

Utilizing the results of the hazard assessment outlined above, any chemical that does not score a Green Circle or Green Half-Circle on the SCIL will be assessed using GreenScreen methodology to determine if it is a CMR or PBT, to be defined as:

- Carcinogen – GreenScreen endpoint C is [H or vH]
- Mutagen – GreenScreen endpoint M is [H or vH]
- Reproductive Toxin – GreenScreen endpoint R is [H or vH]
- Persistent, Bioaccumulative, and Toxic Chemicals – GreenScreen endpoints meet all of the following:
    - [H or vH] for P
    - [H or vH] for B
    - [vH] Toxicity (Ecotox or Group II) or [H or vH] Toxicity (Group I or II*)

- H or vH points to hazard level of the endpoint; H indicating High and vH indicating Very High.

3. Risk + Exposure

For any hazard assessments that result in a CMR or PBT designation as outlined above, the Material Health Assessor will then conduct a Risk and Exposure review of that chemical. This evaluation will determine whether reasonable risk of exposure exists to the final manufacturer, the installer or the user of the product. In some cases, the review will determine that a CMR or PBT in a product has no risk of exposure to the user, and therefore does not need to be removed as per LPC requirements. If any chemicals still remain with the designation of CMR or PBT after the review, then product changes must be implemented.

4. LPC Transparent Material Health Report + Corrective Actions

Once the review is complete, the Material Health Assessor produces a Transparent Material Health Report to be made public along with the product's LPC label and case study. This Report shall contain a summary of the hazard assessment for each chemical ingredient present in the product's formulation, including the results from each step in the Hazard Assessment methodology above. Additionally, the report also provides the risk and exposure reviews for any chemical ingredient that was assessed as a CMR or PBT.

The report summarizes the findings and provides the manufacturer with a final determination (achieved or denied) and a list of Corrective Actions that the MHA determines need to be addressed. ILFI reviews the report and determines if any actions are outside the scope of the LPC review and therefore do not need to be completed by the manufacturer. The manufacturer is then provided a timeline in which those actions need to be addressed and completed before recertification in order to maintain achievement of the Imperative.

If a product fails the assessment, the manufacturer is required to make product or process changes to bring the product into compliance as per the report recommendations before the Imperative will be awarded.

The results of this report should be made publicly available so that any risk and exposure determinations can be evaluated publicly. The report shall also provide a one page product overview, using the table below as an example.

Chemical Name	CAS#	Amount	SCIL Result	GS LT	Toxicological Assessment	CMR	Risk/ Exposure	Notes
Chemical 1	123-45-6	20%		LT-UNK	-	No	-	
Chemical 2	234-56-7	5%	-	LT-P1	Passed	No	-	
Chemical 3	345-67-8	60%	-	LT-1	-	Yes (C)	No	C is inhalable only
Chemical 4	456-78-9	11%	-	BM-2	BM-2	No	-	
Chemical 5	567-89-0	4%	-	LT-UNK	UNK	UNK	UNK	Not assessed

The example above indicates 96% of the product has been assessed, meaning it would qualify for the initial certification. The benchmark scores indicate that 71% of the assessments are publicly available.

5. Temporary Exceptions

The Institute may, on a case by case basis, create temporary exceptions if it is demonstrated that there are legitimate industry-wide market limitations, performance concerns for a specific application with no alternatives, or if a manufacturer provides a reasonable timeline for removing a particular chemical. The manufacturer is then provided a timeline in which those actions need to be addressed and completed. These temporary exceptions are published in the LPC 2.0 Guide and are intended to be removed over time.

6. Improvement Actions

A truly healthy product goes beyond being CMR and PBT (GreenScreen Benchmark 1) risk free. It is completely safe for humans and the environment. Therefore, the Material Health Assessor should include in the report a list of Improvement Actions designed to provide the manufacturer with a pathway for making the product as safe as possible. These actions do not prevent the product from achieving the Imperative during certification. ILFI reviews the report and determines which of the improvement actions should be completed by the manufacturer, based on their relevance to the review. The manufacturer is then provided a timeline in which those actions need to be addressed and completed before recertification.

Risk and Exposure Guidelines

An exposure and risk assessment is required for chemicals assigned *Benchmark 1* or *ToxFMD® for LPC Not Acceptable* hazard classifications. In order to conduct such an assessment, data regarding the chemistry of these chemicals and the materials they comprise, how the chemicals and products containing them are manufactured, and the ultimate environmental fate of said chemicals as well as how the product is used and what types of personal protective equipment (PPE) the manufacturer recommends will be considered.

Chemical and Material-Specific Considerations

For each chemical that an exposure and risk assessment is being conducted, the scientist/risk assessor should have an understanding of the characteristics and manufacturing process for the chemical and

material it comprises to determine if they may contribute to worker or consumer exposure to harmful chemicals during production, use, and final disposal or reutilization in a subsequent production stream.

Matrix Structure

The base material matrix (i.e., base polymer, metal alloy, natural fiber etc.) is used to judge whether chemical additives are able to freely migrate into external systems. For example, certain materials in indoor use applications may release volatiles contributing to poor indoor air quality, so emissions must be verified. Careful consideration is given to the type of matrix when making material assessment decisions.

Reaction Chemistry

Because materials are assessed based on the final state of all inputs to that material, it is important to have an in-depth understanding of the key chemical reactions taking place in a system and whether the chemical is still in its original form after curing or other reactions reach equilibrium. Collecting important chemical function data from the supply chain technical staff is a good way to gain understanding about the full picture of the complex chemical mixtures present in the final material or product in order to give the most accurate assessment rating.

Physicochemical Properties

General principles surrounding the physical and performance properties of chemicals impact the material assessments decisions in some cases. Some examples are as follows:

- Solubility – a chemical may be considered less aquatically toxic if it is insoluble in water. Alternatively, highly water soluble compounds may have limited dermal penetration potential.
- Volatility – if a chemical is known to volatize completely during manufacture, it is assumed to be present at less than 100 ppm of the final material or product.
- Structure stability – an example where structural stability overrides hazard ratings for ingredients is shown with spinels, which are often used in colorant applications, and are virtually indestructible compounds.

Process, Synthesis, and Manufacturing

It is well-known that process-related aspects of manufacturing and production can often pose just as much risk to human and ecological health as the products that are produced, by way of water effluent discharges, use of hazardous intermediate chemicals, and worker safety.

Exposure Route Considerations

Prediction of possible likely exposure scenarios lends guidance to decision-making as part of a risk assessment. Examples of possible exposure routes are:

- Occupational: including inhalation, oral (consider potential both direct and indirect), dermal/ membranes.
- Consumer use: includes, inhalation, oral (consider potential for both direct and indirect), dermal/

membranes.
- End-of-Use Phase Concerns: It is imperative to consider the end-of-use phase of products. Ideally, exposure scenarios will not lead to unintended risk to humans or the environment at any stage, including at the end-of-use. Some considerations to keep in mind when assessing the chemical composition of materials are as follows:
- Methods of disposal (i.e., deposits to water or soil by any method).
- Recyclability impacts.
- Incineration products and by-products.
- Atmospheric impacts (greenhouse gases and ozone depletion).
- Ecological impacts.

Manufacturer Recommendations for PPE and Safety Documentation

The TPP should consult the product SDS and other documentation (e.g., label and instruction manual) for recommendations regarding recommended PPE usage for the installer and/or consumer. The use of proper PPE may preclude exposure to hazardous chemicals, thereby lowering the risk of adverse health impacts. For occupational exposures, communication with the manufacturer and primary suppliers is required to identify the physical form of the chemicals used in the production stream, as well as any PPE and engineering controls used during production.

Modification of Risk Following Exposure Assessment for Consumers, Workers, Ecological Receptors

If the Material Health Assessor can demonstrate that significant consumer exposure is unlikely following anticipated use(s) of the product, then the risk of adverse effects to human health posed by *Benchmark 1* or *ToxFMD® for LPC Not Acceptable* chemicals may be reduced relative to that anticipated from the hazard ratings alone. Similarly, if no occupational exposure is possible at the manufacturing site or for installers based on engineering controls or PPE used or anticipated to be used based on directions from the manufacturer, no risk of adverse effects to human health is anticipated from the product under review.

To demonstrate a lack of significant adverse risks to the environment (applicable for PBT, vPvB, or vPvT chemicals), the manufacturer must demonstrate a lack of direct release of the pertinent chemicals to the environment during manufacturing as well as during final disposal via take-back and/or recycling programs. If these conditions are met, the TPP may assign a risk rating of “LPC Acceptable”for the Benchmark 1 or ToxFMD® for LPC Not acceptable chemical(s) under review. However, if exposure to workers or consumers to the Benchmark 1 or ToxFMD® for LPC Not acceptable chemical(s) is possible or if a PBT, vPvB, or vPvT chemical(s) may be released to the environment during the course of the product manufacturing or lifespan, the risk rating is assigned as “LPC Not Acceptable.”

Recertification Guidance

TMH Requirement Overview:

The Transparent Material Health Imperative requires that manufacturers demonstrate that their product meets an adequate level of health through conducting an assessment of the substances in the product

inventory.

There are two pathways to achieve this:

1. **Preapproved Program Pathway**: Demonstrate that the product has achieved one of the pre-approved material health certifications outlined in the documentation requirements, and that certification is valid at the time of LPC Certification.
2. **LPC Transparent Material Health Pathway**: Engage an approved third party Material Health Assessor (MHA) to conduct a review of a minimum of 95% of material ingredients represented on their valid Third Party Verified Declare label and demonstrate that there is no significant risk of exposure to the manufacturer, installer or end-user of the product (process outlined here) by working to eliminate all BM-1 chemicals (Carcinogens, Mutagens and Reprotoxics or Persistent, Bioaccumulative Toxics) in their product's formulation. The percentage of product assessed is represented on the LPC Label.

Recertification Requirements:

Certification under LPC is valid for 3 years, at which time, the manufacturer must demonstrate maintenance or improvement on any of the areas identified in their initial certification to maintain their status.

The two different pathways outlined in the certification requirements therefore have two different recertification processes:

1. Pathway 1: Preapproved Assessment Results
   For the manufacturer to continue to pursue the pre-approved program pathway at recertification (3 years after certification), their certification for that program must continue to be valid at an approved level, or higher at the time of recertification.

1. Pathway 2: LPC Transparent Material Health Pathway
   Those manufacturers who pursue the pathway outlined in the Transparent Material Health Guide must work with the approved Material Health Assessor leading up to recertification to demonstrate that their product meets any continuous improvement requirements.

As noted above, initial certification allows 5% of the product to be unassessed (100% of the product is still required to be inventoried and show Red List compliance per the Red List Imperative). By recertification, the manufacturer should have worked with the MHA to assess the remaining 5% of the product to achieve 100% assessed at a 100 ppm threshold. If they are unable to assess the remaining 5% they may request to use HH-00X Continuous Improvement for Assessment.

Current TMH Imperative assessments are generally conducted using the GreenScreen® Methodology as well as other screening methodologies that are outlined in the Transparent Material Health Guide. GreenScreen assessments are valid for 5 years, though the LPC Certification period is only 3 years at a time.

The focus of recertification for this Imperative is on optimization, conducting additional assessments, and addressing any changes to the product's formulation, not on redoing work that is still valid. The timing of

components is as follows:

- Recertification takes place every 3 years for LPC
- GreenScreen® Assessments are valid for 5 years
- Declare labels (Third Party Verified) are renewed every 1 year

As the Third Party Verified (3PV) Declare label renews each year and requires verification of backup documentation from the supply chain, it provides an accurate annual picture of what, if any, material ingredient changes or material suppliers have occurred pertinent to the TMH review, and identifies if any new substances are present in the final product requiring review at the time of recertification in 3 years. However, any completed GreenScreen chemical screens have a lifespan of 5 years and should only be revisited when they expire.

Manufacturers are therefore not required to re-review any chemicals assessed at certification, when they recertify (after 3 years) as this falls within the 5 year chemical screen shelf life timeline. Manufacturers will be required to confirm whether their product formulation (BOM) and material suppliers have changed since the formulation's last review. This BOM and their statement will be confirmed through comparison of their 3PV Declare label to the existing review. Recertification under the Material Health Imperative can only proceed after the product has renewed its Third Party Verified Declare Label for that current year and all information has been verified.

At recertification, the MHA must only:

- assess new substances that have been added to the formulation since the last review,
- repeat reviews for any polymeric substances that are being sourced from different suppliers than that of the previous review
- assess new substances that are added to the review under the requirement to assess the additional 5%.

The MHA is required to revisit any chemical assessments made over 5 or more years ago and determine whether they are still valid or whether they require updates (new GreenScreen® or confirming previously obtained polymer data and updating the relevant polymer screens if needed). Therefore, by the second recertification, at six years, the chemical screens present under the TMH report will no longer be valid and may need to be updated based on a review per the discretion of the MHA. If a substance has been recently reviewed by that MHA's firm and they are confident that the results of that assessment stand, the MHA should take that into account and focus efforts on new substances or truly out-of-date reviews.

Continuous Improvement:

The TMH report under LPC, and other pre-approved programs, often mandate corrective actions and/or continuous improvement that should be addressed by recertification.

While the standard asks manufacturers to assess the final 5% by weight of their products, use of the pre-approved program pathway allows manufacturers to sit at a level of 95% assessed. ILFI encourages all manufacturers to pursue 100% assessment of their products to ensure safety for those who interact with

their products. However, for manufacturers pursuing the LPC Transparent Material Health Pathway, ILFI has created RL-020 Assessment Continuous Improvement that relieves them of the absolute need to reach 100% after 3 years. ILFI intends to remove this exception over time, but first seeks to identify more cost-effective pathways that are market-driven to build the business case for achievement.

Approved Consultants and Assessors

LPC ECOSYSTEM

The Living Product Challenge Ecosystem is composed of the leading product certification and sustainability consulting companies helping to scale the Living Product Challenge. Included in the Ecosystem are all of the ILFI-approved Third Party Verifiers and Material Health Assessors required to complete the Material Health Imperatives, as well as LCA Consultants. Manufacturers may either select an Assessor from the LPC Ecosystem, or the Institute may assign an Assessor based on product type and manufacturer needs. Manufacturers will work with the Assessor to gather documentation and verify compliance with Imperative requirements.

For a full list of the current Ecosystem members, refer to the Living Product Challenge website. living-future.org/lpc/basics. To inquire about the process of becoming an LPC Ecosystem Member, please contact LPC.Support@living-future.org.

Declare Third Party Verifiers

For more information on the Declare Verification process, please see the Declare Manufacturer's Guide. To inquire about the process of becoming a Declare Third Party Verifier, please contact Declare.Support@living-future.org.Manufacturers are required to work with ILFI-approved Material Health Assessors to achieve the I09 Transparent Material Health Imperative unless they are using another approved material health program as a pathway to meet the Imperative requirements.

For a list of current Declare Third Party Verifiers, see the Declare website.

LPC Material Health Assessors

The following Professional and Program qualifications are required for a firm to be able to act as an LPC Material Health Assessor:

Professional Qualifications (all)

- Be a GreenScreen Licensed Profiler or Cradle to Cradle Material Health Assessor; and
- Be an approved Declare Third Party Verifier; and
- Have attended the most recent ILFI Ecosystem Trainings for LPC Assessors (held annually in Seattle); and
- Hold a valid assessor contract with ILFI

Program Qualifications (all)

- Have all LPC Transparent Material Health reports and findings reviewed and approved by a Toxicologist or Industrial Hygienist (in-house or contracted); and
- Submit their first five Material Health reports to ILFI for review and approval

Approved Material Health Assessors

ToxServices
WAP Sustainability

Material Health Resources

Material Health Resources

GreenScreen for Safer Chemicals
https://www.greenscreenchemicals.org/

Pharos
Pharos provides hazard, use, and exposure information on chemicals and building products.
https://pharosproject.net/

Safer Chemicals Ingredients List
The Safer Chemical Ingredients List (SCIL) is a list of chemical ingredients, arranged by functional-use class, that the Safer Choice Program has evaluated and determined to be safer than traditional chemical ingredients. The list is designed to help manufacturers find safer chemical alternatives that meet the criteria of the Safer Choice Program.
https://www.epa.gov/saferchoice/safer-ingredients

ILFI Program Glossary

A-G Terms

100-Year Flood

A flood having a one percent chance of being equaled or exceeded in magnitude in any given year (not a flood occurring once every 100 years).

100-Year Floodplain

The area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood.

Adaptive Management

An ongoing process for improving management policies and practices by applying knowledge learned through assessment of previously employed policies and practices to future projects and programs. Also, the practice of revisiting management decisions and revising them in the light of new information.

Adaptive Plan

An Adaptive Plan is a plan for improving the ecological function of a site based on the principles of Adaptive Management, establishing the vision, goals, objectives, and quantitative metrics, as well as the monitoring and maintenance strategies, to be applied to a project.

Adaptive Reuse

The process of reusing a site or building for a purpose other than the original purpose for which it was built or designed.

Adjacent Properties

Properties or developments that share a property line with the project.

Affordable Housing

A project that is financially accessible (<30 percent of household income for gross housing costs, including utilities) to renters who make <60% of median family income (MFI) or unit owners who make <80% of median family income (MFI). The project must retain its affordable status for at least 40 years.

Agriculture

The science and art of cultivating the soil; including the allied pursuits of gathering in the crops and rearing livestock; tillage, husbandry, farming.

Agroforestry

A system of land use in which harvestable trees or shrubs are grown among or around crops or on pastureland as a means of preserving or enhancing the productivity of the land.

Alley

A narrow lane or passage, especially one between or behind buildings.

Alternative Daily Cover (ADC)

Material other than earthen material placed on the surface of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging.

Apiary

A place in which a colony or colonies of bees are kept, such as a stand or shed for beehives or a bee house containing a number of beehives.

Appropriate Durability

Designing or selecting products that last only as long as they need to function in the project, and can then be composted or recycled.

Aquaculture

The active cultivation (maintenance or production) of marine and freshwater aquatic organisms (plants and animals) under controlled conditions.

Aquaponics

A sustainable food production system that combines traditional aquaculture (raising aquatic animals such as snails, fish, crayfish, or prawns in tanks) with hydroponics (cultivating plants in water) in a symbiotic environment.

Area of Disturbance

The area of land altered by the project, including land used for construction staging or any construction activities, including tunneling or conveyance.

Authority Having Jurisdiction (AHJ)

The organization, office, or individual responsible for permitting and enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

Baseline Condition

A description of current biotic and abiotic elements of site prior to restoration, including its structural,

functional and compositional attributes and current condition (per Society for Ecological Restoration, SER 2004).

Biomimicry

The imitation of natural biological designs or processes in engineering or invention.

Biomorph

A painted, drawn, or sculptured free form or design suggestive in shape of a living organism, especially an ameba or protozoan. Adjective: Biomorphic.

Biomorphy

The act of creating a biomorph.

Biophilia

The innate, evolutionary connection between human beings and nature and other living organisms.

Biosolids

The nutrient-rich organic material (byproduct) made from the stabilized sewage sludge from a composting toilet, other sewage treatment, or resource recovery facility. Biosolids can typically be recycled as a soil amendment for crops.

Black water

Discharged water containing solid and liquid human wastes from toilets and urinals. Also, called Sewage.

Brownfield

With certain legal exclusions and additions, the term “brownfield site” means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Brownfields are designated as such by the US Environmental Protection Agency (EPA) or equivalent state, county, or other jurisdictional body.

Business as usual (BAU)

Business as usual (BAU) is the baseline reference point for handprinting. In simplest terms, BAU refers to a repeat of past practices from the year before. More formally, it refers to: responding to this year’s external forces with last year’s approach. For companies that sell goods or services, BAU is: responding to this year’s demand, with last year’s products and processes. For projects, BAU is addressing current demands based on typical fixtures, materials, or processes.

Campus

Multiple buildings that are legally bound through ownership or contract and occupy a generally continuous

area of land.

Car Sharing

Any on-demand mode that offers transport to more than one passenger at a time, or that facilitates independence from single occupancy vehicle (SOV) transport, including employer fleet vehicles, shuttle services, pay-as-you-go car sharing programs such as Car to Go or Zipcar, or scooter or bike shares.

Carcinogenic, Mutagenic, Reprotoxic (CMR)

Toxicity classification given to substances that cause or promote cancers, genetic mutations, and/or damage to reproductive systems.

Chain of Custody (COC)

COC certification traces the path of wood from forests through the supply chain, verifying that FSC-certified material is identified and separated from non-certified and non-controlled material as it makes its way from the forest to the market. The COC process ensures every stage of processing, manufacturing, and distribution is FSC certified.

Charitable Donation

An act or instance of presenting something as a gift, grant, or contribution to a charitable entity.

Charitable Entity

All entities (charitable organizations, religious institutions, non-profits, and private foundations) that meet the criteria for tax exemption under US Internal Revenue Code (IRC) 501© (3) and their international equivalents.

Chemical Abstracts Service Registry Numbers (CASRNs)

A unique numerical identifier for nearly every known chemical, compound, or organic substance. as assigned by the Chemical Abstracts Service, a division of the American Chemical Society.

Cisgender

Cisgender refers to an individual whose gender identity aligns with the one associated with the sex assigned to them at birth. For further information regarding gender-based and other identities, visit Outright International or pflag.

Closed-Loop Water Systems

Systems in which all water used on a project is captured, treated, used/reused, and/or released within a designated boundary, such as the Project Area.

Combined Sewer Systems

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial sewage in the same pipe.

Combustion

Any burning or combustion of fossil fuels or wood products.

Commingled Waste

All relevant project waste streams, with the exception of soil and biomass, that are mixed together instead of being separated on site. Commingled waste will need to be separated for re-use, recycling or other processing, and is typically taken to an off-site facility to be sorted into individual waste streams prior to recycling.

Commodity Products

Commodities are homogenous goods that are traded in bulk on a commodity exchange. Commodity prices are subject to supply and demand; and therefore are determined by their market as a whole. These types of products include agricultural goods, lumber, metals and fuels.

Conservation Easement

A deeded transfer of an interest in real property for the purpose of conserving or protecting the land or its resources for future generations. A conservation easement is legally binding and its restrictions are permanent and run with the land, meaning that not only the original owner but all subsequent owners are subject to its terms.

Construction Waste Material

Construction waste material includes all products and materials that are on the site of, purchased for, or used for the project, but not permanently installed in the final project, and may include demolition waste, temporary materials that are disposed of during or at the end of the construction period, and excess materials purchased for but not installed in the project.

Consumables

Non-durable goods that are likely to be used up or depleted quickly. Examples include office supplies, packaging and containers, paper and paper products, batteries, and cleaning products.

Continuous Simulation Model

A stormwater modeling approach that accounts for many sizes and intensities of storms, as well as variation in the time between storms. Typically based on long-term rainfall records rather than synthetic design storms, such models provide a more accurate representation of infiltration, evapotranspiration, and stormwater control measures than other forms of storm modeling.

Contract Manufacturing

A practice of manufacturing products on behalf of a firm or manufacturer that has provided designs, formulas and/or specifications for the purpose of producing a product as determined by contract.

Contract Worker

A person engaged to perform work on a contractual basis that is specified by timeframes and deliverables.

Copy Room

A dedicated room in a school or business containing two or more copy machines, multifunction copiers, large format printers, or similar commercial scale copy or printing equipment.

Core

Core, short for ILFI's Core Green Building Certification, is a simple framework that outlines the 10 best practice achievements (Imperatives) that a building must obtain to be considered a green or sustainable building.

Cradle-to-Gate

Cradle-to-gate refers to a scope (or boundary) of a life cycle assessment. This scope usually represents the life cycle stages from raw material extraction through material processing and product manufacturing, before the product leaves the manufacturer "gate" at the final manufacturing facility or assembly location.

Cradle-to-Grave

Cradle-to-grave refers to a scope (or boundary) of a life cycle assessment. A cradle-to-grave assessment addresses a full product life cycle from resource extraction (cradle) to the end-of-use fate. The use phase and disposal phase of the product are included in this case. Cradle-to-grave assessments are sometimes the basis for environmental product declarations.

Deconstruction

The systematic removal of materials from a project (building and site) for the purpose of salvage, reuse, and/or recycling.

Defined Benefit Pension Plan

Defined benefit plans provide a fixed, pre-established benefit for employees at retirement.

Disadvantaged Business Enterprise (DBE)

DBE is a Federal certification program administered by the US Department of Transportation. The DBE certification applies to for-profit small business concerns where socially and economically disadvantaged individuals own at least a 51% interest and also control management and daily business operations. See https://www.transportation.gov/civil-rights/disadvantaged-business-enterprise for more information.

Disadvantaged Population

Socially or Economically disadvantaged populations include, according to the US Code of Federal Regulations, those who have been subjected to racial or ethnic prejudice or cultural bias within American society because of their identities as members of groups and without regard to their individual qualities and/or socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same or similar line of business who are not socially disadvantaged.

Diverted Materials

Diverted materials are those that are recycled, reused, salvaged, composted. or otherwise diverted from landfills or incineration.

Diverted Waste

All items removed from the project that are then recycled, reused, salvaged, composted, or otherwise diverted from landfills or incineration.

Dune

A sand hill or sand ridge formed by the wind, usually in desert regions or near lakes and oceans.

Durables

Goods that have utility over time, rather than being depleted quickly through use. Examples include appliances, electronic equipment, mobile phones, and furniture.

Ecological Restoration

Any activity whose aim it is to ultimately achieve ecosystem recovery, insofar as possible and relative to an appropriate local Reference Habitat, regardless of the period of time required to achieve the recovery outcome (per Society for Ecological Restoration, International Standards for the Practice of Ecological Restoration).

Embodied Carbon Emissions

The greenhouse gas emissions associated with the raw material extraction, manufacturing and processing, transportation, and installation of a building material.

Energy Needs

All electricity, heating, and cooling requirements, including resilience strategies, of either grid-tied or off-grid systems. Backup generators are excluded.

Energy Use Intensity (EUI)

Energy use intensity expresses a building’s energy use as a function of its size or other characteristics, and

is often expressed as energy (BTUs) per square foot per year.

Environmental Product Declaration (EPD)

A transparent and objective report that communicates what a product is made of and how it impacts the environment across its entire life cycle. EPDs can be completed to various scopes (e.g. product-specific, facility-specific, industry-wide) based on availability of data. EPDs satisfy all of the requirements of relevant Product Category Rules (PCRs) for a given product category or type and follow international standards, including ISO 14044, ISO 14025, ISO 21930 and EN 15804.

Equity

The just and fair inclusion into a society in which all can participate, prosper, and reach their full potential (per PolicyLink's "Equity Manifesto").

Essential Use

The essential use concept is applicable to uses of the most harmful chemicals. In determining whether use of a substance is essential for purposes of its standards and labels, ILFI will consider whether all of the following conditions are met:

- It is necessary for the health, safety, or critical functioning of society,
  AND
- there are no alternatives that are acceptable from the standpoint of environment and health.

Read more about the essential use approach to chemicals management.

Ethnobotanicals

Indigenous plants used by people of a particular culture and region. For ILFI Program Imperatives, ethnobotanicals must be used as food or medicine to count as agriculture.

Evapotranspiration

The process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants. Evapotranspiration is measured as the sum of evaporation and plant transpiration from earth's surface into the atmosphere and is typically reported in millimeters per unit of time (i.e. mm/day).

Existing Historic Community

A community established and occupied before 1945, when the proliferation of suburban areas began.

Facade

The face of a building, especially the primary or front elevation.

Fit-for-Purpose Water

Water of a quality that is appropriate to the use/demand in question – neither over nor under purified.

Floodplain

A flat or nearly flat area of land adjacent to a river or stream that naturally experiences periodic flooding.

Floor Area Ratio (FAR)

The measurement of a building's gross floor area in relation to the size of the lot or parcel the building is located on (FAR = Gross Floor Area / Total Project Area).

Flow Duration Curve

A flow duration curve is a plotted graph of discharge in relation to percentage of time. In the case of stormwater, a flow duration curve shows the rate of runoff in relation to the duration of those rates.

Footprint

Any human impact on a site, usually with negative ecological implication. Note that this is not the same as the building footprint.

(LPC) A measure of negative impacts, generally those caused by either the operations and supply chain of an organization or the production and supply chain for a product.

Forest Stewardship Council (FSC)

An independent, non-profit, membership-led organization that protects forests for future generations and sets standards under which forests and companies are certified. Certification consists of three equally weighted principles — environmental, economic, and social — to ensure balance and the highest level of integrity.

Fractals

A figure or surface generated by successive subdivisions of a simpler polygon or polyhedron, according to some iterative process.

FSC 100%

The Forest Stewardship Council (FSC) 100% – or FSC 100% – label means that the wood within the product comes entirely from FSC-certified, well managed forests. The wood in the product has not been mixed with material of another material category throughout the supply chain.

FSC Mix

The Forest Stewardship Council (FSC) Mix – or FSC Mix – label means the wood within the product is from FSC-certified forests, recycled material, or controlled wood. The FSC Mix label is supplied with a

percentage claim based on the volume of wood in the product.

Full-Time Equivalent (FTE)

The hours worked by one employee on a full-time basis. Used to convert the hours worked by several part-time employees into the number of equivalent full-time employees.

Fully Occupied

To account for vacancy rates, a building is considered to be fully occupied when it is at 85% of full capacity and intended use.

Furniture, Fixtures and Equipment (FF&E)

Furniture, fixtures or other equipment that has no permanent connection to the structure of a building or utilities and is not part of office systems furniture.

Gender Identity

The internal knowledge of one's identity as a particular gender, including but not limited to transgender woman, transgender man, cisgender woman, cisgender man, or of belonging to a non-binary identity such as agender, genderfluid, genderqueer, or others. For further information regarding gender-based and other identities, visit Outright International or pflag.

Geomorphology

The study of the characteristics, origin, and development of landforms.

Greenfield

Land that was not previously developed or polluted.

Greywater

Water discharged from fixtures such as sinks, showers, laundry, drinking fountains, etc., but not including water discharged from toilets and urinals.

Gross Building Area

The sum of all areas on all floors of a building included within the outside faces of its exterior walls, including all vertical penetration areas, areas for circulation, and shaft areas that connect one floor to another. Gross building area also includes structured parking, but does NOT include unenclosed exterior spaces such as decks, patios, or balconies, or exterior surface parking.

Gross Revenue

Gross revenue is a figure that includes all income occurring during a particular time frame, before any expenses are deducted.

Groundwater

Fresh water supply that is located beneath the surface of the ground and is typically of suitable quality for potable and non-potable uses.

H-P Terms

Halogenated Flame Retardants (HFRs)

HFRs include PBDE, TBBPA, HBCD, Deca-BDE, TCPP, TCEP, Dechlorane Plus and other flame retardants with bromine or chlorine.

Handprinting

Handprinting is a compliance pathway that acknowledges the net positive impacts a project can create beyond the boundaries of the project site.

Handprints

Handprints are beneficial changes to environmental and social impacts. They are reported in positive numbers to represent positive impacts, in contrast to so-called footprints, which represent negative impacts. The reference point for the positive contribution is Business As Usual (BAU), which is essentially the typical way of doing something or the way it's been done in the past.

Additional information on handprinting can be found in the Living Product Challenge 2.0 Handbook, and for building project teams, also in the Early Project Guidebook.

Harvest On-Site

The removal of natural products from the project property with the intention to use them in the project.

Hazardous Materials

Materials that have been deemed dangerous or carcinogenic for humans or the environment and/ or materials that exhibit one or more of the following properties: ignitibility, corrosivity, reactivity, or toxicity. Hazardous materials include asbestos, lead paint, or materials producing ionizing radiation, and must be disposed of in a specific manner, in accordance with local regulations.

Hazardous Waste

Waste that includes hazardous materials. Hazardous waste is required to be processed by a hazardous waste facility.

Homogenous Materials

A uniform solid, liquid or gas composed of one or more substances that cannot be mechanically disjointed, in principle. It may be a chemical formulation or compound; a substance of unknown or variable

composition, complex reaction product, or biological material (UVCB); or a combination of the two. Coatings and finishes such as plating, powder coats, enamels, etc., are considered unique homogenous materials" (Clean Production Action, 2015).

Human-Powered Lifestyle

A way of living that relies primarily on the power of human muscles to transport people and goods.

Human Scaled

Human scale is about the experience of a space as a pedestrian, rather than as a motorist. A built environment at human scale is "legible" when one is on foot or up close, and detail and texture can be perceived by sight or touch.

Hydroponics

A subset of hydroculture: a method of growing plants using mineral nutrient solutions, in water, without soil.

Infiltration

The process by which liquids, typically stormwater runoff, flows into and through the subsurface soil.

Ingredient

A discrete chemical, polymer, metal, bio-based material or other substance that exists in the finished product as delivered to site.

In Situ Materials

Existing materials in their original position on a project site that are fit for reuse or will be incapsulated or otherwise covered from view. In-situ materials do not require re-installation and may or may not require refurbishment.

Interior Materials

Permanently installed materials included in the wall, floor, and ceiling finishes of the building. This does not include miscellaneous items or moveable components such as furnishings, fixtures, or equipment.

Invasive Species

A species that is non-native to the ecosystem under consideration and whose presence harms human or ecosystem health.

Just Label

A label for organizations to disclose social equity ratings attained through the Just program.

Just Program

A voluntary disclosure tool and transparency platform for organizations to disclose social equity information.

Just Self-Assessment

A tool to help organizations social equity performance based on the Just program standard. This tool is meant for internal use not for public disclosure like the Just label.

Key Ecosystem Attributes

Broad categories developed as part of restoration standards to assist practitioners with evaluating the degree to which biotic and abiotic properties and functions of an ecosystem are recovering. In the Society for Ecological Restoration (SER) Guidelines. Includes six identified categories: absence of threats, physical conditions, species composition, community structure, ecosystem functionality, and external exchanges. Complexity, self-organization, resilience, and sustainability of ecosystems typically increase with the attainment of these attributes.

Landscape Remnant

A pre-settlement native plant community or a plant community that has survived on a site to the present day.

Landscape Restoration

Reversion of a plant community back to a pre-determined state (such as pre-settlement) through management. Restorations usually involve removing a plant community that has taken over a native ecosystem or remnant and are often supplemented with seeds from plants that are native to the site.

Landscape Succession

The gradual evolution of vegetation toward a more complex and ecologically appropriate state.

Land Trust

A nonprofit organization that, as all or part of its mission, actively works to conserve land by undertaking or assisting in land or conservation easement acquisition, or by its stewardship of such land or easements.

Leachate

The liquid that is leftover after the composting of organic waste.

LGBT Business Enterprise (LGBTBE)

LGBTBE is a certification program administered by the National LGBT Chamber of Commerce (NGLCC) for eligible businesses that are majority-owned by lesbian, gay, bisexual, and transgender (LGBT) individuals. See https://www.nglcc.org/get-certified for more information.

Life Cycle Assessment (LCA)

A method to assess environmental impacts associated with all the stages of a product's life cycle (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair, maintenance, and disposal or recycling). Defined as compliant with the International Organization for Standardization's ISO 14044 standards.

Livestock

Animals kept or raised for food production, including cattle, sheep, bees, and similar animals.

Local

Of, relating to, or characteristic of a particular place: not general or widespread; primarily serving the needs of a particular limited district. ILFI programs may have more delimited definitions (e.g., of certain distances or qualities) articulated in program requirements.

Low Risk Wood

Low risk is defined as a source country with a score of 80 or higher as reported on the The Nature, Economy and People Connected tool, where the country has laws and a low rating for both the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and Protected Sites and Species Sub-categories, and laws in at least 13 additional Sub-categories, including one law in each of the five Legal Categories. Reference tool: https://www.nepcon.org/sourcinghub/timber

Manufacturer

A person or company that makes goods for sale. Items used in manufacture may be raw materials, assemblies or component parts of a larger product.

Manufacturer Location ("Final Facility", "Final Assembly Location")

The final point of assembly, fabrication or manufacture of a system, product or building material.

Materials Construction Budget

The total cost of all permanently installed materials and systems furniture delivered to the site, excluding labor, soft costs and land.

Minority-Owned Business Enterprise (MBE)

MBE is a certification program administered by NWBOC for eligible businesses that are majority-owned by a racial or ethnic minority. See https://www.nwboc.org/basicinfo.html for more information.

Miscellaneous Hardware

Miscellaneous hardware is a single component or very simple assembly, that requires no on-site assembly, often aids in the installation of a larger product or system onsite, and is able to be quickly installed by a

single tradesperson.

Municipal Potable Water

Water supplied by a city or town, or other large- scaled water systems operating at a similar scale to a municipal water system.

National Women Business Owners Corporation (NWBOC)

NWBOC is a third-party business certifying entity that administers certifications such as women-owned business enterprise (WBE), minority-owned business enterprise (MBE), and veteran-owned business enterprise (VBE). See https://www.nwboc.org/ for additional information.

Native Prairies

Diverse ecosystems dominated by grasses and other flowering plants called forbs; for the LBC native prairies can be either “landscape remnants” or “landscape restorations.”

Naturalized Plant

A plant that was introduced, but is established as if native: that is, having established sufficient population size to maintain itself in the environment, but not so abundant that it becomes invasive, dominating the system and outcompeting native species. Invasive plants that endanger native plants or ecosystems, that function without meaningful ecological checks on their abundance, are not considered naturalized for the purposes of the LBC.

Natural Lands Conservation

Natural Lands Conservation seeks the sustainable use of nature by humans, which could allow, for example, extraction of natural resources if done in a manner that permits their persistence for future generations. It includes maintaining diversity of species, genes, and ecosystems, as well as functions of the environment, such as nutrient cycling.

Natural Lands Preservation

Natural Lands Preservation prevents human use of a site for the protection of its biodiversity and the quality of ecosystem functions.

Net Operating Income

Net operating income is the measurement of an organization’s available income once operating expenses have been subtracted from its gross revenues. For the purposes of ILFI programs, this figure excludes debt payments with associated interest and capital expenditures. This figure may not include depreciation, owner draws/owner distribution payments, or equity payments.

Non-binary

The term non-binary is widely used to describe a gender identity that cannot be categorized as either masculine or feminine. Non-binary covers a wide range of gender experience; people identifying as non-binary could experience their gender as a combination of male and female, neither male nor female, or as something completely independent of notions of conventional gender identities. For further information regarding gender-based and other identities, visit Outright International or pflag.

Non-governmental Organization (NGO)

A nonprofit organization that operates independently of any government, typically one whose purpose is to address a social or political issue.

Non-potable Water

Water that does not meet state and federal drinking water standards for human consumption, but is suitable for other low risk uses, such as toilet flushing, irrigation or laundry. The following uses are considered non-potable for purposes of compliance with I06 Net Positive Water: toilet and urinal flushing, landscape irrigation, cooling tower makeup supply, laundry, miscellaneous processes (e.g., equipment washing, dust prevention, etc.)

Oceania

For purposes of ILFI programs, Oceania is defined as Australia, New Zealand, Melanesia, Micronesia, and Polynesia.

Old-Growth Forest

Natural forests that have developed over a long period of time, generally at least 120 years, without experiencing severe, stand-replacing disturbance such as a fire, windstorm, or logging. Ecosystems distinguished by old trees and related structural attributes that may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function.

On-Site Harvest

On-site harvest is the removal of natural products from the project property with the intention to use them in the project.

On-Site Landscape

The planted area not used to comply with the requirements of Imperative 02, Urban Agriculture.

Operational Carbon

The greenhouse gas emissions associated with the operational energy use of a building, or life cycle stage (B6 as defined by EN 15798).

Operational Energy

The energy used during the service life of a structure to power base systems, such as lighting, heating, cooling, and ventilating systems. Operational Energy is differentiated from Process Energy, which is energy used to support a manufacturing, industrial, or commercial process that may be housed in a building.

Operations and Maintenance Manual

A document containing information about the building's various systems, including any ongoing actions the owner or property manager must take to ensure continuous optimization of the building's function and performance.

Part-Time Employment

Part-time employment is ongoing, but for fewer than 30 hours per week.

Performance Period

A continuous 12-month period used for evaluating project performance. The performance period does not have to commence at the beginning of occupancy.

Permaculture

The conscious design and maintenance of agriculturally productive ecosystems that have the diversity, stability, and resilience of natural ecosystems. Permaculture is a philosophy of working with, rather than against, nature; of protracted and thoughtful observation; of looking at plants and animals in all their functions, rather than treating any area as a single-product system.

Persistent Bioaccumulative Toxins (PBTs)

Substances that do not easily break down in nature and tend to accumulate in species. As a result, they may be highly problematic even at low levels of release into the environment, as they bioaccumulate up the food chain leaving top predators with problematic levels of toxins in they bodies and causing irreversible harm.

Polyculture

Agriculture using multiple crops in the same space, in imitation of the diversity of natural ecosystems, and avoiding large stands of single crops, or monoculture.

Portfolio

For the purposes of the Living Building Challenge, a portfolio is multiple buildings that are owned by the same entity, but are spread out through a community or larger area.

Potable Water

Water that is fit for human consumption. In the US, potable water typically meets state and federal drinking

water standards.

Pre-Development Hydrology

The combination of runoff, infiltration, and evapotranspiration rates and volumes that typically existed on a site before human-induced land disturbance occurred.

Previously Developed

A site with existing or historic structures or on-site infrastructure, or a site that has experienced disturbance related to building activity, including monoculture agriculture. Roads built for natural resource extraction (e.g., logging roads or mining areas) do not qualify a site as previously developed.

Primary Dune

A continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

Primary Materials

The permanently installed building components that make up the majority of the structural, foundation and enclosure systems of a building.

Prime Farmland

Land that has been used for agricultural production at some time during the four years prior to the relevant Important Farmland Map date, or in the four years prior to the project, and where the soil meets the physical and chemical criteria for prime farmland or farmland of statewide importance as determined by the USDA Natural Resources Conservation Service (NRCS).

Priority Natural Lands

Priority Natural Lands include Pristine Greenfields, Wilderness, Prime Farmland, the 100-year Floodplain, and Thriving Vibrant Ecological Habitats and Environments.

Pristine Greenfield

Land that has not been impacted by humans and maintains thriving, viable habitat. Land that has not been developed, but has been altered and degraded through ranching, mono-culture agriculture, crowding, pollution or other means is not considered pristine greenfield.

Process Chemical

Process chemicals are defined as chemicals used in the manufacturing process in the final manufacturing facility that come into contact with the product pursuing certification. For example, surfactants, solvents and

lubricants in the product manufacture are to be considered. General cleaning products used in the facility are not included.

Process Energy

Energy consumed to support a manufacturing, industrial, or commercial process. This is in contrast to Operational Energy which is energy used during the service life of a structure to power base systems, such as lighting, heating, cooling, and ventilating systems.

Process Water

Water required to produce the product at the final facility, including but not limited to water used for material production, machine operation, and rinsing.

Product

A finished good composed of one or more homogeneous materials that are in turn made up of chemical substances, or a combination of one or more materials and substance(s), or one or more substances. A product may be made of one or more homogeneous materials. A product may also be organized into parts, which are in turn made up of one or more homogeneous materials. A product may also function as part of another product (Health Product Declaration Collaborative).

Product Category Rules (PCR)

A set of defined rules necessary for developing an Environmental Product Declaration (EPD) for products fulfilling the same function. PCRs follow international standards such as ISO 14025 and enable transparency and comparability between product EPDs.

Product Share Pathway

The Product Share pathway allows a manufacturer to certify a product, or products, that require(s) only a limited fraction of a facility's production capacity. This pathway requires a manufacturer to offset only the impact of the product pursuing certification on-site, when the production of that product accounts for less than 75% of the facility's total output by dollar value or weight. A Product Share of Net Positive Energy, Water and Waste includes all process energy used to make the product as well as its share of facility lighting, heating and cooling. Worker water usage, waste treatment, administrative office energy and water use and facility-wide stormwater management are excluded from the Product Share certification requirements.

Project Area

The entire scope of the project and all areas disturbed by the project work including areas of construction, staging and conveyance, which is typically, but not necessarily, all land within the property line. Project Area must be consistent across all Imperatives.

Project Water Discharge

All water leaving the building or site including stormwater, greywater, and black water.

Public Art

Art displayed for the benefit of the general public.

Q-Z Terms

Reclaimed Water

Reclaimed or recycled water, also referred to as wastewater reuse, water reclamation, or purple pipe, is the process of diverting greywater and/or domestic sewage into a system where it can be used for non-potable applications.

Recycled Materials

Post-industrial or post-consumer materials that have been significantly processed or altered from their previous form before reaching their current form.

Red List

The Red List contains twenty-two classes of harmful and polluting chemicals considered to be the worst in class in the building industry. Each chemical class contains a multitude of individual chemicals, identified by their Chemical Abstract Services Registry Number, or CASRN. Taken together, these classes comprise nearly eight hundred individual ingredients. The Red List is a resource to show manufacturers precisely which ingredients are prohibited from inclusion in Living Buildings.

Reference Habitat

An intact habitat containing similar structure and function as the ecosystem that would have naturally occurred on the site, acknowledging that ecosystems are dynamic, and adapt and evolve over time in response to changing environmental conditions.

Regularly Occupied Space

A space used by a full-time employee, part-time employee, resident, extended period visitor, or any other person for 4 or more hours per day for 2 or more days in a week.

Regular Occupant

A full-time employee, part-time employee, resident, extended period visitor, or any other person who uses a project space for 4 or more hours per day for 2 or more days in a week.

Renewable Energy

Energy generated through passive solar, photovoltaics, solar thermal, wind turbines, water-powered microturbines, direct geothermal or fuel cells powered by hydrogen generated from renewably powered electrolysis. Nuclear energy is not considered renewable for purposes of LBC or Core. Combustion-based sources are also neither renewable nor allowed in LBC/ Core projects without an Exception.

Renewable Energy Certificate (REC)

Renewable Energy Certificates (RECs) are proof that energy has been generated from renewable sources and are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource.

Reprotoxin

Substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may produce or increase the incidence of non-heritable adverse effects in the progeny and/or impairment of male or female reproductive functions or capacity.

Salvaged Materials

Used building materials that can be repurposed wholly in their current form or with slight refurbishment or alterations. Salvaged consumer goods that are reused as building, finish, or furniture at the end of their life may contribute to a project's salvaged count. Salvaged large furniture items or art elements listed in the specifications can count toward salvaged count when the product is being reused as a salvaged material.

Sensitive Ecological Habitat

Habitat that is threatened, endangered, or particularly vulnerable to changes in the local ecology. Examples include, but are not limited to, wetlands, dunes, old-growth forests, and native prairies.

Service-Disabled Veteran-Owned Small Business (SDVOSB)

SDVOSB is a certification program administered by the Government Services Exchange for eligible businesses that are majority-owned by veteran US citizens. See Government Services Exchange for more information.

Sewage

Sometimes called "black water," sewage is discharged water containing solid and human wastes from toilets, urinals and sometimes sinks.

Single-Event Models

Single-event stormwater models are limited to a single design storm event, e.g., a 50-year storm. They are typically used to estimate the expected volume, rate, or quality of stormwater, to design best management practices and hydraulic structures, and to evaluate the effectiveness of water quality treatment of

stormwater control measures.

Small Mechanical Component

Part of a complex mechanical product composed of at least 10 parts that is no more than 10% of the total product assembly by weight and volume.

Smoking

Smoking is generally defined as inhaling and exhaling the fumes of burning plant material. For purposes of ILFI requirements, smoking includes combustion of tobacco, cannabis, and controlled substances, and generation of emissions produced by electronic smoking devices.

Social Handprints

Beneficial changes to social impacts (also see Handprints).

Stormwater

Precipitation that falls on the ground surfaces of a property.

Stormwater Detention

Stormwater detention is an area where stormwater is temporarily stored, or detained, and is eventually allowed to drain slowly when water levels recede in the receiving channel.

Stormwater Retention

Stormwater retention holds, or retains, stormwater. With the exception of the water lost to evaporation and to absorption by the soil, retention infrastructure is able to store water for indefinite periods.

Stormwater Runoff

Stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground.

Structured Parking

Parking that has at least one level of vehicles not at grade; either elevated, underground, or under a building or other space built to be occupied by humans.

Surplus Materials

Excess materials available as a result of unintentional over-purchasing or incorrect specifications that are available for installation on a separate project.

Systems Furniture

A modular furniture system that might include work surfaces, cabinetry, file systems, and flexible partitions to create or furnish a series of office workspaces.

Thriving Vibrant Ecological Environments and Habitats

For purposes of the LBC and Core standards, “thriving, vibrant ecological environments and habitats” are one class of Priority Natural Land which includes places with high-quality or important ecological function, and/or critical ecology, that may not meet the definition of wilderness or pristine greenfield. Also see guidance under Ecological Clarifications in Ecology of Place.

Total Site Area

The area of land in the Project Area, minus any sensitive ecological areas.

Transgender

Transgender refers to those whose gender identity does not align with the sex or gender ascribed at birth. For further information regarding gender-based and other identities, visit Outright International or pflag.

Transit

Formal or informal multi-rider service that travels between regular, designated stops. Single-occupancy ride-hailing services are not considered transit.

Vernacular

Elements that are of, relating to, or characteristic of a period, place, or group. Domestic, native architecture, or other anthropogenic environments, giving a sense of belonging that is unique to the locality.

Volatile Organic Compound

A volatile organic compound (VOC) is any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. As gases, VOCs are emitted into the air from products or processes and are often harmful to human health and to the environment by themselves, as well as by reacting with other gases to form other air pollutants after they are in the air.

Water Balance

A numerical account of how much water enters and leaves a set boundary over a specified period.

Wetlands

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar

areas.

Whole Facility Pathway

When the dollar value of the output of Living Product(s) exceeds 75% of the dollar value or weight of the facility's total output, a manufacturer must pursue the Whole Facility compliance path, which requires that the entire manufacturing facility meet the on-site requirements of LPC. Whole Facility compliance simplifies the certification process since Product Share of impact does not need to be calculated for each product individually. Every product produced at a facility that has pursued the Whole Facility path will be understood to be Net Positive within LPC for Energy, Water and Waste.

Wilderness

A wild and uncultivated region, as of forest or desert, largely undisturbed by human activity, that retains ecological functions and biodiversity characteristic of the ecosystem in its natural state; and/or a tract of land officially designated as wilderness and protected by the U.S. government. Within this definition, traditional practices of indigenous communities are not considered disturbance.

Women-Owned Business Enterprise (WBE)

WBE is a certification program administered by NWBOC for eligible businesses that are majority-owned by women. See https://www.nwboc.org/basicinfo.html for more information.

Wood Containing Product

Any product containing wood at greater than or equal to 5-10% by weight or characterized by obvious visual wood components. The wood portion of wood-containing products must be included in FSC wood calculations.

Worker Cooperative

A worker cooperative, also known as a cooperative-based organization, is an enterprise that involves one or more classes of membership, in which worker members participate in the profits, oversight, and often management of the enterprise using democratic practices, and in which there are clear criteria for becoming a worker-owner.

Working Port

A harbor town or city where ships may take on or discharge cargo.

Summary of Changes

The LPC Petal Handbooks are updated quarterly to reflect new Clarifications and Exceptions resulting from Dialogue posts, add clarifying text, tables or graphics, and make other amendments or additions that improve the clarity and content of the Guide. Quarterly updates will occur in January, April, July, and October of each year, at which time these Petal Handbooks will be revised and the cover page time stamped with the latest revision date. See Previous Versions of the Handbooks in the Table of Contents for a link to download PDFs of previous versions.

At each update, a summary of the substantive changes is provided here.

July 2023 Updates

Changes to the Health and Happiness Petal (Q2 2023)

July 2023

I08 Red List (Core)

EXCEPTIONS

- RL-024 Added an exception addressing chemical substitution that leads to product failures

DOCUMENTATION REQUIREMENTS

- I08 Exception Documentation
    - Modified Exception Documentation to reflect requirements for new exception RL-024

January 2023 Updates

Changes to the Introduction (Q4 2022)

January 2023

ADDITIONAL TOOLS AND RESOURCES

- LFA Accreditation
    - Removed mention of 2-year limit on LFA accreditation.

- Ambassador Network
    - Removed mention of the Ambassador Network in accordance with current volunteer opportunities.

Changes to the Place Petal (Q4 2022)

January 2023

No changes were made to the Place in the January 2023 update.

Changes to the Water Petal (Q4 2022)

January 2023

No changes were made to the Water Petal in the January 2023 update.

Changes to the Energy Petal (Q4 2022)

January 2023

No changes were made to the Energy Petal in the January 2023 update.

Changes to the Health and Happiness Petal (Q4 2022)

January 2023

I08 Red List (Core)

DOCUMENTATION REQUIREMENTS

- I08-3 Packaging Documentation
    - Removed requirement for the manufacturer letter to state that product packaging does not pose a threat to marine, bird, or animal life.

Changes to the Materials Petal (Q4 2022)

January 2023

No changes were made to the Materials Petal in the January 2023 update.

Changes to the Equity Petal (Q4 2022)

January 2023

No changes were made to the Equity Petal in the January 2023 update.

Changes to the Beauty Petal (Q4 2022)

January 2023

No changes were made to the Beauty Petal in the January 2023 update.

Changes to the Handprinting Guide (Q4 2022)

January 2023

No changes were made to the Handprinting Guide in the January 2023 update.

Changes to the Transparent Material Health Guide (Q4 2022)

January 2023

No changes were made to the Transparent Material Health Guide in the January 2023 update.

Changes to the Glossary (Q4 2022)

January 2023

No changes were made to the Glossary in the January 2023 update.

April 2022 Updates

This summary lists, by Petal and Guide heading, the April 2022 updates to the LPC Petal Handbooks originally published between July of 2021 and March of 2022. Corrections made throughout for grammar, punctuation, nomenclature, typos, and links are not included.

Changes to the Introduction (Q1 2022)

April 2022
Corrections made as needed throughout for grammar, punctuation, nomenclature, typos, and links.

LPC RESOURCES

- Upload updated version of the LPC 2.0 Documentation Requirements spreadsheet

Changes to the Place Petal (Q1 2022)

April 2022
Corrections made as needed throughout for grammar, punctuation, nomenclature, typos, and links.

I01 Responsible Place (Core)

No changes were made to I01 Responsible Place in the April 2022 update.

I02 Habitat Exchange

No changes were made to I02 Habitat Exchange in the April 2022 update.

I03 Living Economy Sourcing

No changes were made to I03 Living Economy Sourcing in the April 2022 update.

Changes to the Water Petal (Q1 2022)

April 2022

I04 Water Footprint (Core)

No changes were made to I04 Water Footprint in the April 2022 update.

I05 Net Positive Water

No changes were made to I05 Net Positive Water in the April 2022 update.

Changes to the Energy Petal (Q1 2022)

April 2022

I06 Energy Footprint (Core)

No changes were made to I06 Energy Footprint in the April 2022 update.

I07 Net Positive Energy

No changes were made to I07 Net Positive Energy in the April 2022 update.

Changes to the Health and Happiness Petal (Q1 2022)

April 2022
Corrections made as needed throughout for grammar, punctuation, nomenclature, typos, and links.

I08 Red List (Core)

APPROVED DECLARE STATUSES IN LPC

- Addition of section “Declare Status Requirements and Annual Red List Updates” to clarify the relationship between annual Red List updates and compliance to LPC requirements to annually maintain an active Declare label

RL-002b SMALL ELECTRICAL COMPONENTS

- Update of Exception name from “RL-002 Small Electrical Components” to “RL-002b Small Electrical Components”
- Update of Exception Documentation Table to add documentation requirements for RL-002b Small Electrical Components

I09 Transparent Material Health

PUBLICLY AVAILABLE REPORTS

- Update of Transparent Material Health Report template graphic

I10 Human Thriving

No changes were made to I10 Human Thriving in the April 2022 update.

Changes to the Materials Petal (Q1 2022)

April 2022
Corrections made as needed throughout for grammar, punctuation, nomenclature, typos, and links.

I11 Responsible Industry (Core)

IMPERATIVE OVERVIEW

- Edit to update name of reference standard to Natural Stone Sustainability Standard (ANSI/NSI 373)

DOCUMENTATION REQUIREMENTS

- Edit to documentation requirements for products that use potential conflict minerals to clarify that supplier completion of a Risk Readiness Assessment is required for products that use minerals and metals that may be considered conflict minerals or metals but do not have an applicable RMAP Standard for smelters and refiners
- Edit to update name of reference standard to Natural Stone Sustainability Standard (ANSI/NSI 373)

RESOURCES

- Edit to update name of reference standard to Natural Stone Sustainability Standard (ANSI/NSI 373)

I12 Regenerative Materials

No changes were made to I12 Regenerative Materials in the April 2022 update.

I13 Net Positive Waste

No changes were made to I13 Net Positive Waste in the April 2022 update.

I14 Net Positive Carbon

No changes were made to I14 Net Positive Carbon in the April 2022 update.

Changes to the Equity Petal (Q1 2022)

April 2022

I15 Ethical Supply Chain (Core)

No changes were made to I15 Ethical Supply Chain in the April 2022 update.

I16 Equitable Investment

No changes were made to I16 Equitable Investment in the April 2022 update.

I17 Just Organizations

No changes were made to I17 Just Organizations in the April 2022 update.

I18 Social Co-Benefits

No changes were made to I18 Social Co-Benefits in the April 2022 update.

Changes to the Beauty Petal (Q1 2022)

April 2022

I19 Inspiration and Education (Core)

No changes were made to I19 Inspiration and Education in the April 2022 update.

I20 Beauty and Spirit

No changes were made to I20 Beauty and Spirit in the April 2022 update.

Changes to the Handprinting Guide (Q1 2022)

April 2022

No changes were made to the Handprinting Guide in the April 2022 update.

Changes to the Transparent Material Health

Guide (Q1 2022)

April 2022

No changes were made to the Transparent Material Health Guide in the April 2022 update.

Changes to the Glossary (Q1 2022)

April 2022

No changes were made to the Glossary in the April 2022 update.

July 2021 Updates

This summary lists, by Petal and Guide heading, the July 2021 updates to the LPC Petal Handbooks originally published between October and December of 2020. Corrections made throughout for grammar, punctuation, nomenclature, typos, and links are not included.

Changes to the Introduction (Q2 2021)

July 2021

In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

LPC RESOURCES

- Add Product Life Database resource

Changes to the Place Petal (Q2 2021)

July 2021
In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

I01 Responsible Place (Core)

No changes.

I02 Habitat Exchange

IMPERATIVE OVERVIEW

- Requirements
    - Edit to remove reference to the Living Future Habitat Exchange Program, which is suspended at this time

CLARIFICATIONS

- Edit to remove sub-heading, “Living Future Habitat Exchange Program”

DOCUMENTATION REQUIREMENTS

- Basic Documentation
    - Edit to remove reference to Living Future Habitat Exchange program in I02-3 Receipt

I03 Living Economy Sourcing

No changes.

Changes to the Water Petal (Q2 2021)

July 2021

I04 Water Footprint (Core)

No changes.

I05 Net Positive Water

No changes.

Changes to the Energy Petal (Q2 2021)

July 2021

In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

I06 Energy Footprint (Core)

DOCUMENTATION REQUIREMENTS

- Life Cycle Requirements
  - Update I04-5 Industry Average, previously I04-5 Energy Footprint, with additional information regarding the Industry Average calculations

I07 Net Positive Energy

No changes.

Changes to the Health and Happiness Petal (Q2 2021)

July 2021

In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

I11 Responsible Industry (Core)

No changes.

I12 Regenerative Materials

DOCUMENTATION REQUIREMENTS

- Basic Documentation
  - Add link to Product Life Database in I12-2 Durability Statement

I13 Net Positive Waste

No changes.

I14 Net Positive Carbon

No changes.

Changes to the Materials Petal (Q2 2021)

July 2021

I08 Red List (Core)

No changes.

I09 Transparent Material Health

No changes.

I10 Human Thriving

No changes.

Changes to the Equity Petal (Q2 2021)

July 2021

In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

I15 Ethical Supply Chain (Core)

No changes.

I16 Equitable Investment

DOCUMENTATION REQUIREMENTS

- Update calculation basis to ¼ cent per dollar of gross profit, instead of gross revenue

I17 Just Organizations

No changes.

I18 Social Co-Benefits

No changes.

Changes to the Beauty Petal (Q2 2021)

July 2021

I19 Inspiration and Education (Core)

No changes.

I20 Beauty and Spirit

No changes.

Changes to the Handprinting Guide (Q2 2021)

July 2021

No changes.

Changes to the Transparent Material Health Guide (Q2 2021)

July 2021

No changes.

Changes to the Glossary (Q2 2021)

July 2021

No changes.

April 2021 Updates

This summary lists, by Petal and Guide heading, the April 2021 updates to the LPC Petal Handbooks originally published between October and December of 2020. Corrections made throughout for grammar, punctuation, nomenclature, typos, and links are not included.

Changes to the Introduction (Q1 2021)

April 2021
In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

LPC RESOURCES

- New heading: “Declare Dialogue”
    - Addition of information on the intended function of, and how to submit to, the Dialogue

Changes to the Place Petal (Q1 2021)

April 2021

I01 Responsible Place (Core)

No changes.

I02 Habitat Exchange

No changes.

I03 Living Economy Sourcing

No changes.

Changes to the Water Petal (Q1 2021)

April 2021
In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

I04 Water Footprint (Core)

DOCUMENTATION REQUIREMENTS

- Clarification that products pursuing the Product Share pathway and do not require on-site water inputs are exempt from all Basic Documentation Requirements (i.e. I04-1, I04-2, I04-3, and I04-4)
- I04-3 On-Site Effluent Treatment Documentation

- Clarification that potential Red List substances used in manufacturing of the product should be identified, and that on-site water testing and treatment methods for industrial water should be documented and described, rather than simply identified

I05 Net Positive Water

No changes.

Changes to the Energy Petal (Q1 2021)

April 2021
In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

I06 Energy Footprint (Core)

No changes.

I07 Net Positive Energy

CLARIFICATIONS

- On-Site vs. Life Cycle Net Positive
  - Updated to correct clarifications regarding energy that previously referred to water

Changes to the Health and Happiness Petal (Q1 2021)

April 2021
In addition to the following, corrections made throughout for grammar, punctuation, nomenclature, typos, and links.

I08 Red List (Core)

EXCEPTIONS
New

- RL-002 Small Electrical Components
  - Restored existing exception that had been inadvertently removed in January 2021 update.

I09 Transparent Material Health

No changes.

I10 Human Thriving

DOCUMENTATION REQUIREMENTS

- Restored I10 Exception Documentation Requirements Table
- Renumbered I10-6 IAQ Testing and I10-7 Facility Ventilation Calculation

Changes to the Materials Petal (Q1 2021)

April 2021

I11 Responsible Industry (Core)

No changes.

I12 Regenerative Materials

No changes.

I13 Net Positive Waste

No changes.

I14 Net Positive Carbon

No changes.

Changes to the Equity Petal (Q1 2021)

April 2021

I15 Ethical Supply Chain (Core)

No changes.

I16 Equitable Investment

No changes.

I17 Just Organizations

No changes.

I18 Social Co-Benefits

No changes.

Changes to the Beauty Petal (Q1 2021)

April 2021

I19 Inspiration and Education (Core)

No changes.

I20 Beauty and Spirit

No changes.

Changes to the Handprinting Guide (Q1 2021)

April 2021

No changes.

Changes to the Transparent Material Health Guide (Q1 2021)

April 2021

No changes.

Changes to the Glossary (Q1 2021)

April 2021

No changes.

Previous Versions of the Handbooks

LPC 2.0 Petal Handbooks

January 2023
April 2022
April 2021
July 2021
January 2021