URBAN IMPACT & SUSTAINABILITY REPORT

2023

Issue 06

ONCE A CHOPSTICK - NOW A STATEMENT

Certified B Corporation

Contents

1.1 About This Report

We lead by example with sustainable practices while being accurate and transparent about our environmental footprint.

Motivation

At ChopValue, we firmly believe that prioritizing social and environmental impact can coexist harmoniously with business profitability. Our commitment is to exemplify the viability of this business model through our own actions. We aim to be a leader in sustainable practices while being accurate and transparent about our environmental footprint, and hope to inspire others to do the same. In the spirit of transparency, we will strive to quantify and report our environmental performance on an annual basis.

This Urban Impact Assessment 6.0 marks the sixth report published by ChopValue. To the best of our knowledge, the technical content in this report is accurate and has been obtained from valid sources. In the absence of valid data, conservative assumptions have been made and are acknowledged throughout this report.

The purpose of this assessment is to evaluate the company's environmental impact for the current year.

This Urban Impact Assessment 6.0 investigates the environmental performance of ChopValue by evaluating the impact of the current operations including the process of sourcing raw materials, manufacturing these raw materials and products, and distributing the final products.

As we outgrow our current operations, there is a need for expansion of the company's manufacturing operations. Motivated by a desire to reduce our environmental footprint, we have made a conscious decision to expand our operations through the establishment of global Microfactories. This manufacturing system, known as distributed manufacturing, has several advantages over conventional centralized manufacturing processes, including a reduced environmental footprint coupled with increased profitability and simpler logistics.

In this impact assessment, the environmental impact of a distributed manufacturing process will be compared to that of a hypothetical centralized manufacturing system, in order to be transparent of our decision-making process. We are demonstrating that a desire to reduce environmental impact can be a motivation rather than a hindrance to good business and profitability.

One of our fundamental values at ChopValue is to create a positive impact – not only environmentally, but also socially. With the creation of local Microfactories at various locations globally, ChopValue can create new opportunities for the employment of young professionals in trades, which we believe is an important appreciation of hands-on work in the modern urban society. Additionally, the collaboration with local restaurants and partners in collecting chopsticks fosters a strong community engagement in recycling initiatives. As we expand our Microfactory network, we aim to raise awareness and educate each local community about the importance of the circular economy.

We work hard to create awareness about the viability of a circular economy. Our motivation is to create real career opportunities for young professionals in trades who can be proud to be part of positive change.

1.2 Our Commitments

Certified B Corporation

111 ChopValue Overall B Impact Score

80 Qualifies for B Corp Certification
50.9 Median Score for Ordinary Businesses

Our team's continuous commitment to redefine the term "waste" to "resource" has paved the way for our achievement of 'Best For The World: Top 5% in the Environment category' in our first year of certifying as a B Corp in 2021.

We will be working to re-certify in 2024 with the goal of continuously improving our efforts in each of the areas: Governance, Environment, Community, Workers, and Customers.

Governance

- Commitment to a specific positive environmental impact (e.g. reducing waste sent to landfills through upcycled products).
- Strong governance structures and metrics.
- Ethics and transparency.

Environment

- Environmental business model to promote the circular economy.
- Direct impact on resource conservation.
- Monitoring of Scopes 1, 2 and 3.
- Sourcing of raw material from local partners.

Community

- Community impact oriented business model.
- Diversity, Equity and Inclusion.
- Economic impact: local ownership and sourcing.

Workers

- Career development and training opportunities.
- Internal policies and best practices.
- Health, wellness and safety.

Customers

- Customer stewardship.
- Quality assurance.
- Economic impact: local ownership and sourcing.

1.2 Our Commitments

Our company-wide environmental and social initiatives area motivated by the United Nations Sustainable Development Goals (SDGs).

Sustainable Cities & Communities

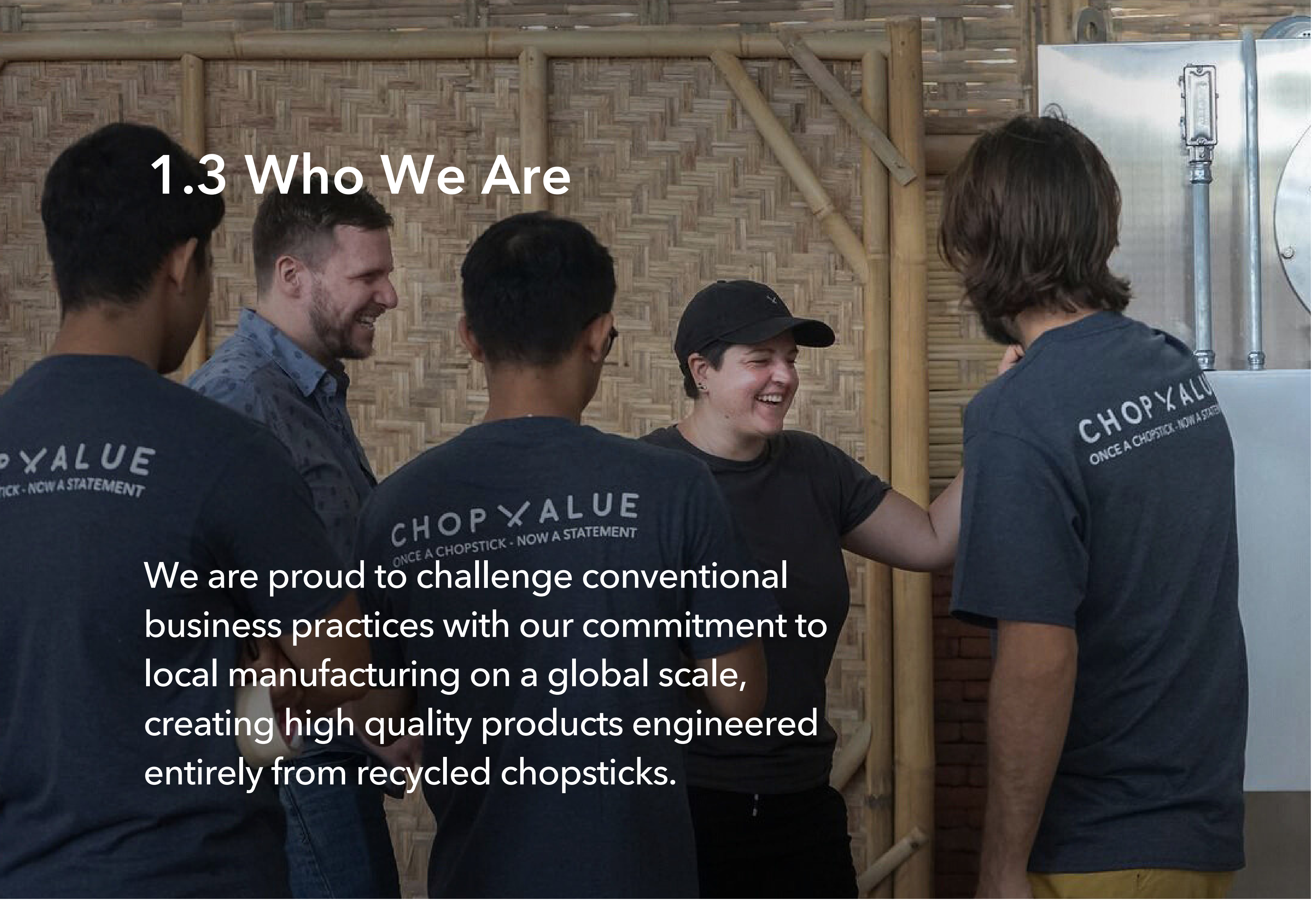
Our corporate office and our global Microfactories provide a platform to engage the local community in sustainable environmental practices by reutilizing waste. Collecting used chopsticks from local partners allows ChopValue to educate the community on the circular economy.

Responsible Consumption and Production

ChopValue actively promotes responsible consumption and production through empowering local communities to manufacture products from used chopsticks. Through our distributed Microfactories in different cities, the company is able to encourage more responsible consumption of circular products.

Climate Action

ChopValue extends the life of bamboo chopsticks by utilizing them into products and extends the duration over which carbon is retained in the bamboo. ChopValue also ensures that its production process maintains a low contribution to greenhouse gas emissions and aims to maintain its current carbon negative status.



1.3 Who We Are

We are proud to challenge conventional business practices with our commitment to local manufacturing on a global scale, creating high quality products engineered entirely from recycled chopsticks.

OUR VALUES

Focus

We relentlessly pursue our vision with clarity, efficiency, and quality.

Community

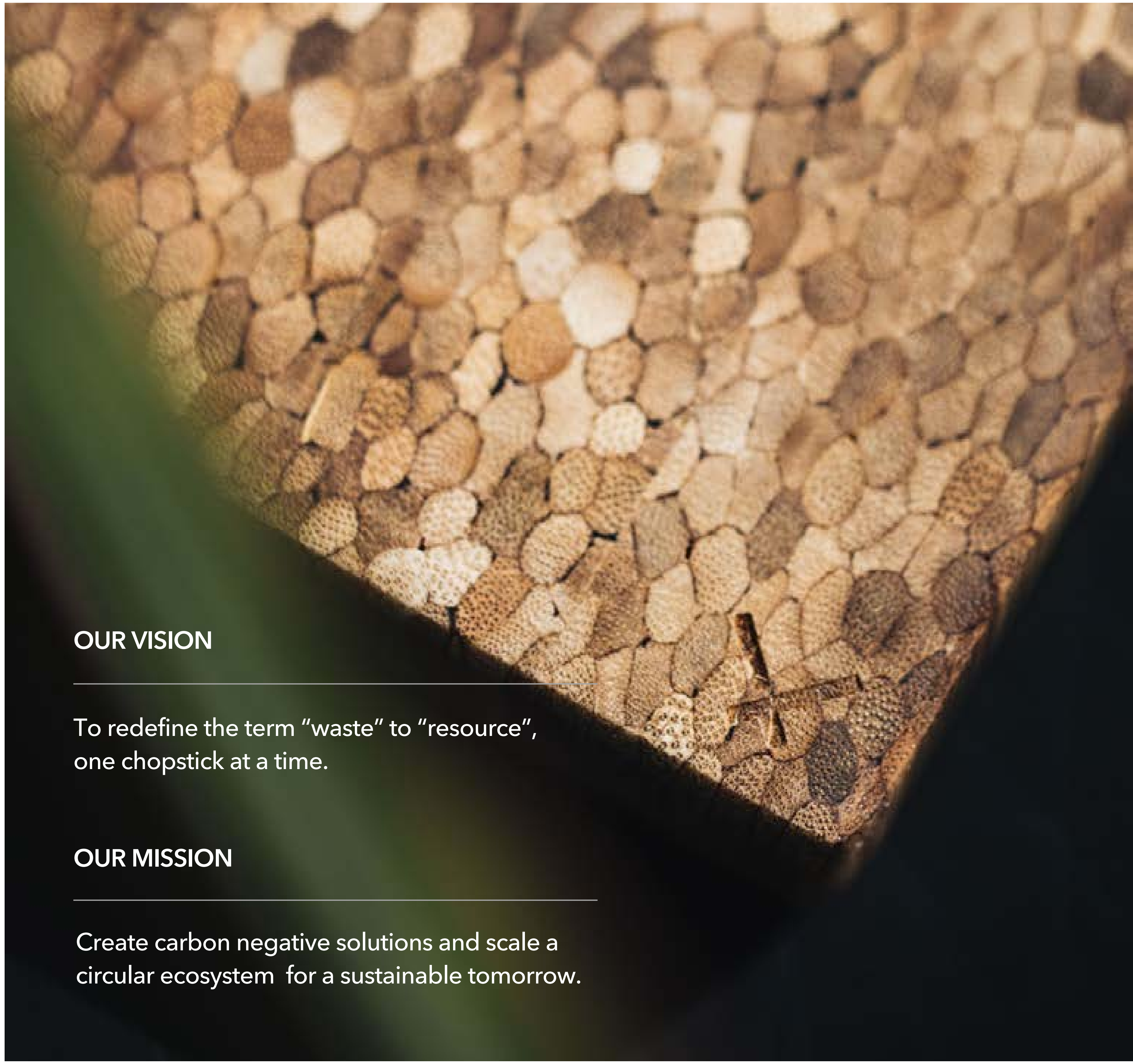
We create connections and collaborate locally on a global scale.

Accountability

We are reliable, and take responsibility for the outcome.

Authenticity

We are sincere, approaching every situation with empathy and honesty.



OUR VISION

To redefine the term “waste” to “resource”, one chopstick at a time.

OUR MISSION

Create carbon negative solutions and scale a circular ecosystem for a sustainable tomorrow.

1.4 Founder's Note

Leading by example, one chopstick at a time.

"I identify with the philosophy that every action, no matter how small, can make a difference - and since starting the adventure of ChopValue, I expect us to take responsibility to scale our positive impact. Once you realize that, you want to make every interaction count and be part of the solution to reduce the stress on our natural resources."

Felix Böck
Founder & CEO

I am fortunate to live in one of the most beautiful cities in the world, surrounded by mountains, the ocean, and forests. I am truly grateful to work on something so fulfilling by looking at our city as urban forest full of resources (and sushi restaurants). People often say that there are no "firsts" out there anymore, and that most ideas have been done, discovered, or tested before; but I think we all underestimated and neglected these little chopsticks right in front of us. For some context, not too long ago, I tried to apply my wood engineering and stereotypical "German efficiency thinking" (not my quote) to tackle the wood and construction waste in Vancouver. A seminar that presented the research results and potential industry know-how for value added materials unfortunately did not resonate much with industry leaders. It was frustrating, but at the same time eye-opening. I realized that in order to prove sustainable business concepts that rely on under-utilized resource supply, there must be thought leaders who show its viability. It had to be interesting, something easy to comprehend, and something that elicits emotions towards the problem of linear economy and our vast amount of waste. I would need to develop a process that creates innovative, highly value added and appealing products from a relatable resource. And that is how ChopValue was born.

More than 10 years in the bamboo composite manufacturing industry have not fulfilled me as much as being surrounded by young professionals who work with me on chopsticks. The extremely hard work I see day in and day out by our team and partners around the world is absolutely amazing. Together, we are actively shaping our purpose-driven culture in times where leadership is tested the most, either because of market uncertainty or global crisis. But with strong core values, creative problem solving, efficiency and focus over the past years, our team has built a special bond and a sense for mutual accountability. Many of our team members are celebrating their 3, 4, 5 and even 6 year anniversaries in 2024 – both office and production staff. I'm lucky to be surrounded with so much talent and thankful for everyone's commitment to spend and grow the most important years of their career with us.

We decided that it was the most important mission to scale with a sustainable, longterm structure. Thanks to impact investment funds, investors with vision, and institutions who support our innovation in manufacturing and resource efficiency, who invested with trust to move from our single city concept to a multi-level manufacturing cluster, we are now well positioned as a global pilot for decentralized local Microfactories. With new franchise partners joining our movement growing our network to over 75 Microfactories under contract and in development to date, we have been able to land some of the most recognizable brands as our customers looking to accelerate their environmental impact, aligning with our shared vision of a climate-positive future through responsible manufacturing practices.

Although our progress represents only a small part of the circular economy and our journey is far from over – ChopValue serves as a blueprint for implementing reverse logistics in our urban environments, demonstrating the potential for impactful change. Our commitment to build our "made local" approach globally is stronger than ever, with the goal to expand our technology and urban harvesting mission in order to transform 100 metric tonnes of "waste" to "resource" per year.

Today, we're scaling a circular ecosystem to build a sustainable tomorrow.

1.5 Acknowledgements

Looking forward, responsibly.

Reference Framework

The Urban Impact Assessment 2023 is ChopValue's sixth annual reporting on important developments of the company's expansion strategies, covering the time period between January 1 - December 31, 2023.

Editorial Remarks

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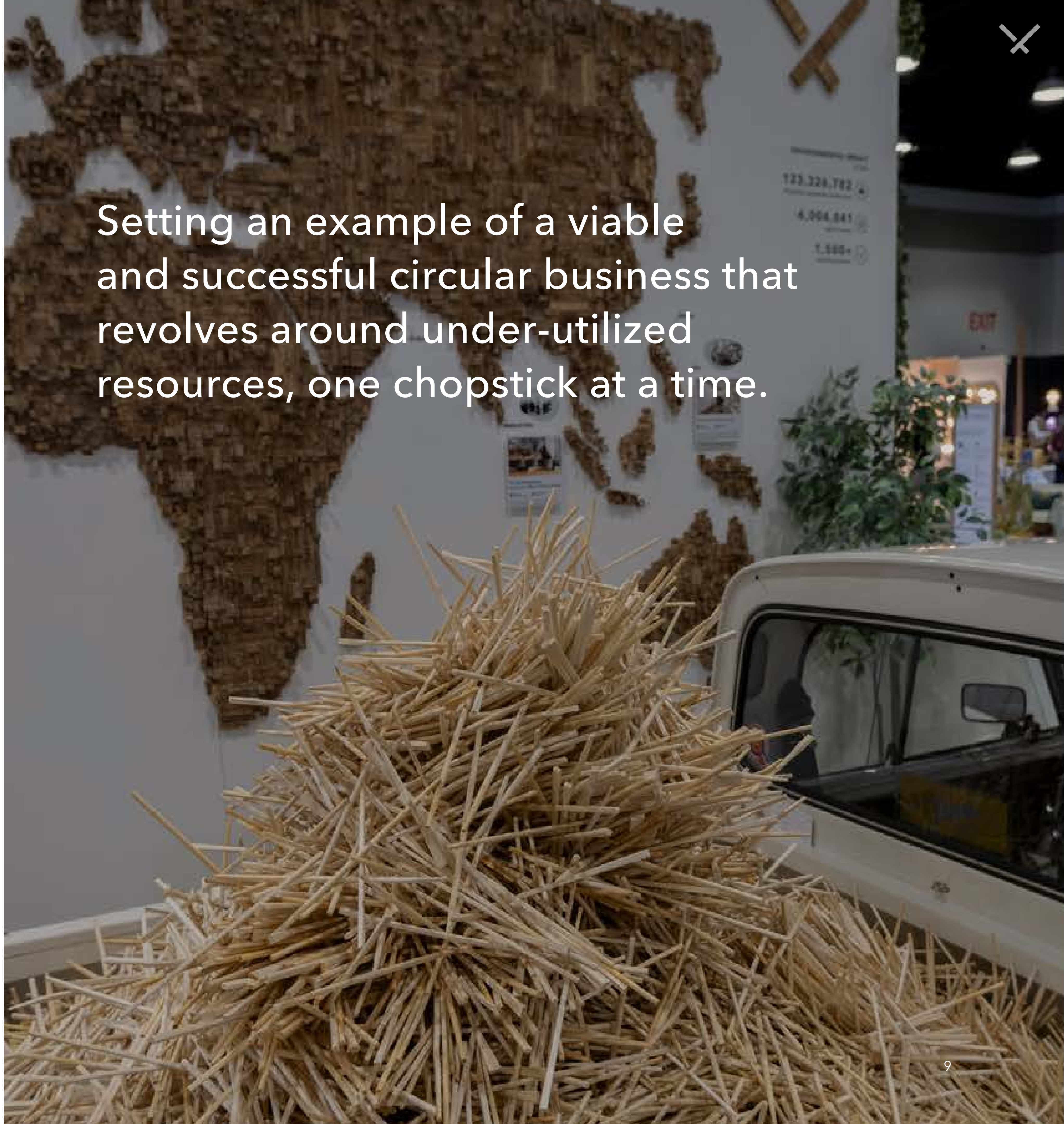


2.1 Circular Economy

Waste to *Resource*

Environmental sustainability is a global issue and more companies should incorporate the principles of circular economy into their business models.

It is no surprise that excessive material and product consumption is causing adverse effects on the environment, including the exploitation of natural resources, accumulation of waste, and production of greenhouse gases. More than two billion metric tons of municipal solid waste are generated worldwide every year, and this figure is expected to increase by 70% by 2050 (Statista, 2023).

The traditional 'Take-Make-Dispose' approach, also known as the linear economy, is where natural resources are extracted, converted into products and then disposed of in landfills. Since this model is clearly not sustainable, many are starting to realize that this cannot be the path forward. As a result, more businesses and communities are aiming to shift towards a circular economy, a model where waste is eliminated by making better use and re-use of materials and natural resources.

By extracting 'waste' from existing streams and reducing the use of new, natural resources, we are able to keep these materials within a 'closed loop system', and prevent resources from going to the landfill.

Busy urban cities contribute to a large volume of waste, including single-use utensils, post-consumer waste, as well as demolition and construction waste. These wasted materials can all be utilized as a resource.

In addition to the environmental and social benefits, the World Economic Forum estimates that the circular economy could yield as much as $4.5 trillion in economic benefits over the next decade (WEF, 2021).

2.2 ChopValue: A Circular Economy Model

The world uses 80 billion disposable chopsticks every year.

That's 1.5 billion chopsticks per week.

ChopValue is founded in Vancouver, Canada - where it is estimated that in Metro Vancouver alone, approximately 100,000 chopsticks are discarded each day. Today, more than 350,000 of these are collected each week.

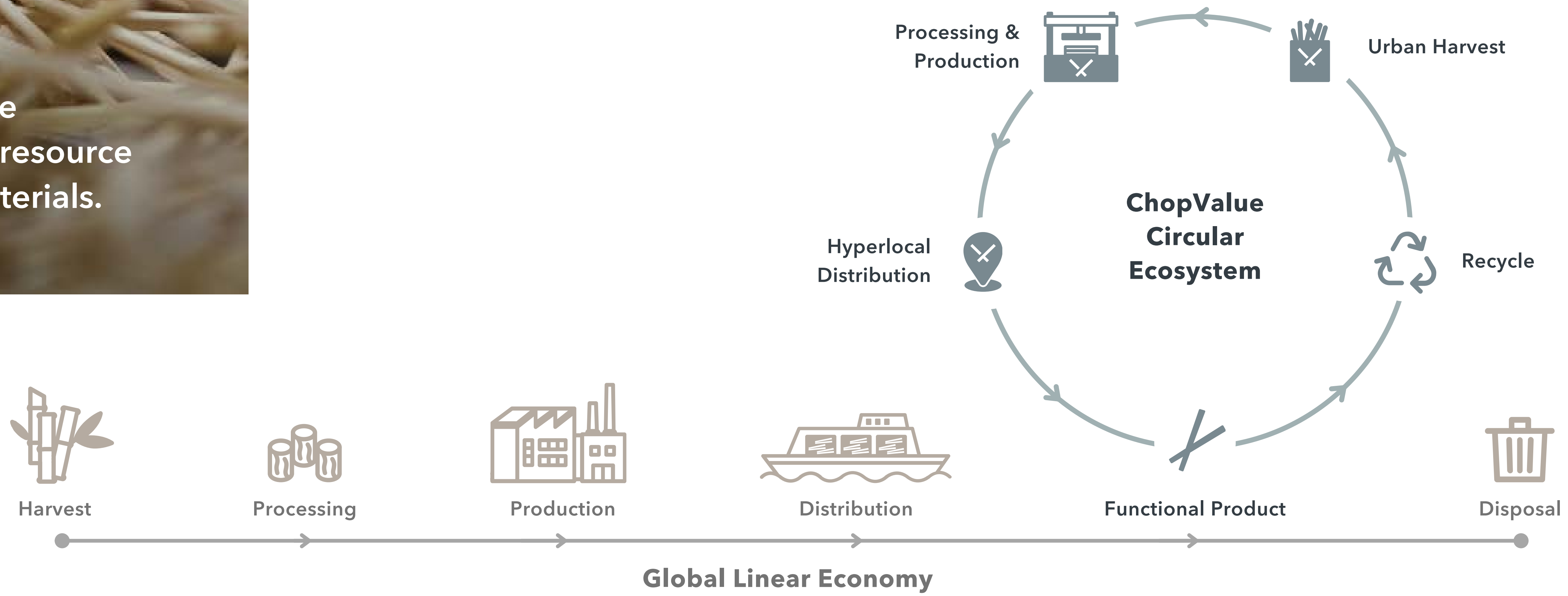
Little consideration is given to this single-use utensil that has travelled approximately 9,000 km for the purpose of a 20 minute meal.

We made it our mission to operate within that framework and work on the problem directly.

ChopValue recognizes that

these perfect, slender, defect-free chopsticks can be reutilized as a resource to develop novel engineered materials.

We reclaim resources in urban areas that otherwise would end up in the landfill. By giving a second life to these materials, urban harvesting allows us to use what is readily available in our cities to minimize environmental impact and encourage resource efficiency.



Environmental stewardship.

With the significant opportunity to collect and reutilize discarded chopsticks across the world, we are taking tangible action through our Microfactories in different cities. As an example, we collect approximately 350,000 chopsticks per week in Vancouver alone. These used chopsticks are then given a new life at ChopValue where we transform them into value-added products.

The production of this novel material required significant technological innovation due to the lack of existing machinery that could be utilized to process this new resource. Technological and material innovation allowed us the opportunity to ensure that our processes were designed by prioritizing environmental sustainability.

Circular economy and environmental stewardship are a priority in all facets of ChopValue's business. Some of our environmental initiatives include:

Zero Waste Ambition in Manufacturing

The waste and off-cuts generated from the manufacturing of our larger products is saved and reused in other smaller products e.g. keychains.

Packaging

Our products are packaged using biodegradable, starch-based peanuts and are wrapped in recycled paper; all packaging cards and labels are printed on recycled paper.

Repurposing

The sawdust that is generated from sanding our products is collected and reused as wood filler.

Oils

The oil used to finish our final products is vegetable-based and environmentally friendly.

Resin

The water-based resin used in the manufacturing of our chopsticks is free of toxic chemicals such as phenol and formaldehyde.

Setting a new norm by changing the way you think about wasted resources and manufacturing.

At ChopValue, we consistently prioritize and highlight environmental sustainability in all stages of our business model including innovation, waste reduction and utilization, and our expansion plans.

By creating a viable business in Canada solely based on previously discarded chopsticks, ChopValue has demonstrated that it is feasible to incorporate the circular economy approach into business and that valuing environmental sustainability does not hinder one from success. We hope to replicate this prioritization of environmental stewardship in the decision to expand from a national to a global scale.

We hope that by remaining transparent about our manufacturing processes and business practices, and measuring the environmental impact of our production chain, we can inspire others to incorporate environmental impact into their businesses as well.

2.3 ChopValue Process

01
Chopstick Collection: Recycling Program

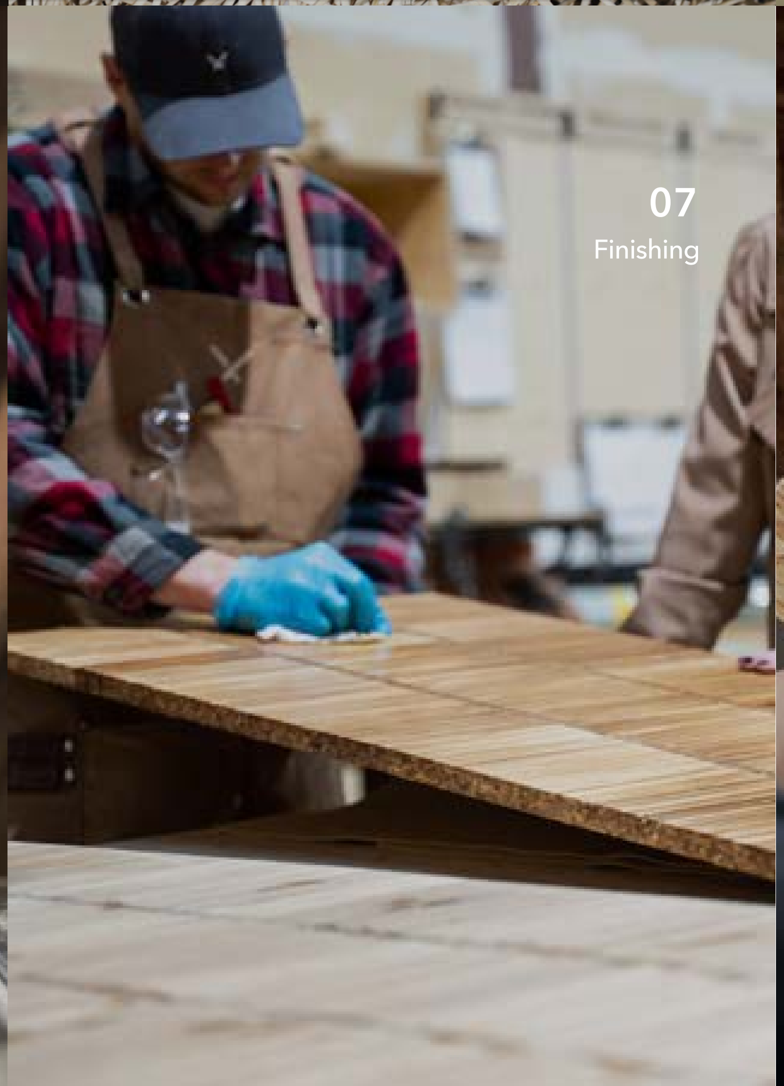
02
Chopstick Sorting

03
Resination

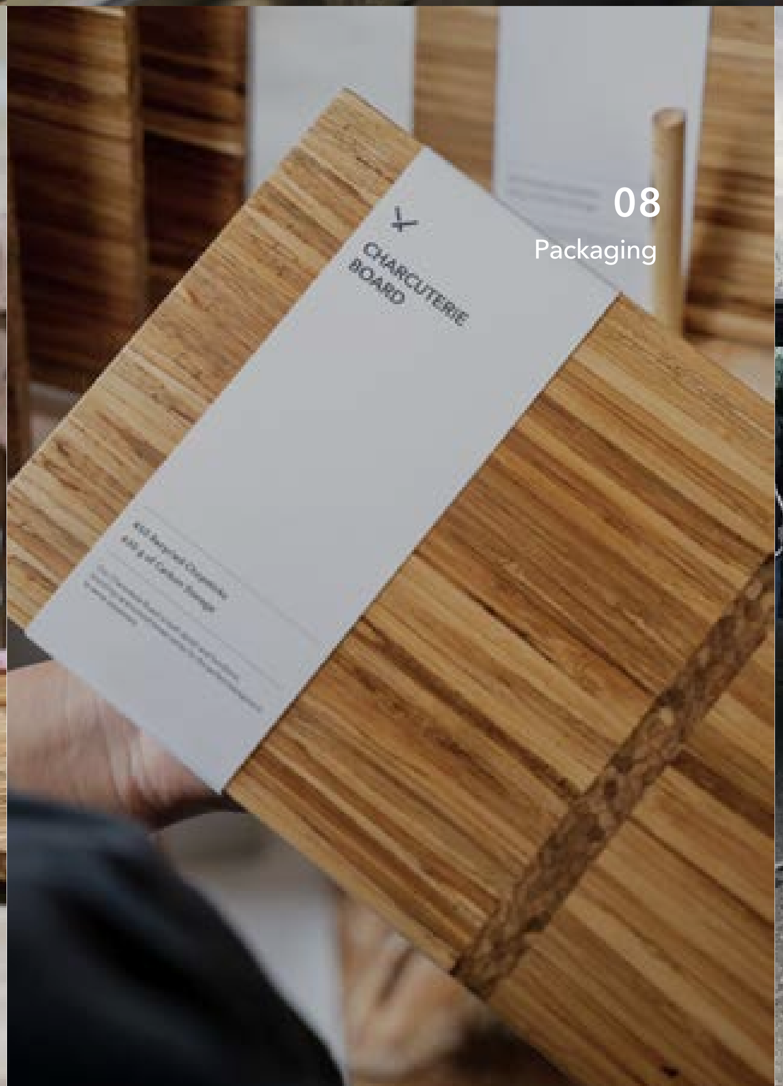
04
Drying

05
Densification

06
Product Manufacturing



07
Finishing



08
Packaging

09
Product Delivery

01 Chopstick Collection: Recycling Program

ChopValue partners with various restaurants, malls, and office cafeterias to collect used chopsticks. The collection program is free of cost to the recycling partner. When signing up a new partner, the ChopValue collection team provides a training session to educate employees about the circular economy and our mission.

Chopstick collection is conducted between 2-6 days a week (depending on the location and Microfactory) using ChopValue's pick-up truck. The route travelled on these days is generated via software to ensure that the distance travelled, and thus the corresponding emission, is minimized. The routes travelled by the collection driver are recorded and used to calculate the emissions from this step in the process.

Emission Sources Distance travelled by the ChopValue truck

02 Chopstick Sorting

Once the chopsticks are collected, the chopsticks are sorted at the facility. The sorting table is used to align the chopsticks in a single orientation for easier processing in the later stages. The design and size of the electric-powered machine has been optimized to sort approximately 30 kg of chopsticks within 2 minutes of operation.

Emission Sources Electricity consumed by the sorting table

03 Resination

The sorted chopsticks are dipped into a water-based, formaldehyde-free resin. The excess resin from chopstick dipping is recycled and used to coat subsequent batches of chopsticks. Since the resin used in the process is free of the toxins found in other conventional resins, such as formaldehyde, the process of applying adhesive to the chopsticks has no adverse environmental impact.

Emission Sources None

04 Drying

The resin-coated chopsticks are placed into a convective dryer. Research was conducted to determine the minimum drying time required for the chopsticks to reach the target moisture level required for pressing to ensure that the emissions from this process are minimized.

Emission Sources Electricity consumed by the dryer

05 Densification

The dried chopsticks are densified into tiles using a heated hydraulic press. This hot press was designed by the ChopValue Engineering team and is customized to meet their needs in terms of production volume, efficiency, and sizing. The high heat and pressure results in chopstick compaction and resin curing, forming a raw, high-density material ready for product manufacturing.

Emission Sources Electricity consumed by the press

06 Product Manufacturing

The raw tile is planed and cut into standard dimensions before being used to manufacture a product, and this standard tile is then processed based on the product being manufactured. There are several measures taken to reduce material waste during this step. Different products require different tile thicknesses and therefore, to minimize the energy consumed and waste generated by planing and sanding down tiles, ChopValue instead presses tiles into three different thicknesses. By doing this, products with thinner dimensions are made using the thinnest tile produced by the press. Additionally, the offcuts and tile scraps resulting from product manufacturing are used in the production of smaller products such as keychains and luggage tags.

Emission Sources Electricity consumed by the woodworking machinery

07 Finishing

After the products are manufactured, they are coated in a vegetable-based and environmentally friendly oil, which emphasizes the material's natural colour. This is the standard finish applied to most products at ChopValue; however, different product applications may require different surface finishes that could result in different environmental impact.

Emission Sources None

08 Packaging

All ChopValue products are packaged using starch-based sustainable packing peanuts, and all labels and cards are printed on 100% recycled paper.

Emission Sources None

09 Product Delivery

We encourage customers to pick up their orders from our production facilities to minimize our emissions; however, under special circumstances, the ChopValue truck is used in the delivery of larger products. The mileage associated with such deliveries is tracked and used in the calculation of process emissions.

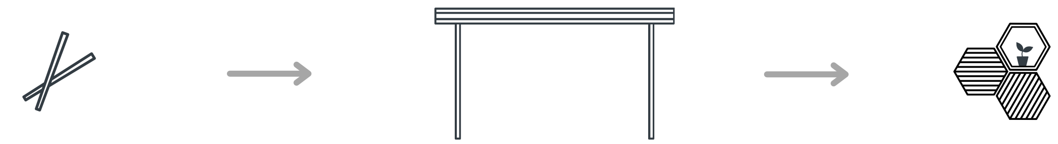
Emission Sources Truck mileage during delivery

3.1 Overall Environment Impact

ChopValue's business decisions are motivated by our desire to be a leader in environmental impact and transparency. As the business expands, it is vital to us to ensure that expansion work, including the addition of new chopstick collection partners, incorporate our core aim of sustainability.

Simplified Approach

The innovative engineered material has a sustainable impact in two directions: the impact of the resource from which a product is made from, and where the product goes after its lifetime. The first part is the carbon storage, which represents the amount of carbon that can be stored by preventing the chopsticks from ending up in a landfill and biodegrading, but instead continuing to sequester carbon in the shape of beautiful, locally processed end products. The second part is creating a product with multiple life cycles, ensuring that it can be reused beyond the product's life cycle.



Carbon Storage

Bamboo consists of 45.8% carbon. This means that for every kg of chopsticks that are given a second life instead of ending up on the landfill, 458 g of carbon remains sequestered. With 137,409,840 chopsticks recycled by the end of 2023, with an average weight of 3 grams per chopstick, we have stored 188,801 kg of carbon and thus avoided emissions that would have been generated during biodegradation.

Multiple Product Life Cycles

This stored carbon in the shape of the engineered material can remain stored beyond the duration of a regular product life cycle; it is solid, so it can be transformed several times through a remanufacturing process into further end products.

Using this basic approach, the carbon impact of recycling 137,409,840 chopsticks as of December 31st, 2023 would be:

188,801 kg
of carbon stored

Comprehensive Approach

To determine the overall environmental impact, the basic approach described in the previous Urban Impact Assessments must be broadened to take further factors into account beyond the mere physical storage of carbon in the remanufactured chopsticks.

For example, recycling chopsticks reduces waste piles, however, the collection process creates exhaust gases. Similarly, the manufacturing process produces a high-performance material, but energy is consumed for its production.

In the following assessment, the cons are also taken into account by considering the overall impact in four areas: Resource, Manufacturing, Logistics and Lifecycles.

Therefore, we refer to a simplified leading question as a reminder of what the alternative would be if a product was not made from ChopValue engineered material:
How many emissions can be avoided if a product is made from ChopValue's engineered material instead of a commercial material?

Resource

Examines how many emissions can be avoided if a product is made from recycled chopsticks instead of virgin resources.

Manufacturing

Examines how many emissions can be avoided if recycled chopsticks are processed into engineered material instead of producing commercial materials.

Logistics

Examines how many emissions can be avoided if supply chains operate hyperlocal rather than on a global level.

Lifecycles

Examines how many emissions can be avoided if a product can be remanufactured rather than disposed of at the end of its life.

The Comparative Material

The following compares how particleboard, fiberboard, and solid wood, as common commercial materials in the furniture industry, compare to ChopValue material in four areas regarding emissions generated:

- Resources
- Manufacturing
- Logistics
- Lifecycle

In all four areas, the calculation is based on averages, so that the calculated overall impact figure can be applied to any given case and still provide a representative figure for CO2 emissions saved.
Adjusting assumptions in one of the four areas requires adjustments in the other areas as well to obtain a representative figure.

The unit of the comparison is kg of CO2 per cubic meter, since the choice of furniture is typically based on dimension, not the weight or the amount of raw materials used.

Assumptions

Commercial Materials are ⅓ fiberboard, ⅓ particleboard, ⅓ solid wood

Coatings and other containing substances are neglected

Particleboard and fiberboard are made from spruce; the maple tree is the reference for solid wood

The wood-based panel plants obtain their energy by thermal utilization of own or purchased wood-base production residues

The solid wood is sourced locally, while the resource for the fiberboard and particleboard is transported overseas

Reference-based Data

Formula from Carbon to CO2	Oxidizing carbon becomes heavier by a factor of 3.67. (Knohl 2012)
Lifetime of Furniture	Furniture is replaced after 13 years. (Statista 2019)
Properties of Spruce	Rotation Period: 100 years (Wald-Prinz 2013), Density: 630 kg/m^3 (Wood - Densities of Various Species 2023), Carbon content: 50% (Muntendorf 2023), Heating value: 4.3 kWh/kg
Properties of Maple	Rotation Period: 110 years (Wald-Prinz 2013), Density: 685 kg/m^3 (Wood - Densities of Various Species 2023), Carbon content: 50% (Muntendorf 2023), Heating value: 4.3 kWh/kg
Properties of Particleboard/ Fiberboard	Density: 738 kg/m^3 (Spang 2013, p. 3), Wood content: 80% (Spang 2013, p. 3), Utilization rate: 95% (Rössler 2008), Energy consumption fiberboard: 10,550 MJ/m^3, particle board: 5,655 MJ/m^3 (Kolb 2023)
Properties of Solid Wood	Density: 685 kg/m^3 (Wood - Densities of Various Species 2023), Utilization rate: 57% (Isopp 2019), Energy consumption: 4,320 MJ/m^3 (Kolb 2023)
Emissions through Transportation	>18t: 149.3 gCO2/tkm, <18t: 380.0 gCO2/tkm, ≤3.5t: 932.5 gCO2/tkm (Loessl and Weismayr 2022), Container Ship 5,500 TEU: 17 gCO2/tkm (Umweltbundesamt 2019)
Payload of diverse Transport Vehicles	Logging Truck: 33t (Lowry 2022), 25t Truck: 12.5t, 12t Truck: 7t, 3.5t Truck: 1.4t (Bussgeldkatalog 2023), Container Ship 5,500 TEU: 33 m^3/TEU inside volume (Beilhammer 2018)

Resources

Virgin trees are felled for the production of the three reference materials: particleboard, fiberboard and solid wood. Particleboard is the only one of those materials that is considered a "recycled product" as it is possible to process residual materials in it. However, this is rarely the case and fresh wood is typically used, similar to the production of fiberboard and solid wood (Rauch 2023).

Three things happen when a tree is felled:

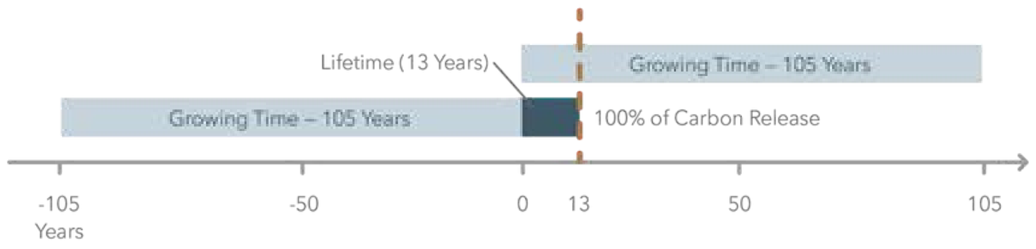
1. Reduction in Carbon Storage Mass
2. Premature Release of Carbon
3. Deforestation Outpaces Reforestation

1. Reduction in Carbon Storage Mass

A simplified approach to wood furniture is that the carbon stored in the tree simply continues to be stored, just in the shape of furniture. However, the felling and debarking removes potential mass that could have continued to function as carbon storage. If the mass of the tree is 15% roots and branches, and 5% bark, this is 80% (85% x 95%) of the mass retained in the processed wood-based material. In the case of solid wood, where not only the bark but also the core is removed, only 49% (85% x 57%) of the mass remains.

2. Premature Release of Carbon

A common approach is to compare the emissions from the production of wood-based materials with the carbon stored in the manufactured materials. Since wood consists of 50% carbon (multiplied by a factor of 3.67 equals the amount of CO_2), at the time immediately after production, the carbon stored in the product outweigh the emissions due to production, giving the manufacturer a negative CO_2 emissions balance and thus a negative footprint. However, this approach neglects the lifetime of the material produced. According to statistics, products in the furniture industry are discarded after approximately 13 years. Until the resource from which the furniture was made from has grown back to the size it was before it was cut down, it takes 100 to 110 years, depending on the tree species.

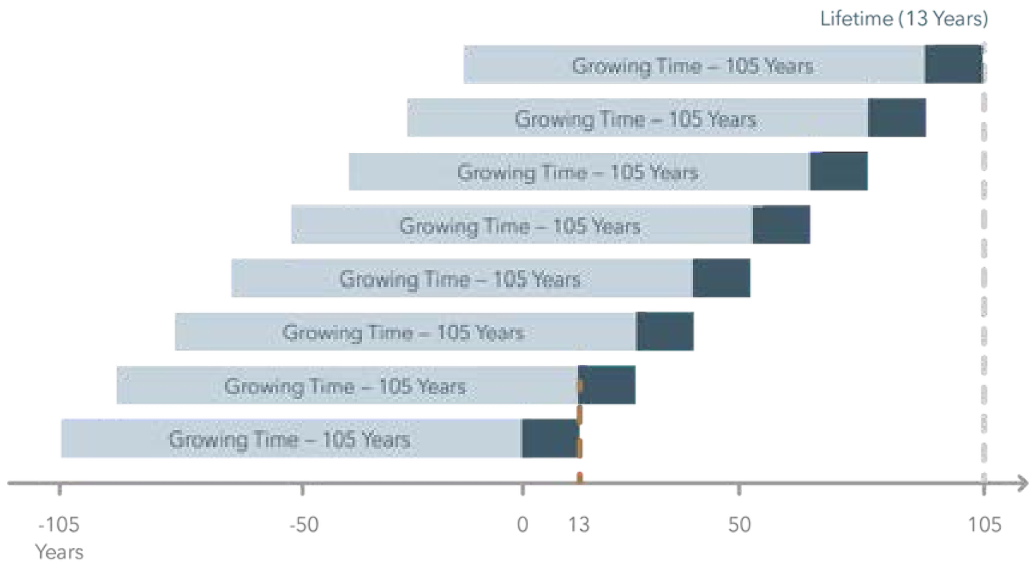


This figure illustrates the growing time of a tree, and the 13 years of lifetime of the produced product afterwards. At the time the furniture is disposed of, the new planted tree has only stored 12% of the carbon that the furniture will release by disposal.

Typically, a tree would naturally rot, leading to the release of the stored carbon more than 400-500 years later. By felling, however, the carbon stored in the tree is released much earlier.

3. Deforestation Outpaces Reforestation

Since the frequency of demand is unaffected by the turnover time of a tree, another tree will be cut down 13 years later. In the example of a 105-year turnover time, by the time a single tree grows back to its original state, 8 trees that theoretically do not exist will have been cut down.



This system represents unsustainable forestry. In this scenario, sustainable forestry requires 8 times the forest area needed to produce a certain amount of product, so that the trees to be felled grow back in sequence and are consistently available for product processing.
As sustainable forestry is not widely practiced globally, and as the tree as a resource is declining due to climate related calamities, this scenario considers the case in which trees are cut to meet demand, regardless of sustainable value concepts.

Calculated Impact by the Choice of Resource

Fiberboard/Particleboard

Considering that 1 m^3 of spruce wood mass with a density of 630 kg/m^3 contains 50% carbon, 315 kg of this can be converted with the factor 3.67 to 1,156 kg of CO2. As described previously, the mass is only 80% of the mass of the living tree with all its branches and roots. Therefore, the living tree could store 1,432 kgCO2 (1,156 kgCO2 / 80%). As explained in the previous section, up to 8 trees are felled until one tree is regrown. In the case of spruce, this is 7.69 trees (100 years/13 years) and corresponds to 11,013 kgCO2 (7.69 x 1,432 kgCO2) emitted by the premature felling of trees to meet the demand. With the assumption that fiberboard and particleboard consist of only 80% wood, these emissions affect only 80% of these commercial materials and correspond to a total of 8,810kg of CO2 emissions per cubic meter, which would be caused by the choice of fiber or particle board.

Solid Wood

Similar to the previous section, 1 m^3 of maple wood with a density of 685 kg/m^3 absorbs 1,257 kgCO2/m^3 (685 kg/m^3 × 50% Carbon × 3.67 CO2/Carbon). Since solid wood, in contrast to fiberboard and particleboard, possesses a core and has more offcuts than just the bark, the mass is only 49% of the mass of a living tree. Therefore, the living tree itself could have stored 2,594 kgCO2 (1,257 kgCO2/49%). Since a maple tree needs 110 years to regrow, in this case, 8.46 (110 years/13 years) trees are cut down during the time that only one can regrow. This corresponds to 21,952 kg of emitted CO2 (8.46 x 2,594 kgCO2) that would be caused by opting for solid wood.

ChopValue Material

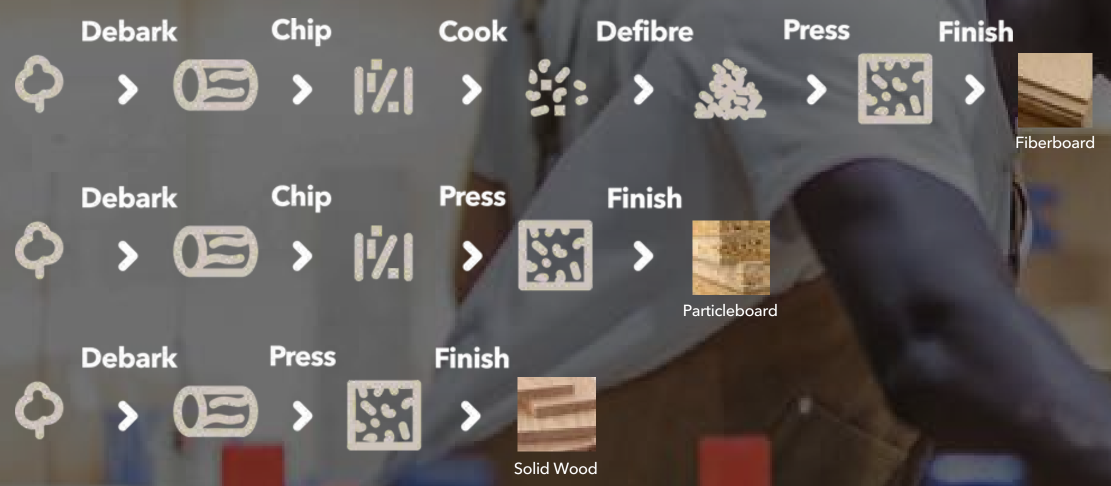
No trees are cut down for the production of ChopValue products, which means that the emissions described above do not occur.
In addition, by using chopsticks as a resource, the carbon contained in the chopsticks is stored for longer, avoiding the emissions that would occur if the chopsticks were instead disposed of in a landfill.
With a density of 1,000 kg/m^3 and a carbon content of 45.8%, our engineered material made from recycled chopsticks consists of 458 kg of carbon per cubic meter, which, multiplied by 3.67, equals 1,681 kg of CO2 emissions that can be avoided by storing the carbon longer in the form of products.

Summary

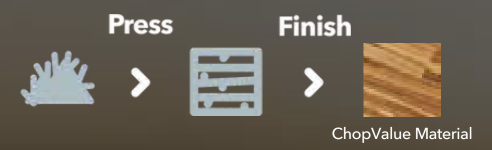
This means that for every cubic meter produced from ChopValue material and not from commercial material, 13,278 kg of CO2 are avoided by the assumed ratio of commercial material (2/3 x 8,810 kgCO2/m^3 + 1/3 x 21,952 kgCO2/m^3), plus the 1,681 kgCO2/m^3 avoided by the chopsticks saved from the landfill. In total, 14,959 kg of CO2 emissions is saved per cubic meter through the choice of resources. This corresponds to -113% less CO2 emissions compared to commercial material, as not only are the use of virgin materials avoided, but the materials used already exist (of which we source through our collections program).

Manufacturing

The figure below illustrates the production processes for fiberboard, particleboard, and solid wood, with fiberboard being the most energy-intensive process at 10,550 MJ/m³, followed by particleboard at 5,655 MJ/m³ and the production of solid wood at 4,320 MJ/m³. (Kolb, 2023)



Compared to this, the simplified and minimalist process flow for the production of ChopValue engineered materials represents a significantly less energy-intensive process flow.



Calculated Impact due to the Energy required for Manufacturing

Fiberboard/Particleboard/Solid Wood

An average of the mentioned energy in MJ/m³ of those commercial materials and converted into the unit of kWh per cubic meter, results in 1,900kwh/m³. With an average heating value of 4.3 kWh/kg, 0.23 kg of wood mass is needed to supply 1 kWh of energy (1 kg/4.3 kWh). This corresponds to 0.12 kg of carbon per kWh (50% Carbon x 0.23 kg/kWh) and 0.43 kg of CO2 per kWh (0.12 kg Carbon/kWh x 3.67). Multiplied by the required 1,900 kWh/m³, this is 811 kg of CO2 emissions per cubic meter that would be caused by the production.

ChopValue Material

In 2022, the Microfactory required 53,036 kWh and processed 48,000 kg of Chopsticks. Per kg of chopsticks, this is 1.1 kWh (53.036 kWh/48,000 kg) and with a density of 1,000 kg/m³, this results in 1,105 kWh/m³. With 436 g of CO2 emitted in the year 2022 by the production of one kWh of electricity (Wiatros Motyka 2023), this results in 482 kg of CO2 emitted per cubic meter produced by a Microfactory.

Summary

Compared to the production of commercial materials, the production of one cubic meter of ChopValue material therefore emits 329 kg less CO2 and thus avoids further emissions (811 kgCO2/m³ - 482 kgCO2/m³).
This corresponds to -41% less CO2 emissions compared to commercial material.

Logistics

This section takes into account average transportation routes: overseas and local (within a region). An adjustment only in this area leads to a distorted overall result, as this would also require a customized adjustment in the other sections “Resource”, “Manufacturing” and “Lifecycles”.

Calculated Impact due to the Energy required for Manufacturing

Fiberboard/Particleboard

On average, global transport routes span a distance of 16,000 kilometers, using a variety of vehicles.

01

A logging truck is limited in its payload by 33 t, which corresponds to 16.50 t of dry wood at 50% water content. With a density of 630 kg/m^3, 26 m^3 of spruce can be transported. After debarking (95% bark content) this corresponds to 25 m^3 and since fiberboard and particleboard consist only 80% of wood, 31 m^3 of wood-based panels can be produced from one transport route. With the assumed distance of 1,000 km, this corresponds to 32 km/m^3 of wood-based panel produced (1,000 km/31 m^3). With 149.3 gCO_2 emissions of a logging truck per tonne kilometer, this results in 158 kgCO_2 per cubic meter of wood-based panel.

02

For the transportation of produced panels, a 12 t truck is assumed for this distance, with a payload of 7t. With a density of 738 kg/m^3, 9.49 m^3 of wood-based materials can be transported. With a 500 km travel distance, this corresponds to 53 km/m^3 of wood-based panel produced. With 380 g of CO_2 emissions per tonne kilometer, this results in 140 kg of CO_2 per cubic meter of wood-based material.

03

For the overseas transportation, a freighter was assumed that reaches an average loading volume of 5,500 containers with a standard volume of 33m^3 each. In addition, it is assumed that only 60% of this volume can be loaded, as the remaining space is taken by other materials or air due to loading reasons. Thus, a single container has the capacity to load 20 m^3, hence the entire freighter has the capacity to load 109,547 m^3 of wood-based panels. With a density of 738 kg/m^3, this results in a mass of 80,790,584 kg of wood-based materials. In addition, the weight of the 5,500 empty containers are added, which equals to 2,000 kg for an empty single container, with a total weight of 11,000,000 kg for all containers. The weight of these containers, together with the weight of the wood-based panels multiplied by the 10,000 km travel distance, results in 917,905,842 tonne kilometers. With 17 g of CO_2 emissions per tonne kilometer, this results in 142 kg of CO_2 per cubic meter of wood-based material.

04

For the long distance of 4,450 km from a port to a supplier, a 25 t truck with a payload of 12.5 t is assumed. With a density of 738 kg/m^3, 17 m^3 of wood based materials can be transported in one route. According to the distance, this results in 263 km/m^3 and with the considered allowed payload, in 3,282 tkm/m^3. With 149.3 g of CO_2 which is emitted per tonne kilometer, this corresponds to 490 kg of CO_2 emissions per cubic meter of wood based material.

05

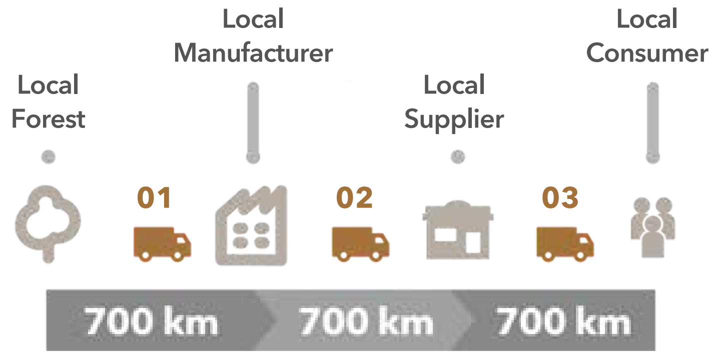
A 3.5 t truck with a payload of 1.4 t is the assumed type of transportation for the last part of the supply chain. With a density of 738 kg/m^3 this results in 1.9 m^3 of wood based materials which can be transported per route. With the assumed distance of 50 km, it is 26 km/m^3 and according to the allowed payload, 37 tkm/m^3. With 932.5 g of emitted CO_2 per tonne kilometer, this results in 965 kgCO_2 per cubic meter of wood based material.

TOTAL

The total emissions from this example of an average global supply chain result in 965 kgCO_2/m^3.

Solid Wood

Regarding the production of solid wood, a local supply chain is assumed. Since 'local' is considered to be within a region, the total transport distance within a province is 2,100 km. The figure below shows that divided among the individual stages, this corresponds to single transport distances of 700 km.



01

A logging truck is limited in its payload by 33 t, which corresponds to 16.50 t of dry wood at 50% water content. With a density of 630 kg/m³, 26 m³ of spruce can be transported. After debarking (95% bark content) this corresponds to 25 m³ and since fiberboard and particleboard consist only 80% of wood, 31 m³ of wood-based panels can be produced from one transport route. With the assumed distance of 1,000 km, this corresponds to 32 km/m³ of wood-based panel produced (1,000 km/31 m³). With 149.3 gCO2 emissions of a logging truck per tonne kilometer, this results in 158 kgCO2 per cubic meter of wood-based panel.

02

Similar to point 2 from the previous section, a 12 tonnes truck is assumed for this step of the supply chain. The calculation differs in the distance, with 700 km and density, with 685 kg/m³. With the same calculation path, this transport step results in 182 kg of CO2 per cubic meter of wood based material.

03

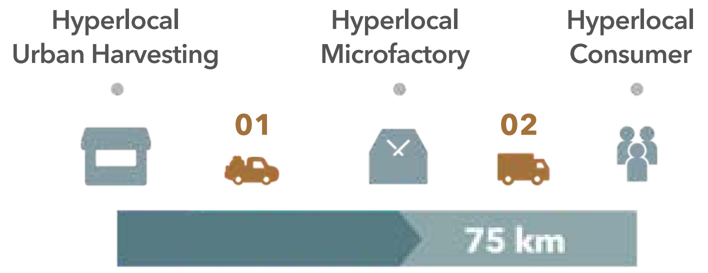
The calculation about the transport step to the customer is also analogous to point 5 of the supply chain of the fiber- and particle board. With the adjusted distance of 700 km and density of 685 kg/m³, this results in 447 kg of emitted CO2 per cubic meter of wood based panel.

TOTAL

The total emissions from this local supply chain are 881 kgCO2/m³.

ChopValue Material

As described in a previous chapter, the concept of ChopValue is characterized by a decentralized approach. The distances traveled when collecting the chopsticks are tracked – the figure below shows the hyperlocal supply chain where chopsticks are collected and products are delivered between 50 and 100 km.



01

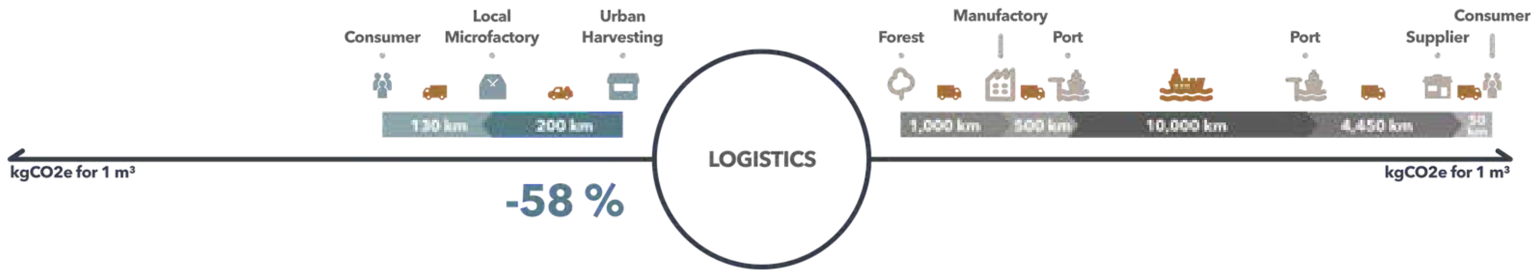
With the chopsticks collected and a weight of 0.003 kg per chopstick, this averages to 2 kg per kilometer. With a density of 1,000 kg/m³ and 1.01 kgCO2 emissions per kilometer traveled (LTL Dry Van), this corresponds to emissions of 505 kgCO2 per cubic meter of ChopValue material.

02

As in the case of fiberboard, particleboard or solid wood, a 3.5 t truck with emissions of 932.5 gCO2 per tonne kilometer is assumed for the transport route to the customer. With the same calculation, but a distance of 75 km and a density of 1,000 kg/m³, the emissions result in 70 kg of CO2/m³ of ChopValue material.

TOTAL

The total emissions from ChopValue's hyperlocal supply chain are 575 kgCO2 /m³.



Summary

Compared to commercial materials (in the ratio of 1/3 fiberboard, 1/3 particleboard, 1/3 solid wood), the transport of one cubic meter of ChopValue material therefore emits 362 kg less CO2, thus avoiding further emissions (2/3 x965 kgCO2/m³ + 1/3 x 881 kgCO2/m³ minus 575 kgCO2/m³).
This corresponds to -39% less CO2 emissions compared to commercial material.

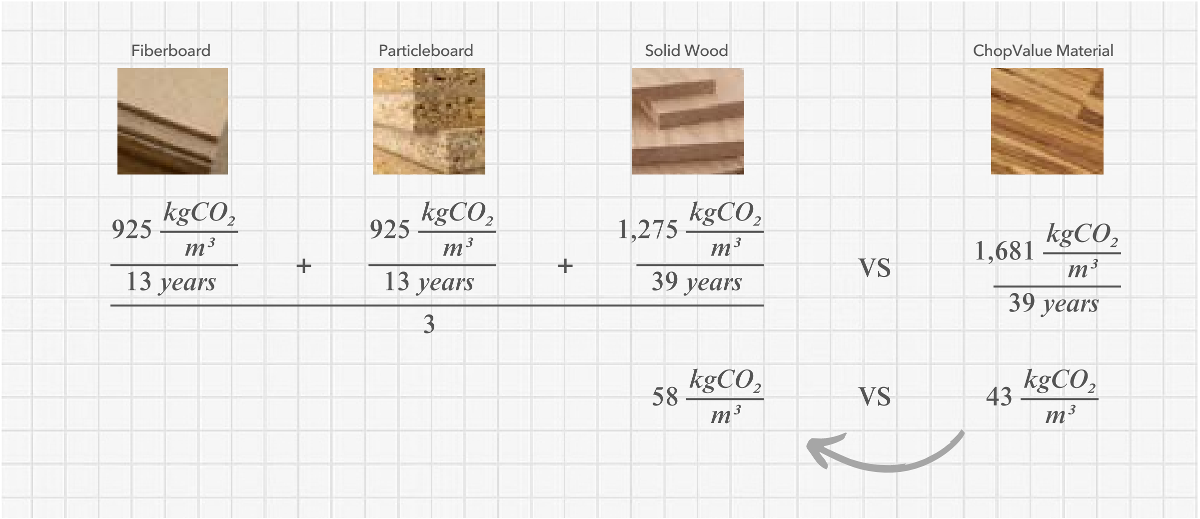
Lifecycles

This section considers the lifetime of manufactured products and their potential to be refurbished. While Fiberboard and Particleboard can only be thermally utilized after their life time (the captured carbon is released), solid wood and ChopValue material on the other hand, have the potential to be refurbished and reused by sanding and remanufacturing.

For this reason, a potential of 3 life cycles is assumed for solid wood and ChopValue Material, which corresponds to 39 years by considering the average product lifetime of 13 years.

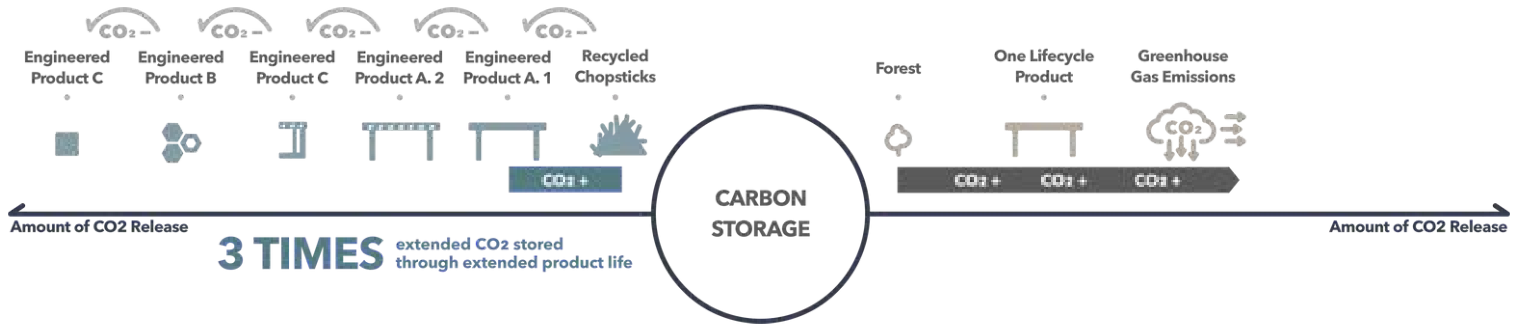
As described in the 'Resource' section, a single cubic meter of spruce absorbs 1,156 kg of CO2. With the 80% wood content per fiber or particle board, this corresponds to 925 kg of CO2 per cubic meter. The amount of CO2 absorbed for solid wood and ChopValue material was described in the same section and is 1,257 kgCO2/m³ and 1,681 kgCO2 /m³.

The comparison of the three commercial materials: fiberboard, particleboard and solid wood vs. ChopValue Material, are also shown in the figure below.



$$\frac{\frac{925\,\frac{kgCO_2}{m^3}}{13\ years} + \frac{925\,\frac{kgCO_2}{m^3}}{13\ years} + \frac{1{,}275\,\frac{kgCO_2}{m^3}}{39\ years}}{3} \quad \text{VS} \quad \frac{1{,}681\,\frac{kgCO_2}{m^3}}{39\ years}$$

$$58\,\frac{kgCO_2}{m^3} \quad \text{VS} \quad 43\,\frac{kgCO_2}{m^3}$$



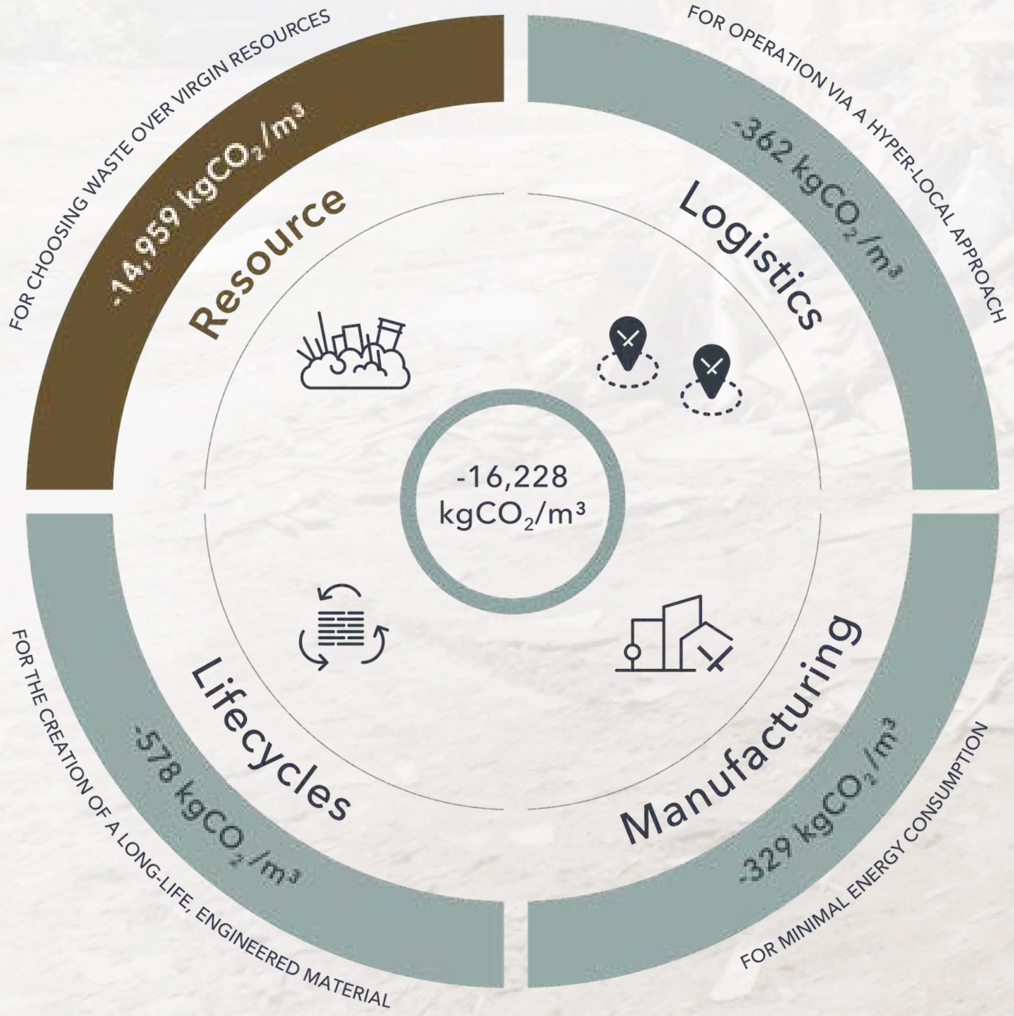
Summary

For each square meter produced from commercial material, 1.34 times more CO2 is emitted than if it were produced from ChopValue material. If a client chooses one single cubic meter of furniture to be made out of ChopValue material instead of commercial material, 1,681 kg of CO2 is emitted instead of 2,259 kg of CO2 (1,681 kgCO2 /m³ x 1.34). Thus the difference, 578 kgCO2/m³, can be saved.
This corresponds to -26% less CO2 emissions compared to commercial material.

As Forests Shrink, Landfills Grow.

With ChopValue's approach, up to 16,228 kg of CO2 emissions can be saved per cubic meter of furniture by choosing ChopValue Engineered Material over conventional commercial materials.

This calculation is not intended to disparage wood as a renewable resource - renewable resources are a more sustainable choice. However, the main point is to raise awareness of the unused potential of many resources, where the input is disproportionate to the lifespan. The reuse of already processed resources is often more energy efficient and often available in the immediate vicinity, so that a hyperlocal approach can save further emissions due to the shorter transportation route. We recommend using renewable resources over non-renewables, but consider waste streams first.



Resource Impact:

One of our most significant positive contributions as a company is the elimination of overseas transportation for raw materials, greatly reducing carbon emissions associated with long-distance shipping. In addition, the preparation of virgin materials for production is highly energy-intensive, a step we completely bypass, further reducing our environmental footprint.

3.2 Carbon Stored vs CO2 Emissions Saved

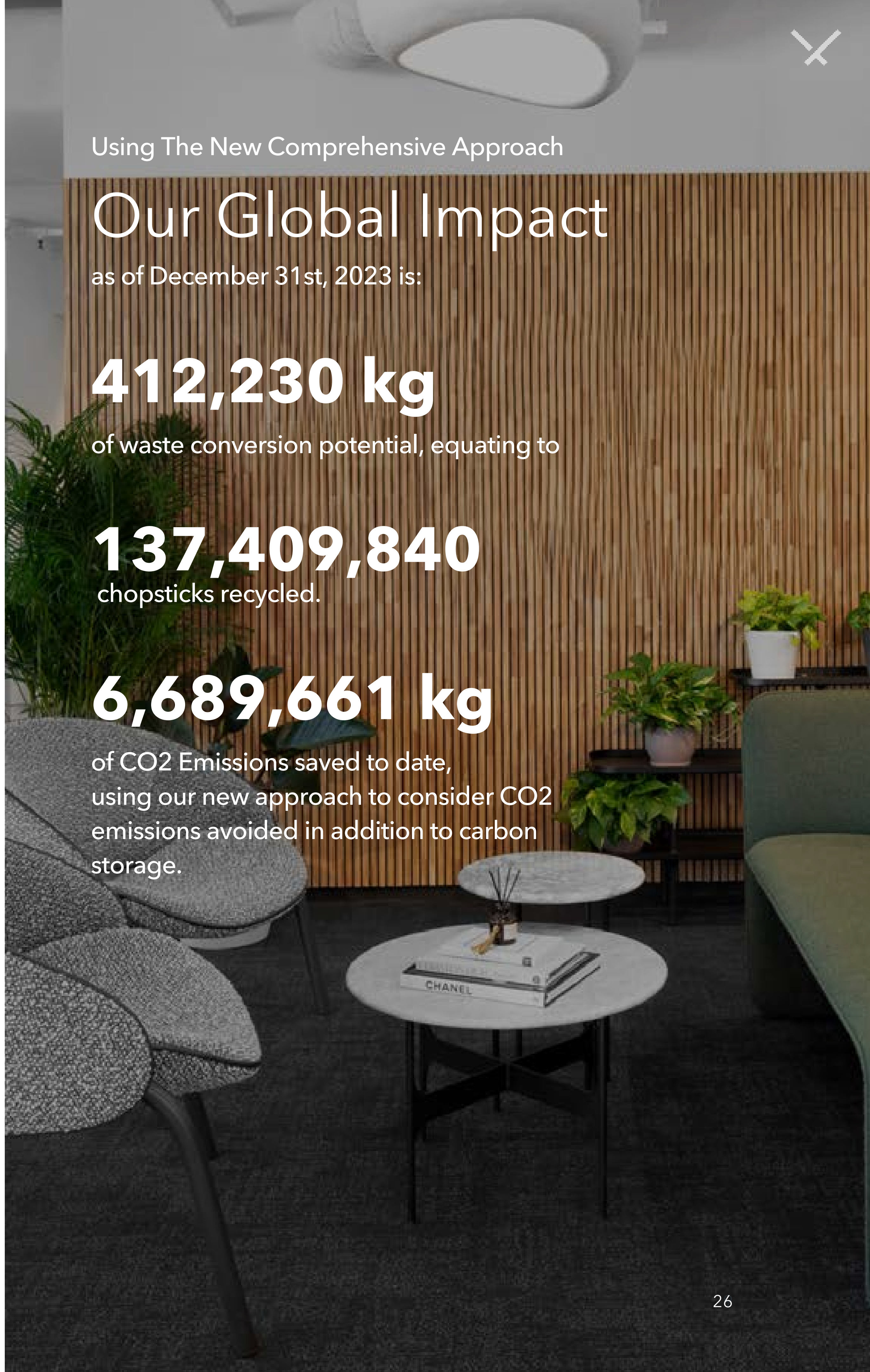
The introduction of the 'CO2 emissions saved' approach offers a significantly wider perspective compared to the original 'carbon stored' method, which solely accounted for the 188,801 kg of carbon stored up to December 31st, 2023 within the final product. This new approach enables a more comprehensive understanding of the environmental impact, particularly in terms of the carbon emissions mitigated throughout the production process and through the method in which we urban harvest our resources.

Carbon is naturally bound (or stored) in materials and only becomes carbon dioxide (CO2) through oxidation when exposed to air. Through this, the carbon is no longer stored and only in this form (and in excessive quantities), significant problems can arise. Therefore, it is crucial to look at carbon in its oxidized form and shift the focus to monitoring and reducing "CO2 emissions" rather than simply considering the "carbon stored" in materials.

The new approach considers not only the physical amount of carbon stored, but also the amount of CO2 emissions avoided. This calculation highlights the CO2 emissions that are saved.

The calculation shows that for each cubic meter produced from a material that is already in the loop, and processed through the concept of hyperlocal manufacturing, 16,228 kg of CO2 emissions can be saved.
This represents 16,228 kg of carbon dioxide emissions that would have been generated per cubic meter of final product if ChopValue did not offer a more sustainable alternative to conventional commercial materials.

With 137,409,840 chopsticks recycled by the end of 2023, an average weight of 3 grams per chopstick, and an average density of 1,000 kg per cubic meter, we have transformed 412,230 kg of waste conversion potential mass into beautiful end-products, saving 6,689,661 kg of CO2 emissions to date.



Using The New Comprehensive Approach

Our Global Impact

as of December 31st, 2023 is:

412,230 kg

of waste conversion potential, equating to

137,409,840

chopsticks recycled.

6,689,661 kg

of CO2 Emissions saved to date, using our new approach to consider CO2 emissions avoided in addition to carbon storage.

3.3 Scopes 1, 2, and 3 Emissions

Scope 1 emissions are direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles).

Vehicle: We use a small pick-up truck for our chopsticks collections where we use software to manage the efficiency of our routes and collect from restaurants on suitable cadences according to the volume. E.g. if a restaurant is not as busy, we may collect biweekly or monthly.

Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Although scope 2 emissions physically occur at the facility where they are generated, they are accounted for in an organization's GHG inventory because they are a result of the organization's energy use.

Electricity: Our power to fuel our machinery comes from 95% renewable sources (hydro) in British Columbia.

Our hydraulic press that we developed presses tiles continuously at a fixed set temperature without requiring cooling (a standard process in other industries) - this saves us a lot of energy in our operations).

Scope 3 emissions are the result of activities from assets not owned or controlled by the reporting organization, but that the organization indirectly affects in its value chain. Scope 3 emissions include all sources not within an organization's scope 1 and 2 boundary. The scope 3 emissions for one organization are the scope 1 and 2 emissions of another organization. Scope 3 emissions, also referred to as value chain emissions, often represent the majority of an organization's total greenhouse gas (GHG) emissions.

Purchased goods and services: Paper, traveling, packaging material. We contribute as best we can to where we can control – we try to source supplies locally to support the local economy and through our franchise business model.

Franchises: Every initiative regarding sustainability (as outlined in this report) is communicated and adapted by every franchise partner location.

Reusing of crates: Introduction of standardized crates.

Combined shipping: Shipments combined with collection of chopsticks.

Remanufacturing service: For continued products' lifetime.

3.4 Centralized vs Decentralized Manufacturing

If ChopValue were to follow a centralized manufacturing approach, the supply chain would start with urban harvesting chopsticks from global collection locations and would include the shipment of these chopsticks back to the production facility in Vancouver to be processed and manufactured into viable products. These products would then be shipped globally in a central manufacturing model, causing emissions in the process.

As ChopValue follows a hyperlocal approach for decentralized manufacturing, these emissions can be avoided, resulting in a significantly less impact on the environment.

With our global growing partners, hyperlocal resource sourcing and hyperlocal sales can be achieved. Avoiding supply chains in this way eliminates emissions from transportation – on a global scale.

Performing through a hyperlocal supply chain.

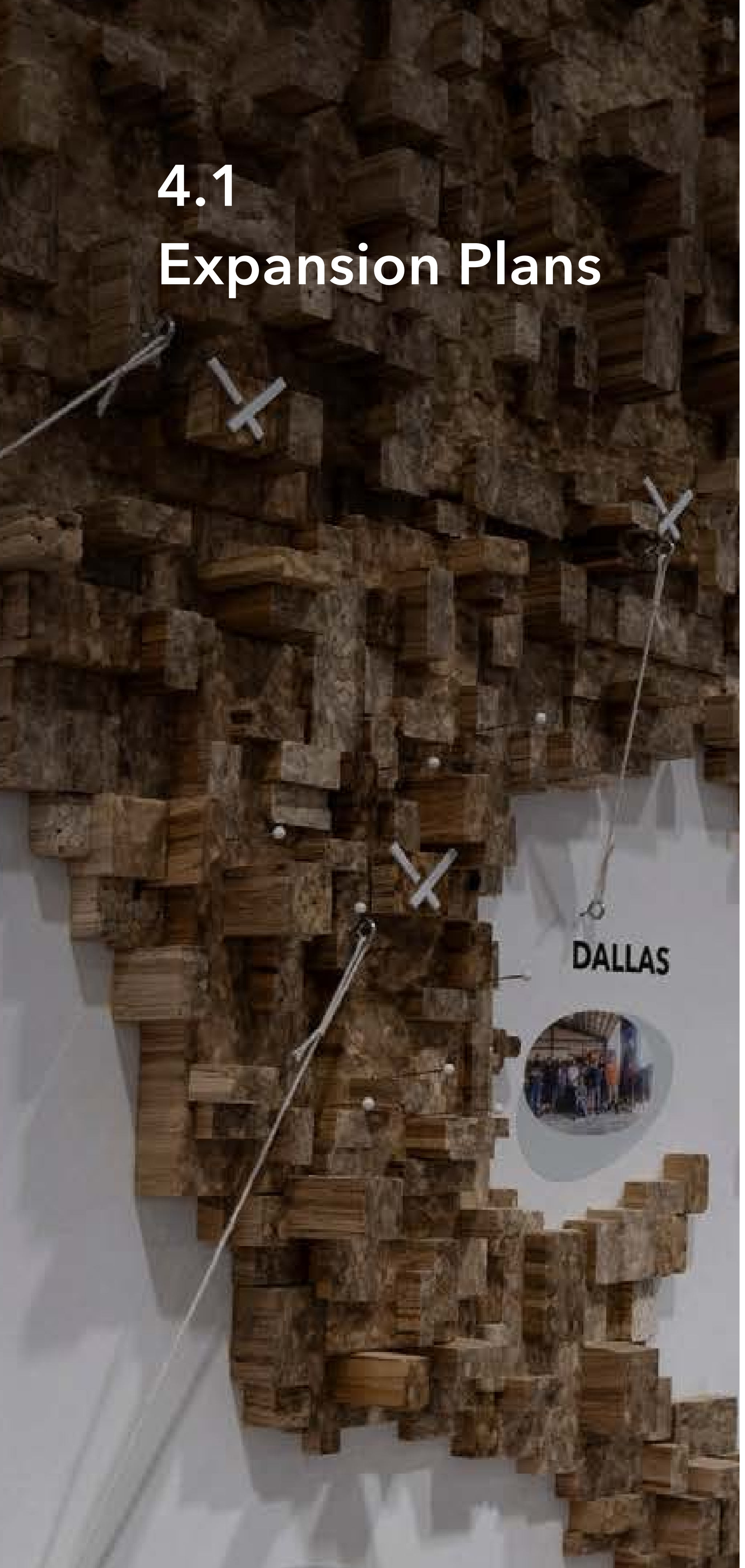
Centralized Manufacturing

ChopValue’s Decentralized Manufacturing

Made Local on A Global Scale

Lean manufacturing of high-value products under shared ownership, using locally available resources to minimize our society's environmental footprint. Our expansion philosophy ensures that ChopValue is manufacturing and delivering premium, circular products globally: carbon neutral or better.

4.1
Expansion Plans



Driven By Impact

ChopValue's collaboration with the local restaurant community has allowed the business to demonstrate that waste can be effectively used as resources. The utilization of formerly neglected materials has allowed ChopValue to bring its business model into new cities and establish itself to make a positive impact in different communities.

After systematically establishing Vancouver's efficient and profitable production facility and the success of ChopValue in international countries such as Mexico and Singapore, it has been demonstrated that ChopValue can start to make an impact at a larger scale.

Our Decisions Are Purpose Driven

Choosing Our Microfactory Locations

New ChopValue Microfactories require an abundant supply of chopsticks, an existing demand for products, and a community that is receptive to greener lifestyle choices, as well as ChopValue's goals for a cohesive, socio-environmental community.

As additional collection and manufacturing facilities are expected to spike the company's carbon footprint, the extensions must be justified by ChopValue's ability to offset those emissions and create a positive impact on the community. With the rise of ChopValue Microfactories around the world, the company will be able to establish multiple facilities for optimal, local production and distribution that will reduce transportation emissions by fulfilling customer orders using the closest Microfactory available.

Choosing Our Suppliers

As a business that aims to support the local community, it can be a challenge to find suppliers that also source their resources locally, so ChopValue does its best to purchase locally made goods wherever and whenever possible. It is important for us to have control over the emissions we produce because once it is out of our hands, the company and our customers are impacted by third-party prices, shipping, taxes, and trade agreements.

Choosing Our Partners & Collaborators

Community is important to ChopValue for making strong, lasting, mutual relationships filled with unity and participation. In order to make the biggest impact, we hope to support and inspire local businesses to support local businesses, and therefore, invest back into the local economy.

The 1.5 Billion Chopstick Vision

By 2025, we commit to having 150 Microfactories in development around the world, including Japan, Hong Kong, and Dubai. The Microfactories will provide a framework for franchise partners to establish their own business based on converting waste to resource.

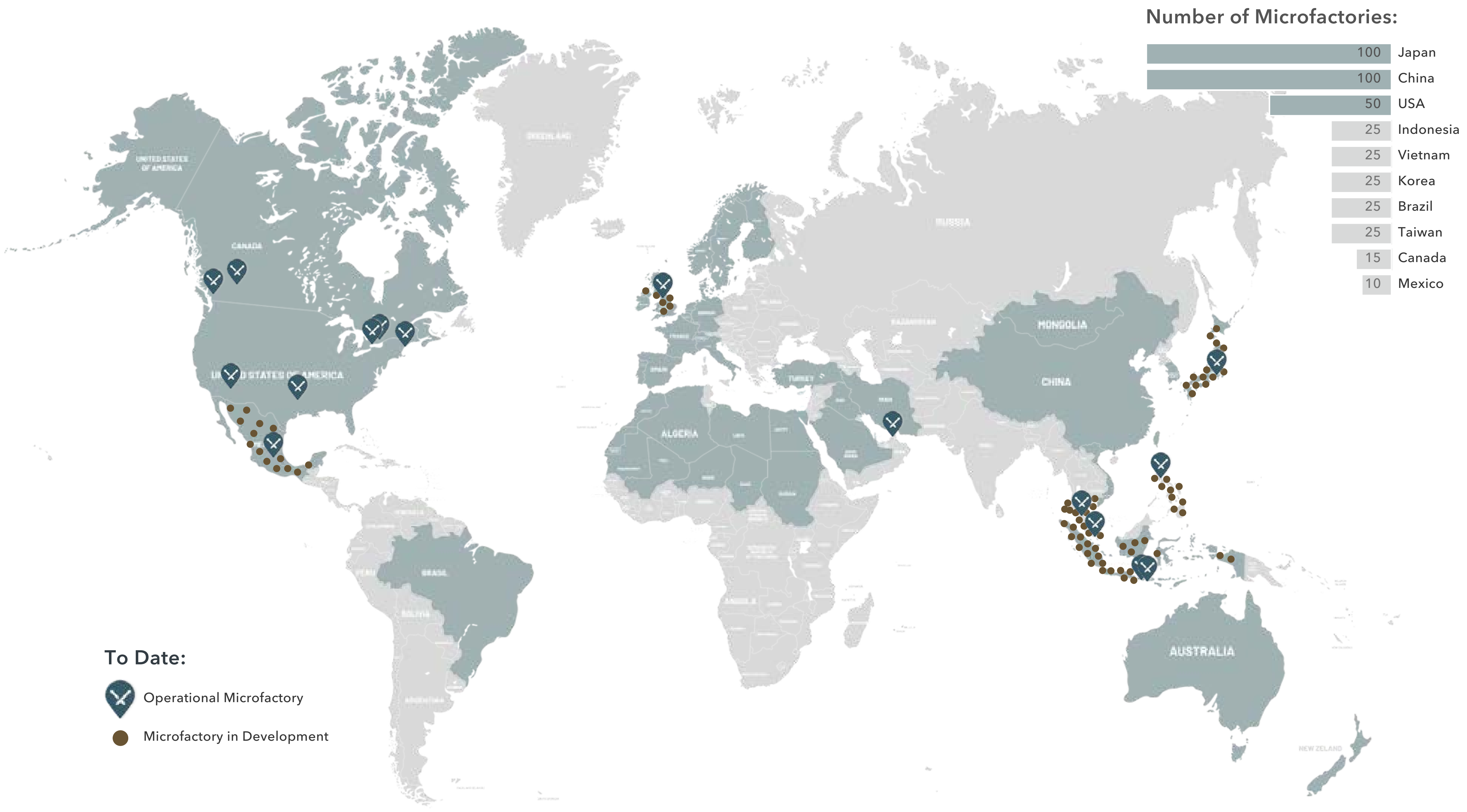
1.5+
Billion Chopsticks
Ready to be urban harvested into new performance products

150+
Microfactories
Worldwide

1000+
Locally Employed
Trades, Designers, and Engineers

Global ChopValue Opportunity Map

10 year development plan presented to strategic partners



4.2 Community of Partners

Our relationship with partners is at the core of our business.

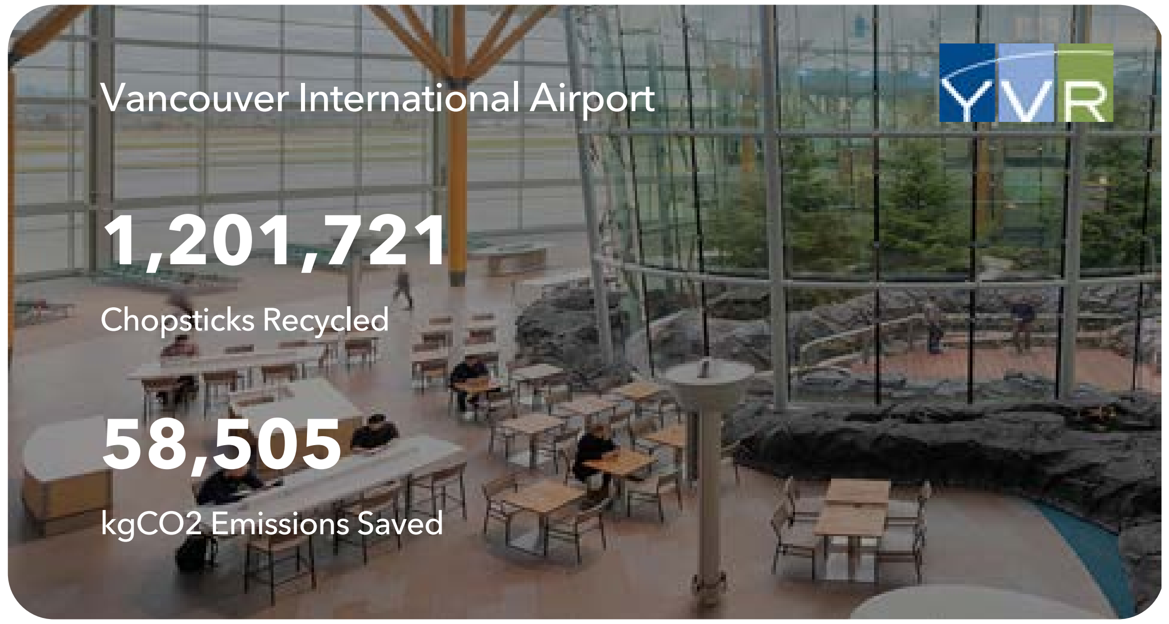
We bring communities together to spearhead the change needed for a more sustainable future.

Our community of partners play a vital role in our business, including restaurants, hospitality partners, retailers, developers, architects, interior designers and corporations.

A ChopValue Microfactory requires a strong network of local businesses, chopstick collection partners, employees, and customers. The presence of a ChopValue Microfactory creates a local community that is engaged in the circular economy movement. Establishing each new collection partnership is an opportunity to educate and inspire others to reutilize their waste into resources. By collecting one chopstick at a time, ChopValue has created a significant positive impact across different communities, which continues to grow each year.

Key Partnerships & Collaborations

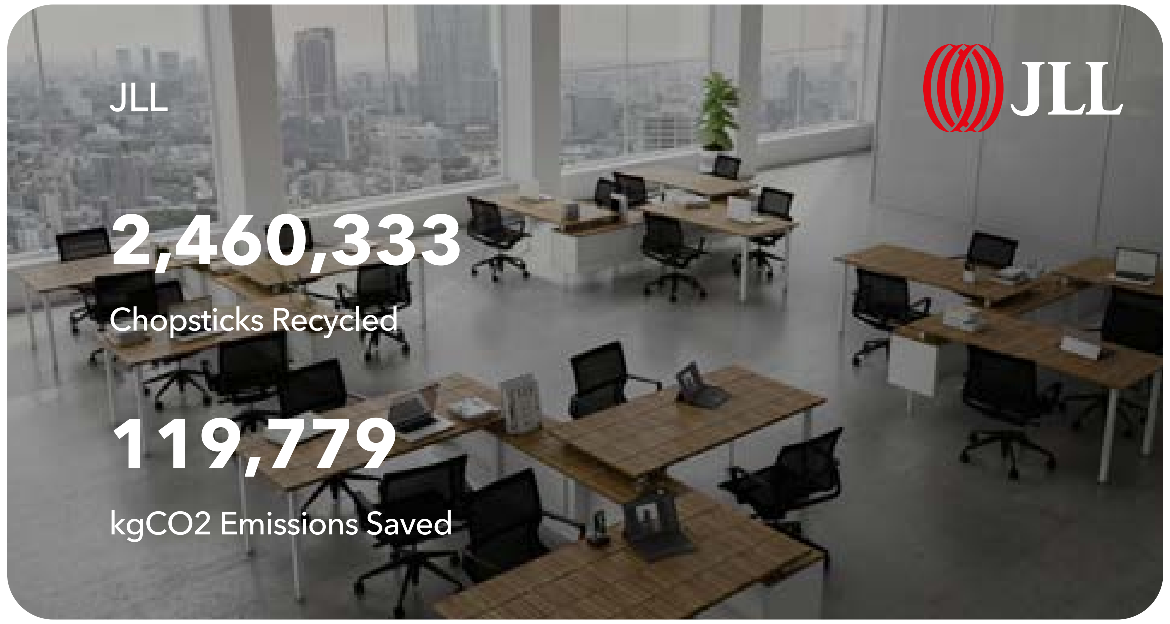
We are thankful to several collection partners and collaborators who have joined in our mission to raise awareness about the circular economy by either collecting with us or investing in our products.



Vancouver International Airport was ChopValue's first high-concentration collection partner, joining the program in December 2016. By 2019, our collaboration had achieved a significant milestone, collecting over a million chopsticks.

With the airport's goal to achieve their target of 50% waste diversion by 2020, they emphasize the importance of waste management by running internal initiatives, such as the annual 'Waste Wars', to evaluate their tenants on their waste sorting habits and accuracy for YVR's four waste streams (organic waste in green bins, plastics, paper and metals in appropriate recycling bins, and the rest in garbage). This initiative also acts as an education platform to inform staff on proper waste disposal and excite them with beautiful products that are made from the waste resources they divert.

To demonstrate their commitment to waste, YVR's recent expansion plans also highlight ChopValue in their main building materials and products.



JLL kickstarted their partnership with ChopValue through the chopstick collection program in June 2018 and soon grew to become one of ChopValue's most engaged recycling partners. With the united belief that wasted resources should be utilized to accelerate the circular economy, ChopValue has worked with JLL to work on their sustainability targets across their real estate portfolio.

With all the chopsticks that have been collected, ChopValue worked with JLL to create an art installation showcased at one of their premier shopping centres, spotlighting the impactful partnership.

ChopValue also collaborated with JLL to furnish the office space of a leading global technology firm's Asia Pacific Headquarters, providing ergonomic furniture solutions.

Cadillac Fairview and ChopValue both pride themselves in transparency, holding their actions accountable to the decisions made in the operation of their company. Cadillac Fairview focuses on developing and operating their properties through collaboration with local community members to find ways to continuously reduce their environmental footprints when possible.

With such a broad network and reach, they run a 'Green at Work' program where they incentivise property teams - like our recycling partner, Richmond Centre, to engage their company and employees in integrating sustainability into their daily practices, especially in their building operations and maintenance.
They see growth and opportunity in urban spaces. ChopValue runs their business the same way, ensuring sustainability is at the forefront of company values. ChopValue has produced feature walls and tabletops for the Richmond Centre food court from the chopsticks recycled from their facility and participate in their hosted events to highlight their sustainability efforts.

Google · A&W · TED · MARINA BAY Sands SINGAPORE · Fairmont HOTELS & RESORTS

The Value of Trades and Craftsmanship

We recognize the significant value of local trades and craftsmanship in our circular economy. Contrary to common belief, active participation in sustainable practices doesn't require academics – it's the dedication, hard work, and hands-on approach, coupled with a deep appreciation for product quality and design, that can drive tangible change. Embracing these principles empowers individuals and communities to play an integral role in shaping a more sustainable future, where every action contributes to the collective effort of creating lasting environmental impact.

Our material has mechanical properties and natural wooden surface characteristics similar to tropical wood, making it an easy choice as a climate positive alternative for virgin materials in furniture making and construction.

4.3 Impact Summary

As of December 2023, ChopValue's cumulative environmental impact is:

137,408,840

chopsticks diverted from landfill

The equivalent of
412 basketball courts

412,226.52 kg

of waste diverted from landfills

The equivalent of
41,222 table tops* made from our performance material

* Based on 24"x24" IMPACT construction

6,689,666 kg

of CO_2 emissions saved

The equivalent of
charging 14,822,367 cell phones

Bamboo

As A Renewable Resource.

As a material, bamboo is similar in chemical composition to wood but is a part of the grass family, making it a valuable and non-wood forest product. Easily adaptable to changes and differences in climatic and soil conditions, its connection to the grass family ensures its fast growth and ability to spread from its dense-root rhizome systems and produce a higher production yield than timber products over a shorter time period.

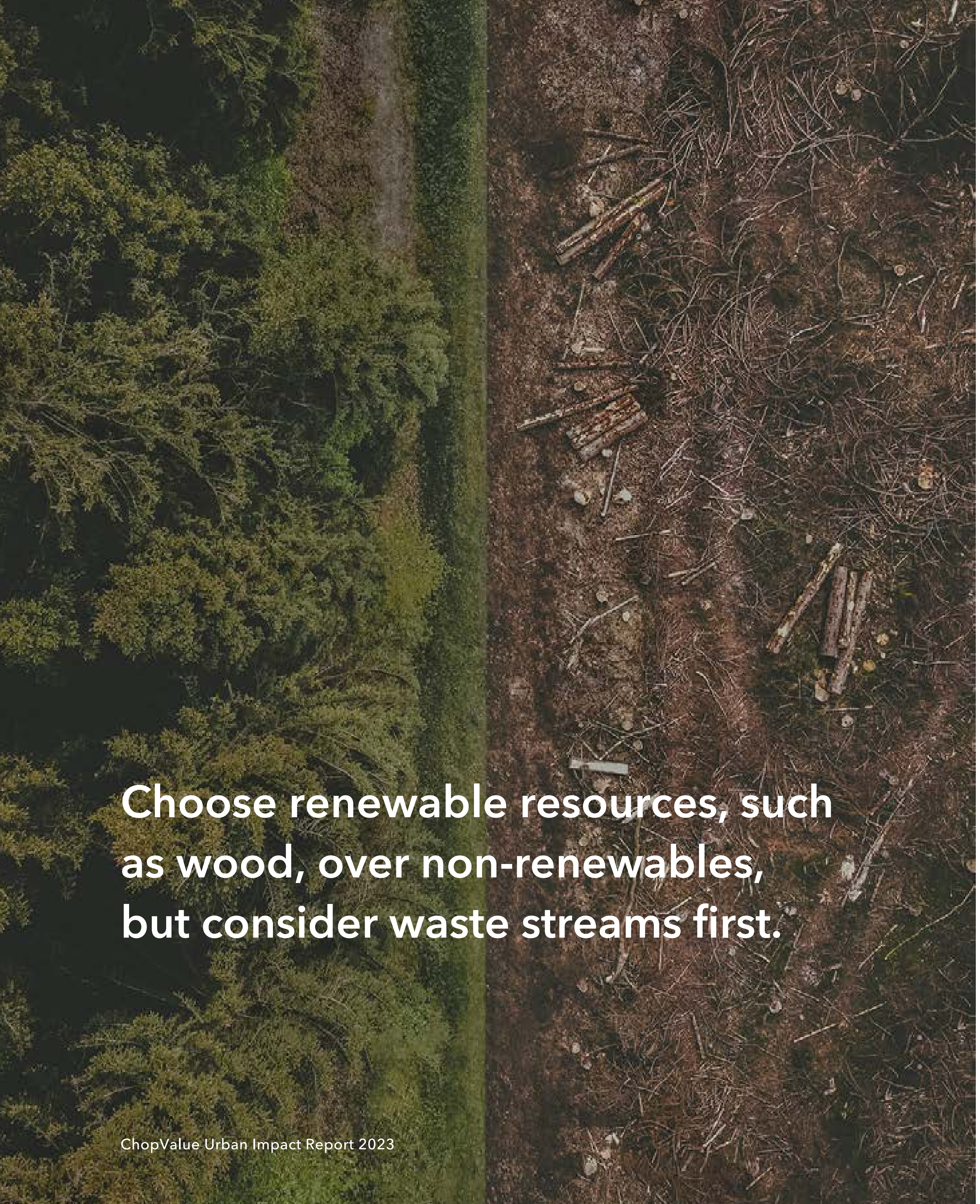
In the 'Overall Environmental Impact' chapter, a comparison with wood as a renewable resource was conducted. Due to its long growth period, averaging at least 100 years, wood ideally should be utilized for products with a lifespan matching the time it takes for the resource to regenerate—hence, 100 years. Considering sustainability needs to be at the heart of our business, effective resource allocation is paramount. Bamboo holds the advantage of regenerating every 3-5 years, aligning more closely with typical consumption patterns.

If produced locally, bamboo has an even lower environmental impact than tropical hardwood and can grow on slopes deemed unsuitable for agriculture or agroforestry crops. The ecological benefits of bamboo forests are its water conservation and prevention of soil erosion – both of which assist with land rehabilitation and carbon sequestration, mitigating forest floor degradation.

Bamboo sequesters 45.8% its total biomass as carbon.

The remanufacturing of bamboo chopsticks offers the opportunity to utilize this wasted resource and to treat it as a valuable raw material.

Therefore capitalizing on the potential to retain carbon within new products. Bamboo also has a denser composition than softwoods and is therefore more resistant to environmental changes (especially humidity) and is generally scratch resistant, both of which make utilizing bamboo advantageous compared to wood-based products. ChopValue's conversion of chopsticks into products extends their lifetime indefinitely, thereby extending the time that this carbon dioxide remains stored.



Wood

As A Renewable Resource.

The comparison in the chapter ‘Overall Environmental Impact’ could lead to the misinterpretation that wood performs negatively as a resource. This chapter therefore serves to emphasise the fundamental sustainable nature of wood as a renewable resource.

Using virgin resource such as wood is not as sustainable when compared to ChopValue material, which is created from waste streams. However, it should not be neglected that wood is still a renewable resource. Utilized through responsible forestry, this resource can be considered sustainable — especially when compared to non-renewable resources.

Choose renewable resources over non-renewables, but consider waste streams first.

While non-renewable raw materials such as concrete or steel first have to be laboriously extracted and cause emissions in the process, the production of wood as a raw material happens naturally. With sun, water and time, a tree grows naturally without the need of a factory or plant. To contrast, instead of causing emissions, the tree converts CO2 and stores it in its mass as carbon.

A full 50% of the wood consists of this converted carbon.

The aim now is to keep the carbon sequestered for as long as possible - an untouched tree manages to hold the carbon for around 300-500 years until it dies and rots. It would therefore be ideal to produce furniture that prevents wood from rotting for a longer period of time.

A wooden house, industrial parquet flooring or a solid cabinet that lasts for over 100 years covers the time until another tree has had time to reproduce. A piece of furniture made of particleboard, with a lifespan of 10 years, not only reduces the time that the carbon could have remained stored in the living tree, but also does not take into account the growth time required for a felled tree to regrow.

For wood to be considered sustainable as a renewable resource, the lifespan of manufactured products must align with the regrowth period of trees.

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