LCA, FOOTPRINTS & HANDPRINTS

Greg Norris, Chief Scientist
How LCA Developed, Part 1

The motivating question: what are the comparative impacts of alternative product systems?

To answer, we ask: how is it made or used, and what are the impacts of those processes?
A different motivating question:
What is the impact of our presence?
SUSTAINABILITY

“Meet the needs of the present generation without compromising the ability of future generations to meet their own needs”

- Brundtland Commission, 1987
SUSTAINABILITY

Meet our needs (and desires) in ways that don’t harm the planet or other people.
What is a Footprint?

For a product: All the negative impacts of all the processes needed to make something.

Products have footprints
Services have footprints
People have footprints
Organizations have footprints
THE GREENHOUSE GAS PROTOCOL

SCOPE 1 DIRECT
- COMPANY FACILITIES
- COMPANY VEHICLES

SCOPE 2 INDIRECT
- PURCHASED GOODS & SERVICES
- CAPITAL GOODS
- FUEL & ENERGY RELATED ACTIVITIES
- TRANSPORTATION & DISTRIBUTION
- BUSINESS TRAVEL
- WASTE

SCOPE 3 INDIRECT
- PURCHASED ELECTRICITY, STEAM, HEATING AND COOLING FOR OWN USE
- LEASED ASSETS
- EMPLOYEE COMMUTING

GRAPHIC SOURCE: IMAGE ADAPTED FROM WRI / WBCSD: GREENHOUSE GAS PROTOCOL
HTTP://WWW.GHGPROTOCOL.ORG
ALL ICONS FROM NOUNPROJECT.COM
SUSTAINABILITY
Shrink your footprint

Flickr: chuddlesworth
But Every Product Has Many Footprints
The planet would be better off without me?
To be NetPositive, we need to Give more than we Take
WHAT DO WE TAKE?

Person: What is required to sustain you
Organization: What is required to enable you to offer what you offer to the world
Product: What is required to offer it to the world
WHAT DO WE GIVE?
Handprints Defined
Handprints are positive impacts we cause to happen relative to “business as usual.”
Handprints are defined in relation to Footprints, so that:
[Handprint > Footprint] → NetPositive

- Built on LCA using the same metrics as Footprints
- Same Impact Dimensions: Supply Chains and Life Cycles
Handprinting in Depth

- How to create handprints
- Relationships between Footprints and Handprints
- Footprints and Shared Responsibility
- Handprints and Shared Credit
3 ways to create Handprints
Step 1: **Reduce your own footprint:**

- Reformulate/redesign your good or service
- Switch suppliers, or promote innovation in your supply chain
- Green your own production operations
We’ve constrained
The good we can do
by the harm we’re now causing

Your footprint

Humanity's Footprint
Step 2: Help anyone/everyone else reduce their footprint

Make your product more efficient for others to use

Engage/inform/inspire users to use more wisely

Share innovations or research

Grow demand for NetPositive goods and services
Step 3: Think outside the foot!

Take generative actions:

Plant a tree

Protect or restore habitat or other ecosystems

Promote healing, health, and human development
With NetPositive, it’s Not a Not

Your footprint remains in the limelight and shares it with your handprint.
Footprints

Consumption as the causal linkage
Purchased inputs
Other consumption

Shared Responsibility
Handprints

All causal linkages matter (not just consumption)

Co-causation of change

Co-causation (it happened in part because…)
(it wouldn’t have happened otherwise)

Shared Credit among co-causes
HANDPRINTING EXAMPLES
Innovating around an Existing Product

Innovating Existing Product (demand unchanged)

Shifting Demand (product performance unchanged)

Innovating in ways that also change demand
Welcome to the Handprint Calculator!
Use this tool to help you organize, evaluate, compare and communicate your handprinting opportunities.

Handprints are positive impacts that we cause to happen, relative to business as usual. They are based on life cycle assessment (LCA), just like footprints. And they can be compared with footprints (the unintentional negative impacts caused by producing a product or sustaining a person or organization) in order to guide the achievement of NetPositive sustainability. When your handprint is bigger than your footprint, you give more than you take, and you are NetPositive.

This tool is currently tailored to assessing the handprints caused by innovations which occur somewhere in the life cycle of a product. It allows you to upload LCA results for the product before and after the handprint-creating innovation or action. And it allows you to assess the impacts of multiple innovations, one at a time – and to compare their impacts. You can set the Impact Categories to match the life cycle impact assessment method you use. If you need support in doing an LCA of your product, please contact us.

The results buttons allow you assess the timing of your handprints in one of two ways. Sales-based results assign the (life cycle) impacts of an innovation to the year in which the innovated product was sold. Impact year-based results take the timing of the actual impacts explicitly into account, so that for example the benefits of energy efficiency occurring in the 10th year of a product’s life occur 10 years after it was sold.

http://www.lumina.com/handprint/
### Innovations

<table>
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<tr>
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<th>First Year Selling</th>
<th>Product Life</th>
<th>Innovation-Relative</th>
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<tr>
<td>Transmission</td>
<td>2014</td>
<td>10</td>
<td>5</td>
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<tr>
<td>Water Heater Blankets</td>
<td>2015</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Toilet</td>
<td>2015</td>
<td>20</td>
<td>5</td>
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<tr>
<td>Pasta Meal</td>
<td>2015</td>
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### Sales Year

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<td>16.53K</td>
<td>18.97K</td>
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<td>57.6K</td>
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<td>10.5K</td>
<td>11K</td>
<td>11.5K</td>
<td>12K</td>
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<td>Pasta Meal</td>
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<td>20K</td>
<td>21K</td>
<td>22K</td>
<td>23K</td>
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<td>Impact Category</td>
<td>Pre-innovation Upstream</td>
<td>Pr...</td>
<td>Pre-innovation Use...</td>
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<td>Acidification (kg SO2 eq)</td>
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<td>Ecotoxicity (CTUe)</td>
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<td>232.2K</td>
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<td>Human Health - Carcinogens (...</td>
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<td>Human Health - Non-Carcinogens (...</td>
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<td>3.899m</td>
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<td>Ozone Depletion (kg CFC-11 eq)</td>
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<td>Photochem. Ozone (smog) (kg ...</td>
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<td>31.85K</td>
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<td>Resource Depletion (MJ surplus)</td>
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<td>Water Consumption (kg)</td>
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<td>89.01K</td>
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Catalyzing Systemic Handprints

We’ve come to realize that
“Just doing our own bit” won’t cut it.
I can check and properly inflate my tires. This will reduce my carbon footprint by 1%.
Scale by 100

Get 5 friends to join me with gauges and pumps at a supermarket parking lot one afternoon.
Scale by… 1000?

Hand the lucky drivers a card about handprinting, encouraging them to do their own “pump day.”
Scale by a mind-boggling amount

If Handprinter.org has a crowd-sourced, crowd-assessed database of action ideas, and humanity is striving for NetPositive.
Ripple effect example
Handprinting for Architects and Engineers

What is the impact of your presence?

1) Of course, your footprint
2) Now, what do you give to the world?
   • Changing your BAU
   • Changing BAU footprints for the occupants of buildings and communities that you design
   • Creating ripple effects in the profession, and in the lives of the people you touch
LIVING PRODUCT CHALLENGE™
1.0
A Visionary Path to a Regenerative Future
<table>
<thead>
<tr>
<th>PETAL</th>
<th>IMPERATIVE CERTIFICATION*</th>
<th>IMPERATIVE</th>
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<tbody>
<tr>
<td>PLACE</td>
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<td>01. RESPONSIBLE PLACE AND HABITAT IMPACTS</td>
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<td></td>
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<td>02. HABITAT EXCHANGE</td>
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<tr>
<td>WATER</td>
<td></td>
<td>03. NET POSITIVE WATER</td>
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<tr>
<td>ENERGY</td>
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<td>04. NET POSITIVE ENERGY</td>
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<tr>
<td>HEALTH &amp; HAPPINESS</td>
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<td>05. NET POSITIVE MATERIAL HEALTH</td>
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<td>CORE IMPERATIVE</td>
<td>06. HUMAN THRIVING</td>
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<td>MATERIALS</td>
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<td>07. RED LIST</td>
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<td>CORE IMPERATIVE</td>
<td>08. LIVING ECONOMY SOURCING</td>
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<td>CORE IMPERATIVE</td>
<td>09. RESPONSIBLE INDUSTRY</td>
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<td>10. NET POSITIVE CLIMATE</td>
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<td>11. NET POSITIVE WASTE</td>
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<tr>
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<td>12. PRODUCT FIT TO USE</td>
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<td>13. USEFUL LIFE DISPOSAL</td>
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<td>EQUITY</td>
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<td>14. EQUITABLE PRODUCT ACCESS</td>
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<td>15. RESPONSIBLE CO-PRODUCTS</td>
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<td></td>
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<td>16. EQUITABLE INVESTMENT</td>
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<td>17. JUST ORGANIZATIONS</td>
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<td>BEAUTY</td>
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<td>18. POSITIVE HANDPRINTING</td>
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<td>19. BEAUTY + SPIRIT</td>
</tr>
<tr>
<td></td>
<td>CORE IMPERATIVE</td>
<td>20. INSPIRATION + EDUCATION</td>
</tr>
</tbody>
</table>

*Petal Certification requires the achievement of at least three of the seven Petals, one of which must be Water, Energy or Materials and the four Core Imperatives.
<table>
<thead>
<tr>
<th><strong>IMPERATIVE CERTIFICATION</strong></th>
<th><strong>PETAL CERTIFICATION</strong></th>
<th><strong>FULL CERTIFICATION</strong></th>
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</thead>
<tbody>
<tr>
<td>7 Imperatives</td>
<td>3 Petals, one of which must be Energy, Water or Materials</td>
<td>All Imperatives are Mandatory</td>
</tr>
<tr>
<td>Including 4 Core Imperatives</td>
<td>+ include 4 Core Imperatives</td>
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Free Download on LPC Website

Detailed explanation of Handprinting Imperatives

Case Studies

Updates / expansions
Handprint: A New Framework for Sustainability

In: Corporate Sustainability and Health (SHINE)
105% of the energy used to produce the product in its final form must be generated from on-site renewable energy on a net annual basis.

The manufacturer must use the Institute's footprint calculator to assess and document the energy footprint of producing the product, and identify the five processes that make the largest contributions to the product’s cradle-to-gate energy footprint. The footprint assessment can alternatively be based on a Life Cycle Analysis (LCA) for the product, performed by or for the manufacturer; the LCA should follow the ISO 14044 standard for a Life Cycle Assessment being used in a third-party communication.

The manufacturer must develop and publicly share a three-year plan to reduce the product’s energy footprint and create an energy handprint greater than the footprint through one or more of the following strategies:

- Innovate to conserve energy or generate renewable energy across the life cycle of the product.
- Innovate within supply chains to conserve energy or generate renewable energy in the supply chain.
- Engage with users to achieve energy conservation through improved use of the product.
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- Engage with users to achieve energy conservation through improved use of the product.
HANDPRINTING EXAMPLE
New Product, Start-up
Humans dump 8 MILLION tons of plastic in the ocean each year.

Fishing nets = 10% of that waste

News.NationalGeographic.com
EVERY BOARD ≈ 300 FT OF FISH NETS

49,620sf recycled so far
Bureo Net+Positiva
A net positive solution to prevent ocean plastics

Net Collection
Discarded nets are collected to prevent a harmful form of ocean plastics by working directly with low-income fishing communities to create jobs and improve waste management.

Efficient Operations
Nets are recycled in Santiago through a zero solid waste process which results in an estimated 70% reduction in greenhouse gas emissions in comparison to virgin plastics.

Premium Products
Premium products are manufactured to ensure a long life where they can then be returned to be recycled again for a fully closed loop system.

Community Empowerment
A portion of the funds from the sale of each product are used to support coastal communities that are most affected by these forms of waste for a truly net positive impact.
**BUREO**

**HOW WE MAKE WAVES**

**NET+POSITIVA**
- Bureo’s initiative is Chile’s 1st fishnet collection and recycling program.

**CLEANER OCEANS**
- Discarded fishing gear makes up an estimated 10% of the oceans’ plastic pollution and is extremely harmful to marine mammals.

**SUPPORT AND FUNDS**

**EFFICIENT OPERATIONS**
- Nets are transported to recycling facility in empty returning dead-head trucks.
- Using recycled fishnets results in more than a 70% reduction in greenhouse gas emissions compared to virgin plastics.

**PREMIUM RIDE**
- Skateboards are paired with industry-leading components, including 30% veggie oil wheels.

**RIDE YOUR FOOTPRINT**
- Each board supports net positive and prevents over 30 square feet of harmful fishing net waste from entering our oceans.

**BE A PART OF THE BUREO STORY AND SUPPORT POSITIVE SOLUTIONS FOR PLASTIC-FREE OCEANS**
Two Handprinting Actions:

100% Recycled Content

Energy Efficient Manufacturing
More from you