Torus Innovation Proposal
for LG Elextronics

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Innovation Space
Arizona State University
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Team Pink Matter

About us

By combining our unique talents we hope to create useful, innovative products.

Seyla Muise

Industrial designer tasked with separating Torus's look and feel from other existing products in the market.

Hannah Skogebo

Business analyst focused on overseeing marketing and deployment strategies of Torus.

Joe Ackerman

Electrical engineer tasked with the logistics of Torus's functions and ensuring its production.

Andrew Htoon

Visual communication designer focused on developing branding and visual identity of Torus.

Heejoo Min

Sustainability expert ensuring that Torus's product lifecycle has minimal environmental impact.



LG Electronics

About our sponsor

Designed with you in mind, LG products offer innovative solutions to make life good.

Because life waits for no one, at LG USA we create consumer electronics, appliances and mobile devices that are designed to help you connect with those who matter most. Whether that means cooking a nutritious, delicious meal for your family, staying connected on-the-go, sharing your favorite photos, watching a movie with your kids or creating a clean, comfortable place to celebrate the moments that matter, we'll be there for you every step of the way.

Designed with you in mind, LG products offer innovative solutions to make life good. With intuitive, responsive controls, sleek, stylish designs, and eco-friendly features, our collection gives you the power to do more at home and on the go.



Improving Comfort

By changing cooling

Our team aimed to change a market that has stayed the same for over 130 years.

According to US-Inventions.com, Franklin Institute in 1904 officially credited Schuyler Wheeler for inventing portable fan in 1882. The fan had two blades and used extremely dangerous open wound motor to push air forward. Since then, over 130 years, the fan has more or less stayed the same blowing air in only one direction.

Our team aimed to change a market that has stayed the same for over 130 years. Although there have been some innovations in the shapes of the fan blades and energy efficiency, one-directional air flow is a highly inefficient way to circulate air throughout a space. Our product circulates air in 360 degrees without oscillation. Our team was seeking ways to change current standalone fans to better circulate air around the room. Torus blows air in 360 degrees and offers a more efficient and sustainable way to better circulate and cool the air in a space.



The Current Market

Existing fans

Many standalone fans of today's market lack the ability to properly circulate air.

When it comes to cooling a space down, stagnant air causes a great deal of discomfort for people. To manage the stagnant air in their home many people will opt to a standard box fan. Many standalone fans of today's market lack the ability to properly circulate air within a space. User's must settle for a fan that only blows in one direction or wait for a model that oscillates to swing back and forth in their direction. This forces users to choose between enduring long periods of stagnant warm air or sacrifice areas which their fan would help to cool down. In typical households, quick cooling for large rooms requires several of these inefficient fans placed in different locations to circulate air properly.



Design Language

Torus mood boards

The design of Torus is centered around a neutral, bold and elegant look.

The look and feel that customers experience regarding Torus is key to its design. Torus aims to be a product that feels comfortable inside of a modern home and offers an idea of luxurious comfort and cooling. Our target audience wants to enjoy the comforts that Torus offers without the industrial look that a standard box fan may have.

The design of Torus is centered around a neutral, bold and elegant look. This offers users a product that maximized comfort and minimizes the visual noise that many current market products contribute to a variety of living spaces.

Neutral

Neutral is functional, clean, unisex form with taupe based colors and geometric shapes.



Bold

Bold is a natural, playful theme with organic shapes, complex textures and bold colors.



Elegance

Elegance has curvy, complex forms with black and white tones.



Product Benchmarking

Competitor design analysis

Design	Model	Personality	Form	Textures	Color
	Dyson Air	Technological Modern	Simplistic Geometric	Plastic Shiny	Neutral Accents
	Lasko Air	Functional Business	Elegant Curved	Plastic Neutral	Neutral
	Vornado Air	Playful Unique	Different Long	Plastic Dark	Black
	Seville Tower	Functional Business	Elegant Curved	Plastic Neutral	Neutral
	Lasko Desk	Functional Business	Elegant Curved	Plastic Neutral	Neutral

Model	Personality	Form	Textures	Color
Torus	Elegant Bold	Simplistic Organic	Complex	Black White



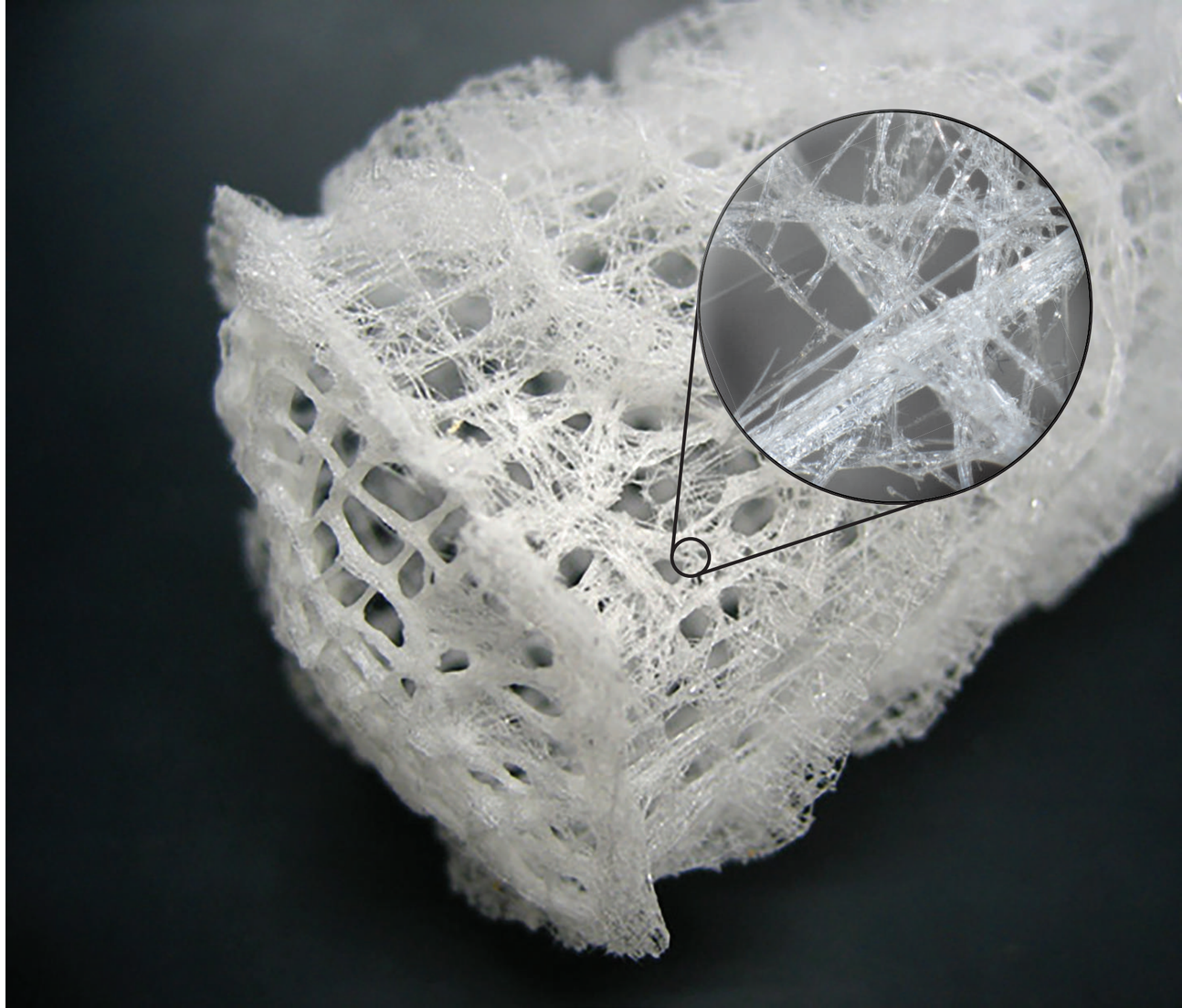
Inspired by Nature

Venus flower basket

Flexible but tough, these glass fibers make small squares and form a cylinder.

Venus flower basket is a sea sponge found commonly in the deep ocean floor near the Philippines. This tube shaped animal filter through seawater using their skeleton made of silica, the main components of glass. Glassy thin fibers of venus flower basket may give impression of fragility. However, the way it structures and organizes itself makes the sponge very tough and stable. Flexible but tough, these glass fibers make small squares and form a cylinder with a cap on top. Also the spiral that goes around the tube strengthens the structure. It prevents the structure from crushing and twisting. Our team looked into the structure and material of venus flower basket to apply its material and structure to our fan, Torus.

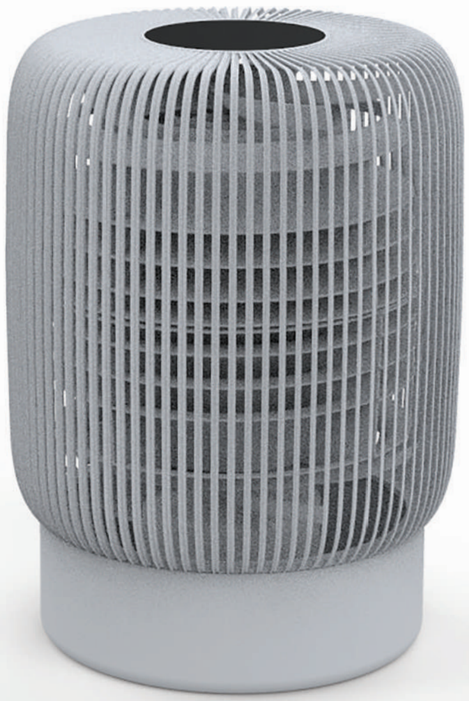
Inspired by small squares that make up the cylinder, we incorporated the structure to our design. It allows Torus to have breathing holes all around the cylinder to push out air 360 degree yet, have strength to support itself. Also the thin glass fiber of venus flower basket is light but when put together into a structure it provides elasticity and strength. We are looking into using the 3D printed silica as our material in the future to make the fan more lighter, affordable and sustainable. Using thin silica fiber and finding a way to structure like venus flower basket, we can reduce the amount of material used to make the exterior and weight of the product into more than half. Although it is light-weight, the pattern on Torus that mimics venus basket will provide enough strength to support the motor and other mechanical parts.



The venus flower basket
inspires the outer shell of Torus.

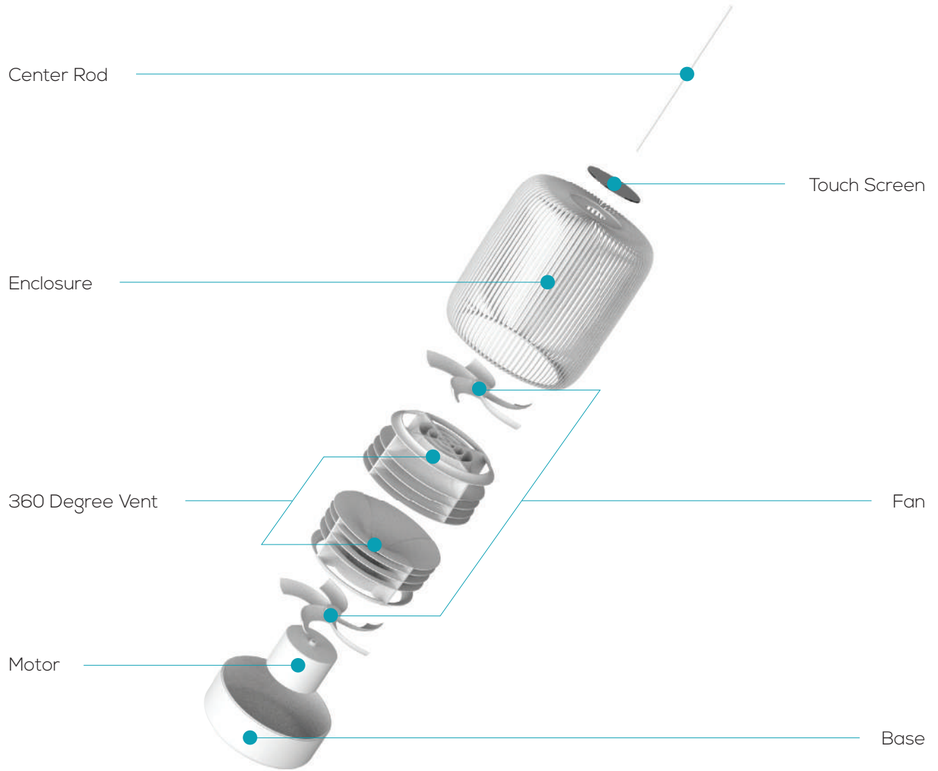


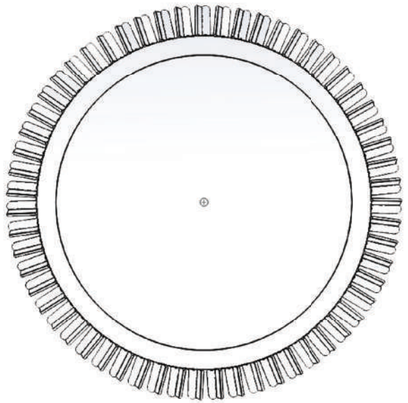


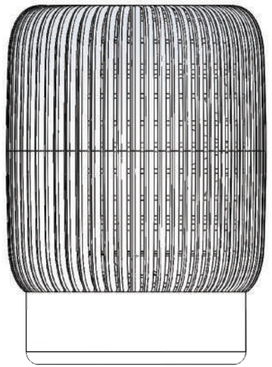


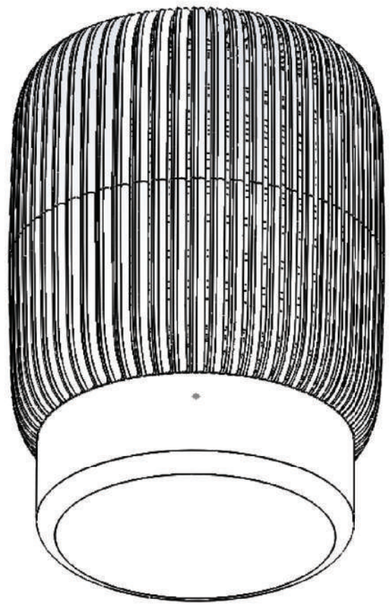


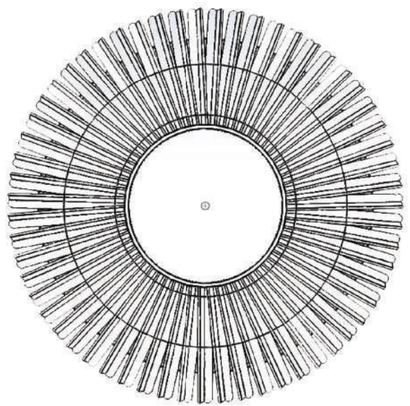


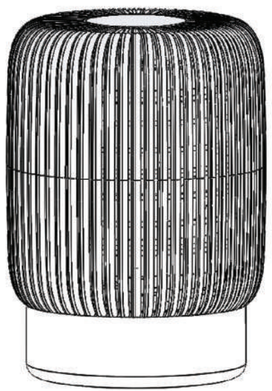

Center Rod
Touch Screen
Enclosure
360 Degree Vent
Fan
Motor
Base

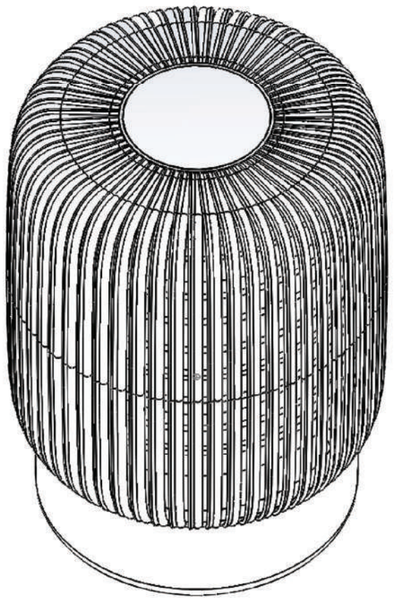












Technology & Torus

A look inside 360° air flow

Torus uses a cutting edge DC motor developed by LG to provide 360° air flow.

Combining new technology and an innovative design allows Torus to standout and be a truly unique product. Torus uses a cutting edge DC motor developed by LG to provide 360° air flow. This allows the fan to simultaneously cool multiple people around the fan continuously. In order to maximize comfort Torus also aims to minimize the amount of noise that it produces while operating. The new motor and unique vent design provide users with a single solution to cooling and comfort.



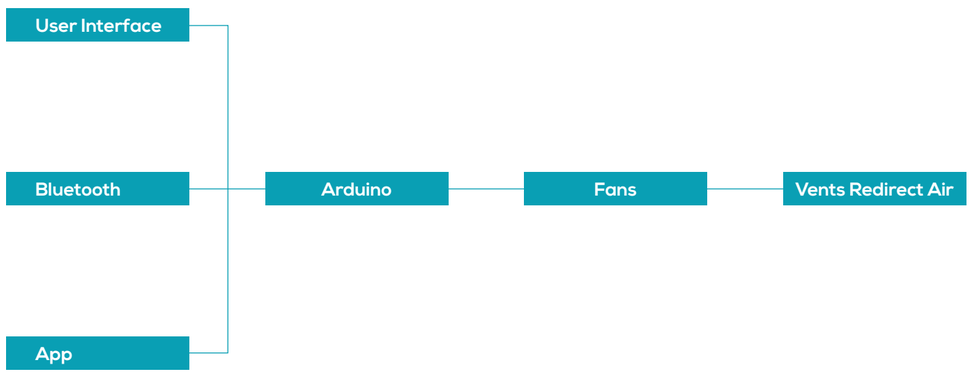
Function Tree Diagram

Torus function breakdown

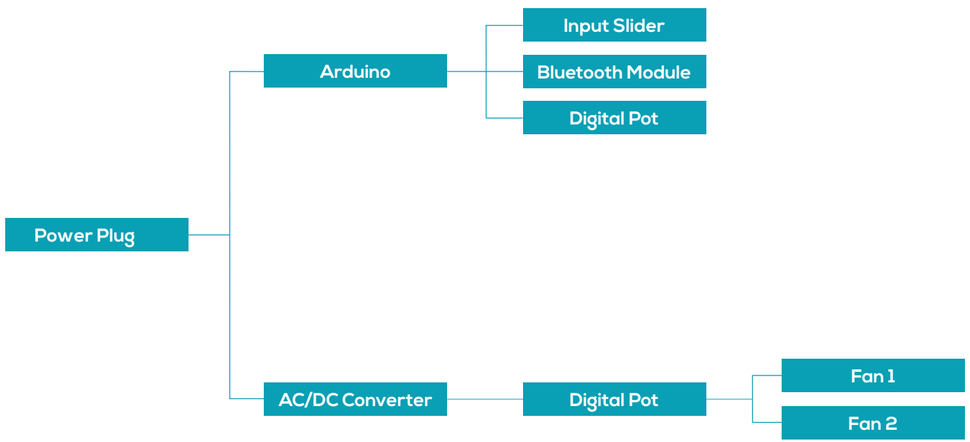


Function Block Diagrams

Functionalities and the user



Functionalities and the components



Specifications Sheet

Requirement Type	Demand or Wish	Requirement	Requirement Details
Geometry	D	Height	18 Inches
	D	Diameter	10.5 Inches
	W	Weight	Less than 20 Pounds
Kinematics	D	Air Flow	Air flow is created in full 360 degrees
	D	Air Direction	Air is brought in through top and bottom
	W	Adjustable	Adjustable air direction in 360 degrees
Recycling	D	Material	Total of 70% recycled content
	W	Material	Total of 100% recycled content
Quality Control	W	Lifetime	Unit lifetime of 2 or more years

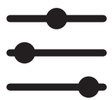
Requirement Type	Demand or Wish	Requirement	Requirement Details
Forces	D	Air Flow	Air is pushed out through the vents
	D	Diameter	10.5 Inches
	W	Weight	Less than 20 Pounds
Power	D	Setup	Connects to 120V outlet
	W	Battery	Battery Power that lasts 6 or more hours
	W	Efficiency	Energy Star Rating
Assembly	D	Setup	No need for reassembly after moving
	W	Maintenance	Easy to disassemble for cleaning

Problem Understanding Form

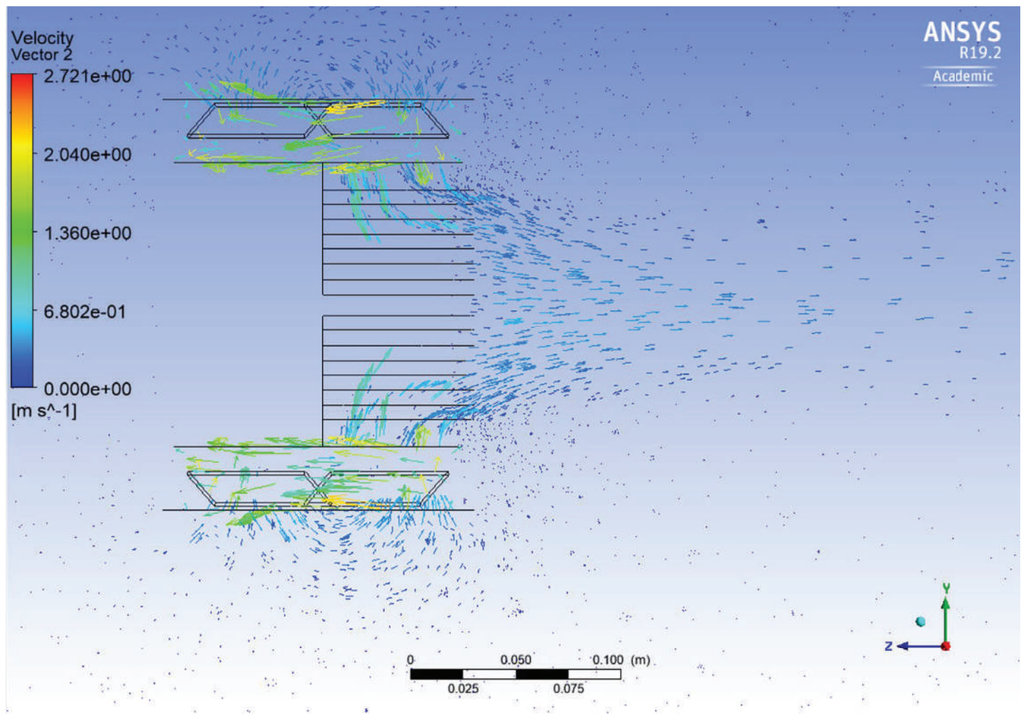
Key	Customer Needs	Engineering Requirements											
		A	B	C	D	E	F	G	H	I	J	K	L
A Setup Time	Energy Efficiency	5	1	3	5	5	1	1	3	5	5	1	5
B Fan Rotational Speed	Air Flow Effectiveness	5	1	3	5	5	1	3	3	5	3	1	5
C Weight	Portability	1	5	5	1	1	3	1	1	1	1	1	1
D Energy Usage	Easy Setup	1	5	5	1	1	3	3	1	1	1	3	1
E Air Quality	Low Noise	5	1	1	3	1	1	1	1	1	5	1	3
F Easy to Clean	Air Purity	3	3	1	3	5	5	1	1	5	3	1	1
G Materials Used	Easy to Clean	1	3	1	1	5	5	3	5	3	1	1	3
H Manufacturing Process	Attractive Appearance	1	3	3	1	1	1	5	5	1	1	3	1
I Sustainability	360° Air Flow	5	5	3	5	1	1	1	1	1	3	1	3
J Variable Air Velocity	Innovative	3	3	3	3	1	1	3	3	3	5	5	5
K IOT Connectivity	Cost	3	3	3	3	3	1	5	5	3	1	3	3
L Adjustable Air Direction	IOT Connectivity	1	1	1	3	1	1	1	3	1	5	5	5
5 Most Important	Adjustable Air Direction	3	3	3	3	1	3	1	3	1	1	3	5
1 Least Important	Sustainable	3	1	1	5	5	1	5	5	5	5	1	1

Air Flow Breakdown

Morphological chart

Sub Function	Solution 1	Solution 2
Limit Range of Coverage	Limit Range Symmetrically 	Limit Range in One Direction 
Control & Adjust Variable Speed	Control via Knob 	Control via Slider 
Air Movement within Vents	Concentric Vents 	Open Center System 

Ansys simulation



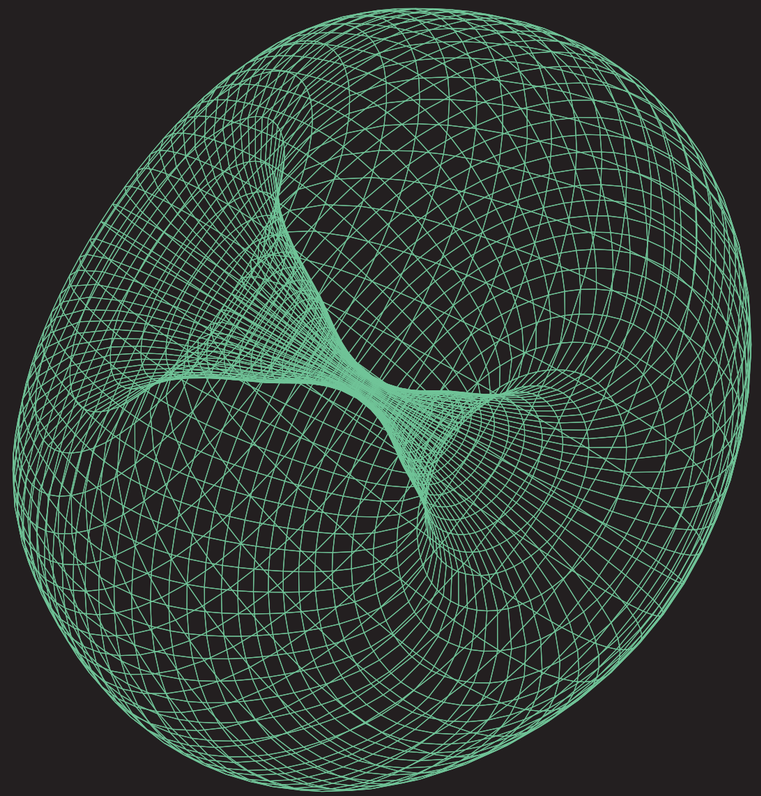
Brand Overview

The identity of Torus

torus

Air All Around

Torus is named after the ring like shape in which it moves and circulates airflow. The logo is a wordmark that alters the "O" to mimic the ring like shape that the air will circulate in the product. The name is sleek and simple and gives users an idea of what to expect when using Torus.



Brand Benchmarking

Competitor Analysis

Brand	Personality	Form	Color	Typography
Hunter	Rural	Logotype Classic	Green	Script Sentence case
Honeywell	Industrial	Logotype Old style	Red	Sans-serif Sentence case
LASKO	Industrial	Logotype Heavyweight	Blue	Sans-serif Uppercase
BIONAIRE	Futuristic	Logotype Geometric	Black	Sans-serif Uppercase
dyson	Modern	Logotype Geometric	Black	Sans-serif Lowercase
Holmes	Modern	Logotype Geometric	Black	Sans-serif Sentence case

Marketing

Audience message matrix

Audience/Stakeholder	Message/Benefit	Channel
Homeowners	Torus will help airflow in your home	Television Ad
College students/ Renters	Torus is portable and can be moved from place to place	In-store demo
Homeless Shelters/ Charities	Torus will help provide cooling and comfort inside shelters	Returns are donated to charities

Brand Guidelines

Logo, colors and typography

Color Logo

torus

Monochrome Logo

torus

Color Palette

00-00-00-100
35-31-32
#23LF20

84-16-27-00
00-159-181
#009FB5

00-00-00-00
255-255-255
#FFFFFF

57-00-53-00
110-196-152
#6EC498

Personality

Cool/calm
Modern
Sleek
Clean
Minimal
Intelligent
Comfortable

Typeface

Nexa Light
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Nexa Bold
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Area of isolation



With the exception of the tag line, nothing should enter the area of isolation around the wordmark. The tag line should be the same length as the logo and sit on the bottom border of the area of isolation.

Logo Usage

Colors may not be altered or inverted



Solid logo must be brand color palette colors, no outlines



Do not warp or distort logo



Do not apply effects to logo



Torus.com

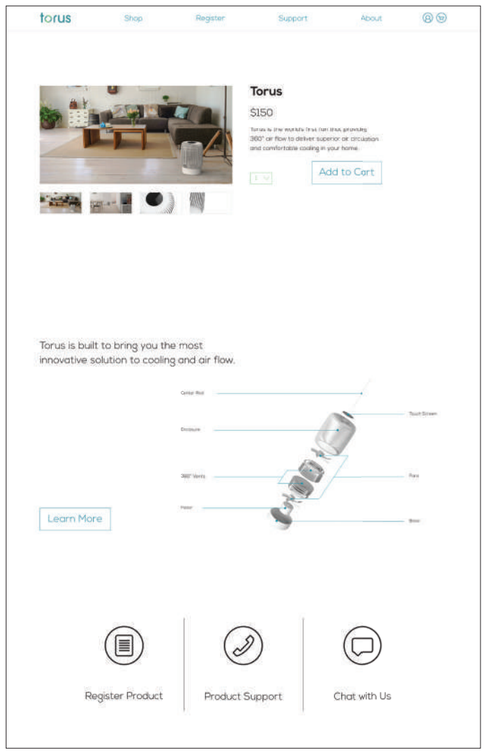
Website walkthrough

A simple and clean site will offer users a hassle free shopping experience.

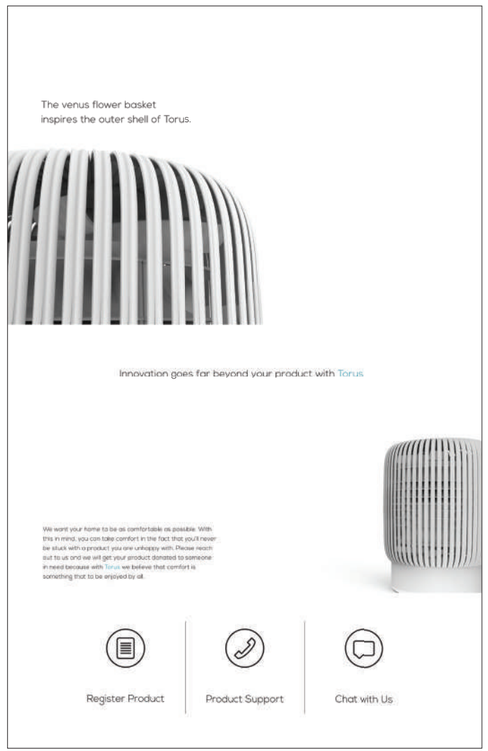
The Torus website will offer customers a venue to purchase or learn more about the product and its benefits. In a world of increased online shopping, Torus plans to compete by developing a minimalistic website that matches the look and feel of the product and fits within brand standards. A simple and clean site will offer users a hassle free shopping experience. Customers will be able to purchase and register their products through the site or simply learn more about the various innovations Torus is making in both fan technology and in the cooling tech industry.




torus
Shop
Register
Support
About
Torus
Air All Around
Designed for maximum comfort and using cutting edge technology,
Torus is the only fan that provides consistent 360° air flow.
Shop Torus
Learn More
Register Product
Product Support
Chat with Us


torus
Shop
Register
Support
About
Torus
$150
Add to Cart
Torus is built to bring you the most
innovative solution to cooling and air flow.
Learn More
Register Product
Product Support
Chat with Us


torus
Shop
Register
Support
About
Inspired
by Nature
The venus flower basket
inspires the outer shell of Torus.
Innovation goes far beyond your product with Torus


The venus flower basket
inspires the outer shell of Torus.
Innovation goes far beyond your product with Torus
Register Product
Product Support
Chat with Us

Torus: Air All Around

The pitch

Torus, the only fan that distributes air in 360 degrees

If you were to take a tour of suburban American homes as summer is just beginning and take a look inside each of their closets, you are likely to find someone digging out an old, ugly box fan on that first 90 degree day. The family will likely plug in the loud, buzzing fan while all family members; grandma, kids, and dogs alike, would crowd the fan, fighting for a just little breeze to cool them off too! Before you realize that you're going to need to another ugly fan before this summer, let us introduce to you: Torus, the only fan that distributes air in 360 degrees; so that you no longer have to stand underneath the fan at just the right spot, in just the right position to cool down.



Implementation Timeline

- Create the Team
- Confirm Office Space
- Consumer and Market Research
- Usability testing of Prototype Alpha
- Develop Prototype Beta
- Test Market Advertising
- Advertising Deployment
- Confirm Manufacturing Space
- Develop Prototype
- Develop Prototype Alpha
- Refine Prototype Alpha
- Test Market Product Launch
- Product Deployment





Listing of Services

Our services must be responsive, fast, and friendly.

Since Torus' primary goal is to increase the comfort for everyone living in a home, our services must be responsive, fast, and friendly. We plan to offer maintenance and repair services available 24/7, with a human on the phone rather than an answering machine. This team will likely be made up of trained LG Electronics employees, specifically for Torus and its unique needs.

Torus will also require ongoing support staff, most likely through our sponsor company of LG Electronics, for needs other than just repair. We hope to have an easy-to-use, interactive online support system in order to make this the easiest appliance to use in your whole house; so easy that the whole family can use it without fear.

Finally, Torus will be manufactured with components that are easily recycled so that we can promote a take-back program, in which retired models are returned to us in exchange for some benefit. This will allow us to minimize our end-of-life cycle impact on the environment.



Concept Testing

Torus and consumers

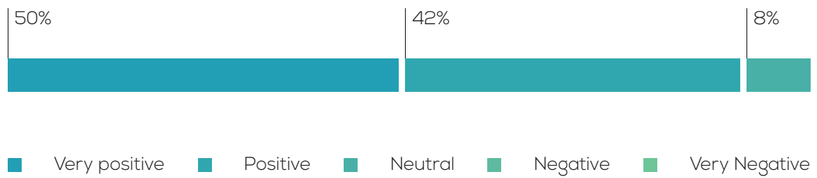
Through concept testing, we gathered information regarding the potential success of Torus.

Concept Testing is a survey method used to determine how a new business idea (product/service) resonates with a target audience. It focuses on gathering insights around the appeal, positioning, strengths and potential of a new product or service. Through concept testing, we gathered information regarding the potential success of Torus. The testing also offered insight on potential improvements that Torus could implement in the future. Information gathered from our concept testing will be utilized to properly market and improve Torus's ability to perform at deployment.

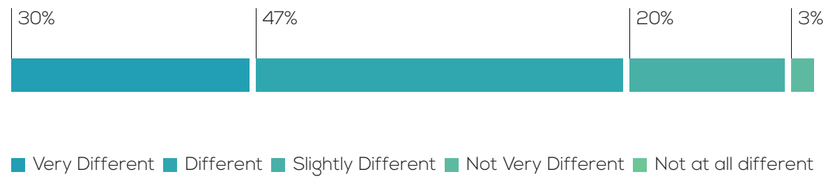


Concept Testing Results

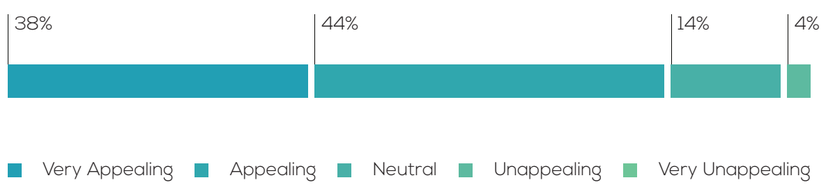
Initial reaction



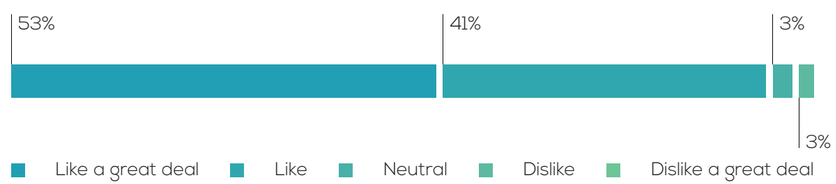
Uniqueness of concept



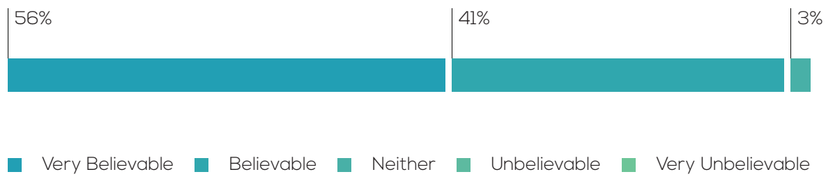
Concept appeal



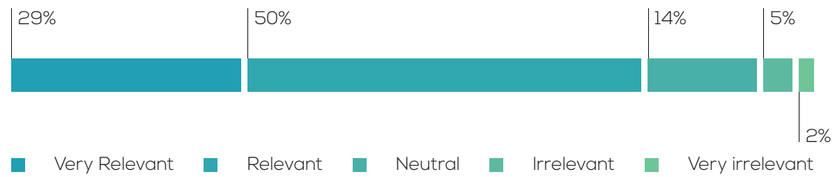
Concept likability



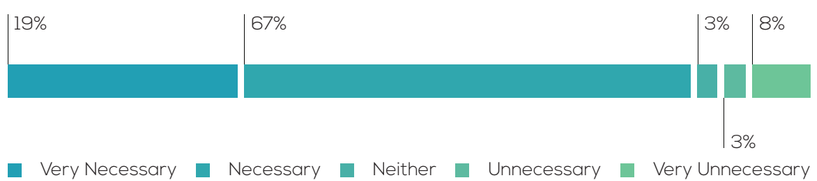
Concept believability



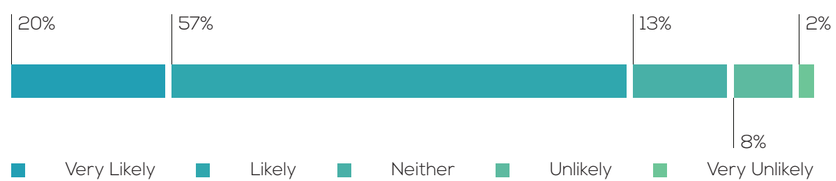
Concept relevance



Need for concept



Likelihood to buy



Business Model Canvas

Key Partners	Key Activities	Key Resources	Cost Structure
ASU	R&D	Materials	R&D
LG Electronics	Patenting	Manufacturing	Manufacturing
	Marketing	Components	Office Space
	Manufacturing	Distribution	Overhead Costs
	Distribution	Office Space	Labor
	360 degree flow	Wind Flow Technology	Market Testing
			Advertising

Customer Relationships	Customer Segments	Channels	Competition
Reliable	Tech-minded Consumer	Business to Business	Hunter
Helpful	Environmental Consumer	Online Presence	Honeywell
Quick	Health Conscience Consumers	Cost-minded Consumer	Lasko
Human Interaction	Cost-minded Consumer	Big Box Retailers	Dyson
Non Automated Service			Holmes
			Bionaire

Value Propositions	Revenue Stream
Air Distribution	Direct Retail
Air Purification	Online Sales
Reduced A/C Bill	Big Box Retailers
Improved Air Flow	

Sustainability

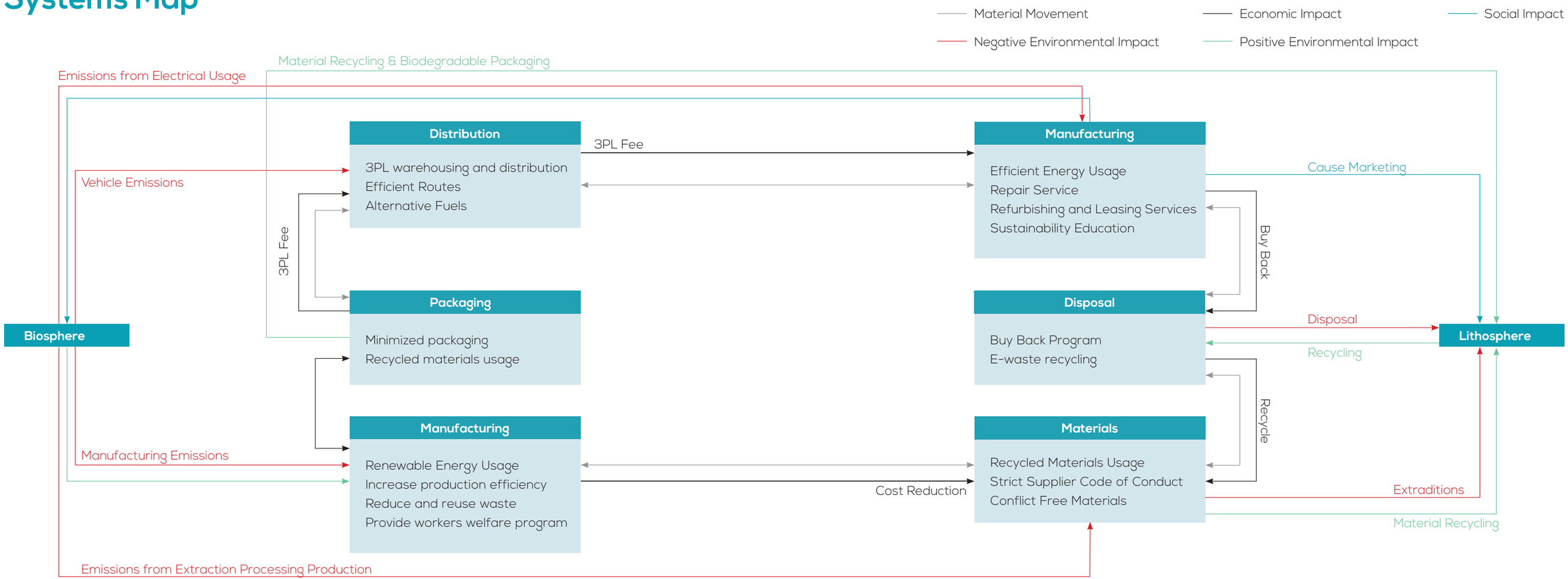
Torus and our world

True growth for Torus must come without harming society, environment or economy.

Having sustainability as one of our core values, we view Torus as a part of the complex socio-ecological system. Therefore, true growth for Torus must come without harming society, environment or economy. We believe that we are obligated to take responsibility in environmental responsibility, social equity and economic viability. Torus is determined to find ways to innovative current technology and business models to reform the current market.



Systems Map


Material Movement
Economic Impact
Social Impact
Negative Environmental Impact
Positive Environmental Impact
Material Recycling & Biodegradable Packaging
Emissions from Electrical Usage
Distribution
3PL warehousing and distribution
Efficient Routes
Alternative Fuels
3PL Fee
Manufacturing
Efficient Energy Usage
Repair Service
Refurbishing and Leasing Services
Sustainability Education
Cause Marketing
Vehicle Emissions
3PL Fee
Buy Back
Packaging
Minimized packaging
Recycled materials usage
Disposal
Buy Back Program
E-waste recycling
Biosphere
Disposal
Recycling
Lithosphere
Recycle
Manufacturing
Renewable Energy Usage
Increase production efficiency
Reduce and reuse waste
Provide workers welfare program
Materials
Recycled Materials Usage
Strict Supplier Code of Conduct
Conflict Free Materials
Manufacturing Emissions
Cost Reduction
Extraditions
Material Recycling
Emissions from Extraction Processing Production

Stakeholder Map

		Expertise		Willingness	Value	
	Stakeholder	Contribution	Legitimacy	Willingness to Engage	Influence	Necessity of Involvement
1	Investors	High	High	High	High	High
2	Shareholders	High	High	High	High	High
3	Employees	High	High	High	High	High
4	Customers	High	High	High	High	High
5	Suppliers	High	High	High	High	High
6	Competitors	Low	Low	Low	Medium	Low
7	Local Residents	Low	Low	Low	Low	Low
8	Chambers of Commerce	Medium	High	Low	High	High
9	Governments	Medium	High	Low	High	Medium
10	Policy makers	Medium	High	Low	High	Medium



Okala Impact Analysis

Current

		Bill of Materials	Amount	Unit	Okala Factor Points	Unit	Okala Impact Points
Exterior	A	Recycled HIP Plastic	2	lb	2.1	/lb	4.2
	B	Recycled PC plastic	2.1	lb	4.7	/lb	4.7
Manufacturing		Injection	2	lb	0.72	/lb	1.44
		Auto Paint	4.5	sq.ft	0.01	/sq.ft	0.045
		Al. Powder Coating	4.5	sq.ft	0.98	/sq.ft	0.441
Usage		US Low Electricity	0.06	kW	1.1	/kW-h	0.066
Sourcing	A	Sourcing from India	8,448	Miles	1.6	/p.-mi	13,516.8
	B	Sourcing from California	568	/ton-mi	1.1	/ton-mi	624.8
Package		Recycled Corrugated Board	0.59	lb	0.96	lb	0.57

Option A Okala Impact Total	Option B Okala Impact Total
13523.562	631.996

Okala Impact Analysis

Potential

		Bill of Materials	Amount	Unit	Okala Factor Points	Unit	Okala Impact Points
Exterior		Silica	1.8	lb	2.6	/lb	4.68
Manufacturing		3D Printing	1.8	sq.ft	110	/lb	3.186
Usage		US Low Electricity	0.06	kW	1.1	/kW-h	0.066
Sourcing	A	Sourcing from Massachusetts	2,653	Miles	1.1	/p.-mi	2918.3
	B	Sourcing from Phoenix	7.9	/ton-mi	1.1	/ton-mi	8.69
Package		Recycled Corrugated Board	0.59	lb	0.96	lb	0.57
		Corn Starch	0.5	lb	0.92	lb	0.462

Option A Okala Impact Total	Option B Okala Impact Total
2927.264	17.654

Sustainability Development Goals

United Nations goal list

1. No Poverty

2. Zero Hunger

3. Good Health & Well-Being

4. Quality Education

5. Gender Equality

6. Clean Water & Sanitation

7. Affordable & Clean Energy

8. Decent Work & Economic Growth

9. Industry, Innovation & Infrastructure

10. Reduced Inequalities

11. Sustainable Cities & Communities

12. Responsible Production & Consumption

13. Climate Action

14. Life Below Water

15. Life on Land

16. Peace, Justice & Strong institutions

17. Partnerships for the Goals

Torus goal list

4.

- Global citizenship education
- Provide scholarship programs
- Donate to infrastructure
- Provide educational finance to workers

5.

- Female Mentorship Programs
- Leadership Opportunities
- Reasonable Income

6.

- Safely Treat Wastewater
- Reduce & Reuse Wastewater
- Improve Water Sanitation
- Sanitation Education

7.

- Infrastructure Updates at factories & other company facilities

8.

- Upgrade Tech & Innovation
- Safe Work Environments
- Vaccine Services for Workers
- Worker Well-being progress reports

12.

- Produce Sustainable Products
- Consider Integrated Systems
- Sustainable Consumption
- Strict Supplier code of conduct

13.

- Climate Change Awareness
- Reducing GHG in processes

14.

- Recycle Plastic Waste

16.

- Transparency
- Inclusive Decision Making
- Non-discriminatory Policies

17.

- Support Fair Trade
- Partner with Local Leaders
- Partner with NGOs committed to Sustainable development