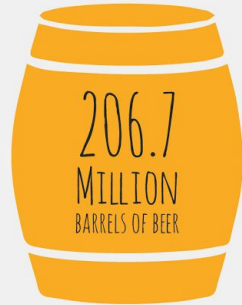




Urban Metabolism: RainBeer

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Sustainability | May 4, 2017

IN THE
UNITED STATES



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SWIMMING POOLS



WATER

is the main material
used in the fermentation
process of the brewing

water is used for
BARLEY & HOPS

RAINBEER

since



2017



CRAFTED IN
PORTLAND, OR

10x

In a multi leveled facility, we can fit approximately 10 times the amount of crops in our hydroponics farm than a traditional soil farm



subterranean
heating & cooling

COST REDUCTION OF



70%

Supplemented by
Solar Panels

90% LESS



water used for
roof-top-hydroponics

3 TIMES

the amount of oils,
resins, flavornoids,
& acids from
traditionally grown
crops.

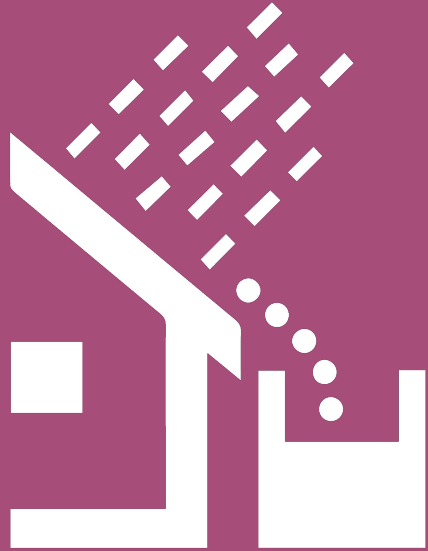
High
Rainfall



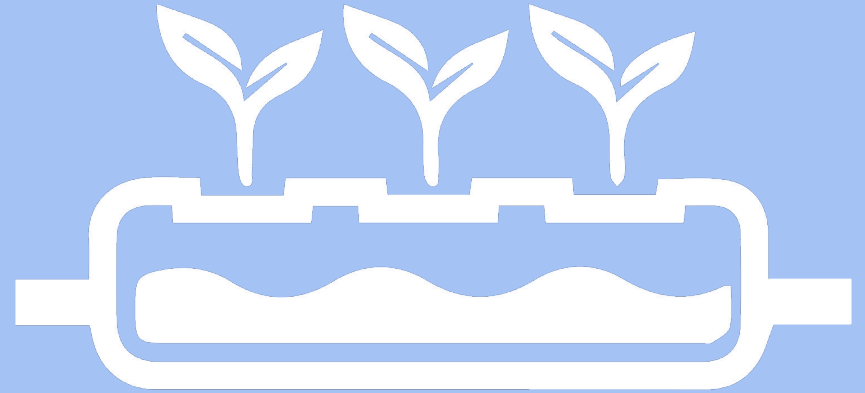
Urban
Area



RoofTops



Hydroponics



Unique Process

Green Roofs | Storage | Collection | Filtration | Hydroponics



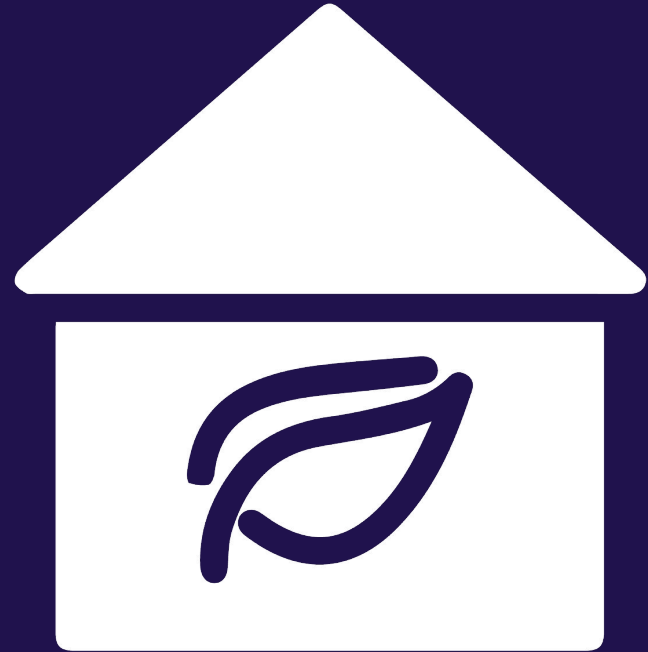
Collection

- Average water collection 2,273 gallons/month for both harvesting and brewing
- Collect water 3-4 times a month with avg. rainfall of 44 in.
- Transportation of water will be with two 4,000 gallon trucks



Greenroofs

- Reduce the strain on the local sewer systems from stormwater runoff
- Utilize natural process such as infiltration, plant transpiration, and evaporation
- 8 layer system, to protect from water damage
 - Vegetation
 - Growing media
 - Filter fabric
 - Reservoir sheet
 - Root barrier
 - Roof membrane
 - Insulation
 - Roof deck



Storage

- Store rainwater into a storage tank through a system of distribution piping & first flush diverters
- 2,500 gallon vertical water storage tank (complies with FDA standards)
 - Comprised of UV stabilized & BPA-free polyethylene resin



Filtration & Disinfection

- Use double filtration and disinfection system
 - Ultraviolet Light (UV)
 - Reverse Osmosis
- Step 1: Run water through the UV light purification system
- Step 2: Run through reverse osmosis nano-filtration membrane filter



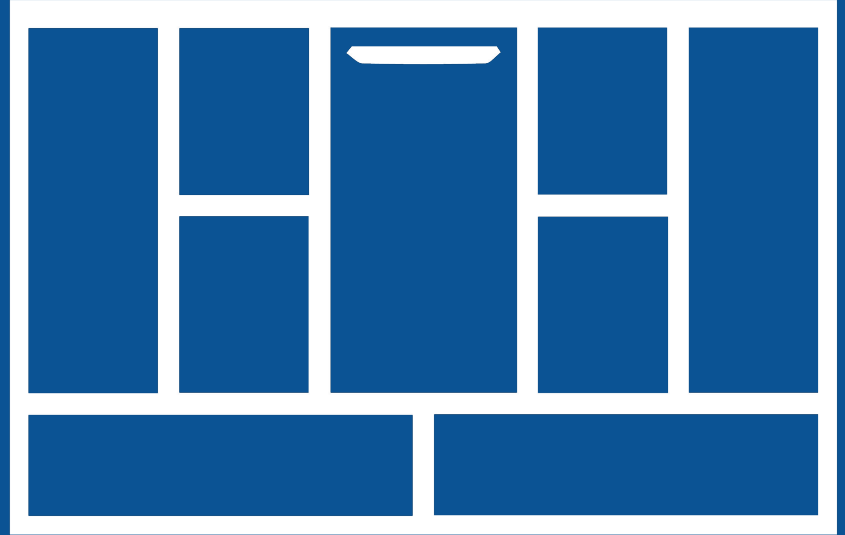
Hydroponics

- Use hydroponics system to irrigate and grow our crops in-house at the brewing facility
- 89% of water that goes into production is used for barley and hops
- Hydroponics system will use 90% less water than traditional soil-based farming methods
- Advantages of using hydroponics include
 - Control over nutrient sources
 - Temperature
 - Humidity

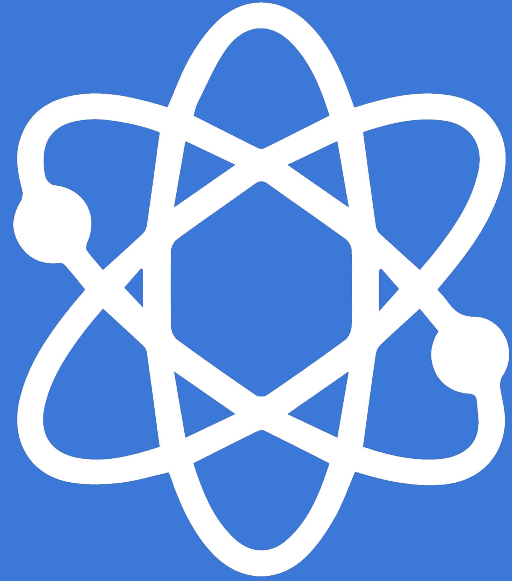


Business Model

Partners | Activities | Resources | Value Proposition | Customer Relationship |
Channels | Customer Segments | Cost | Revenue



KEY PARTNERS <ul style="list-style-type: none">• Location based partnerships• Local business	KEY ACTIVITIES <ul style="list-style-type: none">• Local fairs• Word of Mouth• Social Media• Local Bars• Local Grocery Stores	VALUE PROPOSITION <ul style="list-style-type: none">• Sustainable Beverage• No/Low Impact to resources• Same alcohol satisfaction	CUSTOMER RELATIONSHIPS <ul style="list-style-type: none">• Trust• Transparency• Sustainability	CUSTOMER SEGMENTS <ul style="list-style-type: none">• Environmentally conscious individuals• Beer enthusiasts• People who enjoy locally crafted beer
	KEY RESOURCES <ul style="list-style-type: none">• High Skilled Staff• Disting Brand Values• Packaging Partnership• Facility		CHANNELS <ul style="list-style-type: none">• Direct• Local distributors	
COST STRUCTURE <ul style="list-style-type: none">• Hydroponics• Filtration system• Brewing Facility• Water Collection• Packaging• Employees			REVENUE STREAM <ul style="list-style-type: none">• Purchase by bottle• Purchase by grower• Purchase through distribution	



Theory of Change

Short & Long Term Needs

Needs	If	Short Term Then	Long Term Then
<ul style="list-style-type: none">• In the US 6,407 million gallons of water is used to make a gallon of beer.• 89% of the water used in the production of beer is used for barley and hops.	<ul style="list-style-type: none">• If Rainbeer uses hydroponics to harvest the barley and hops and use filtered rain water, we would only use 3.5 million gallons of recycled water.	<ul style="list-style-type: none">• Increase in local employment.• Partnership with restaurants and markets.• Decrease the use of water to harvest barley and hops.	<ul style="list-style-type: none">• Social awareness of sustainable manufacturing and harvesting process.• Further development of sustainable energy and material usage.



Social Impact Value Chain

Input → Activities → Outputs → Outcomes

Input

- Local, Reusable Bottles/ Packaging
- **Local partnerships with neighboring business rooftops**
- Local hops suppliers (15 miles of production facility)
- 140,000 sq/ft production facility space
- Collect 3.5 million gallons of beer annually
- LED lighting
- 6in Fan & subterranean heating system
- **Waterless vacuum pumps**
- Lube-free conveyors for bottles
- **Clean-in-place systems to minimize water needed to clean tanks**
- **Close-loop recycle system for fermenter cooling or chilling water**



Activities

- Build a brewery facility
- **Build water-harvesting rooftops for neighboring business**
- Hire & train staff
- Market Reinbeer
- **Establish best practices to minimize waste of materials**
 - Ensure hoses & water sources are turned off when not in use
 - Implement standard procedure for cleaning floors
 - Ensure heat exchangers are well maintained



Outputs

- Produce 1 Million bottles of beer
- Sell 6-pack 12oz bottled beers at \$15
- Set initial target for annual profit



Outcomes

- **Estimation of \$2 Million in net profit**
- **Elimination of freshwater use**
- Reduction of carbon emissions through decreased transit from external agricultural sites.
- Less energy waste from powering greenhouse with a 6 in fan to reduce heating & cooling
- LED lights to reduce energy needed for hydroponics.





QUESTIONS?

Malting
Barley is steeped in water, allowed to germinate, then kiln dried.

Barley / Malt



Hammer mills

Milling

The malted barley is crushed and added to the mash tun.

Water



Mashing

Hot water activates enzymes which convert malt starches into fermentable sugars.

Mash kettle

Hops



The Boil

The wort is boiled in a kettle. This is the point where the hops are added.

Cooling

The hopped wort is cooled to room temperature and transferred to fermenters.

Cooler

Whirlpooling

The boiled wort is whirlpoiled causing the spent hops (trub) to collect at the bottom for removal.

Whirlpool tank

Yeast



O₂

Oxygen

Filtration Unit

Resting Tank

Fermenting Tank

Aging

Aging allows the carefully crafted flavors to develop. A process which takes a number of weeks.

Used Yeast

Fermentation

Yeast is added which consumes the sugars producing alcohol, flavors, and carbon dioxide. This process takes days.

Packaging

Bottler

Packaging

The beer can now be placed in bottles or kegs ready to enjoy.

● Ingredients

→ Process

