CT DEEP Request for Information
PEAT
PUBLIC SUBMISSION
Circular waste management mushroom/biochar farm
April 14th, 2023

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Thank you for giving us the opportunity to help the state of CT create an efficient waste management system that provides ecological, health, and economic benefits among many more to the local residents and environment. Since the day we started it has been our mission to remove all unnecessary waste from landfills. We appreciate the state of CT's deep commitment to this shared mission.

We are excited to present our unique solution that utilizes multiple waste streams to create edible mushrooms for the residents of CT as well as improve soil health using biochar for agriculture and convert the grid to renewable electricity via electricity production as an output of our process.

For a high level overview click here for our deck

Warmly,

Winson Wong - Chief Executive Officer

Circular Mixed Waste Management
Mushrooms, Biochar & Electricity

We are proposing the development of a 50,000 square foot circular mushroom farm that turns organic waste into mushrooms and a 2 acre plot to house modular biochar containers that use "byproducts" of the mushroom farm as inputs.

The two facilities feed each other and close the full circular loop from food consumption to food creation of all varieties. Therefore it is best if they are located directly next to each other as it also significantly reduces carbon emissions from logistics; although not required.

Having the facilities working in tandem drastically increases our waste processing capability and waste input types including food waste, sawdust/wood chips, mixed wood products, and using our "by-product" mushroom blocks from our farm directly fed into the biochar units.

The biochar unit will produce electricity to power the facilities and provide excess power back to the grid.

For a high level overview click here for our deck
Videos, layouts, and images of the proposed facility.

1. *What type of solid waste processing operation are you interested in developing in Connecticut?*

Peat processes food waste and wood/sawdust waste using mother nature combined with a proprietary indoor farming technique/technology and biochar pyrolysis process. We are proposing the creation of a 50,000 square foot circular mushroom farm and 2 acre plot of modular biochar containers:

- To process **62,100+ tons of waste**
  - 20% of CT's goals
- Produce **3,916,800+ kWh of electricity** per year
  - Powering roughly 300 homes
- **Offset 23,040+ tons of GHG emissions**
  - Produce **11,520+ tons of biochar** in the process to regenerate farms, forests, storm drain protection, water filtration and produce construction material
  - **Biochar price-point drop from $500/ton to $60/ton for mass adoption**
- Produce over **2 million lbs of local, fresh and sustainable mushrooms** to feed CT residents
  - Reserving a portion for low-income communities
- Create **over 200 jobs** and rotational workforce training opportunities

Funghi are the most efficient organisms on the planet in decomposing waste. Funghi use their root system, known as mycelium, which more closely represents animals than plants, to decompose almost all waste materials. They can process food waste efficiently but are not limited to just that. They are capable of growing around plastic, cleaning up oil spills, and much more.

We are proposing using food waste and wood products like wood chips and sawdust as an input to help the growth of our fungi which produce two byproducts:

1. Local, fresh mushrooms such as Lions Mane, Oyster Mushrooms, and 10+ more species that are healthy and sustainable. Edible mushrooms are known for their brain and immunity boosting power.

2. Mushroom blocks known as SMS (spent mushroom substrate) which is decomposed waste which can be used as a soil amendment, mulch, or further processed into a fertile compost and/or used in waste to biochar to energy facility

The Biochar produced from the SMS is an effective way to process feedstocks as a pure carbon source to be re-used in the soil as an amendment known to serve as a habitat for many beneficial microorganisms, to increase water retention, lower acidity, increase soil health, and sequester carbon for 1000’s of years thus cleaning our environment while reducing our reliance on chemical agriculture.

Biochar also has many other practical uses including: water treatment, animal feed supplement, decontamination, insulation, construction materials and much more.

2. Please describe in detail the technology proposed, and potential capacity and throughput in tons per day and tons per year. Please describe how your project is consistent with the State's solid waste hierarchy and the state's goal of 60 percent diversion from landfill and combustion.

Diversion

Peats project is in line with the state's goal of 60 percent diversion of landfill because we can process food waste and wood products with 100% landfill diversion and net zero waste products produced in the process.

The byproducts can be consumed as an edible mushroom, used to regenerate our soil and turned into energy (the SMS) through biochar processing.

We can scale our facility up or down as needed by the state. We have a viable economic offtake model that is both proven and profitable with an existing customer base and distribution model.
Our business, although in need of financing to kick the project off, can be self-sustainable and profitable regardless of state or federal incentives.

Capacity

The mushroom farm and biochar facility together can process a total of **62,100 tons of waste which is 20% of CT's goals.** We can scale up the biochar production as needed since it's modular and increase the mushroom farm size from the start or over time as well.

We can process 4800 tons of food waste at the mushroom farm alone which will produce 4800 tons of mushroom blocks (SMS) to be turned into biochar alongside other mixed waste inputs of roughly 50,000 tons and 4800 tons of edible mushrooms produced for food consumption by CT residents.

There are about 7500 food generating establishments across the state of CT with an estimated total production of 60,000 tons of food waste which would allow us to process roughly 25,000 tons of food waste including meat, dairy, and bones. This is about 35% of all of CT back of house restaurant food waste. We will also process sawdust and woodchip waste from parks departments, community gardens, landscaping companies and more allowing us to process an additional 25,000 tons of organic waste a year.

We will sell a portion of these mushrooms back to the same food service companies whose waste we are using to grow the mushrooms with 594,000 lbs reserved for restaurants, universities and hospitals and 1,581,000 lbs reserved for grocers.

A one train biochar reactor can process 8 tons of feedstocks per day. Ran for 6 days a week, that is 2,496 tons of feedstocks per year. The pyrolysis process should produce 1-2 tons of biochar per 8 tons of feedstocks per day or, 312 to 624 tons of biochar annually.

We are proposing 20 train reactors on roughly 2 acres of land connected to the mushroom farm for direct SMS inputs. The biochar reactors are self-contained units within shipping containers. **This will process 57,600 tons of waste per year and convert into about 11,520 tons of biochar per year produced for CT use-cases.**

CT Alternative Protein Program

We can work with the state of CT to create a CSA and Food Box program distributed to CT residents with a big discounted and free option to select low income communities, schools or other uses with 65,000 lbs reserved for low income communities, schools or other programs.

CT Land Regeneration/Farming Project

We can work with the state of CT to focus select amounts of biochar to be reserved for land with depleted soils and in need of regeneration. We can also reserve a select amount of biochar to go towards subsidizing farms in the State of CT.

Mushroom Farming Technology

(click link here for example layouts, videos, images)

The technology is an automated indoor farm that utilizes food waste and wood products as the nutrient source for mushrooms to grow. The process can be broken down into three main components which is detailed below.

- Processing
- Incubation
- Fruiting/Harvesting

Processing

The processing facility takes in food and wood waste daily. 85% of food waste currently generated from the food services industry are back-of-house items like lettuce heads, apple cores, coffee grounds, chopped onions, and more. We will also take in wood waste such as sawdust, woodchips and other materials and mix it together to simplify operations.

The processing facility is a series of industrial equipment combined by conveyor belts to automate the process of turning waste into mushroom blocks ready for growth.

1. The food waste begins by getting chopped up along with wood products
2. They are then mixed into a wood chip/food waste “smoothie blend” along with some other secret ingredients we put in like Biochar and additional nutrients.
3. They are put into rectangular shaped bags and capped at 3lbs per bag
4. At this point the bags are moved to a boiler where they are steamed to sterilize the waste and readied for inoculation
5. They are transferred to a clean room to be inoculated with a mushroom strain (the seed) and are now ready for growth

Incubation

The incubation phase is where the “seed” begins to grow the root system of the mushroom called mycelium. This is the moldy white looking substance people sometimes associate with mushroom growth. This mycelium starts to grow throughout the mushroom blocks and begins the decomposition process of the waste using the waste as a nutrient source to grow its roots.

The incubation phase is fairly simple and is all about mushroom blocks sitting in a relatively dark space in an avg. room temperature space stacked in shelves. The higher the shelves the more blocks we can fit. These blocks, depending on strain, will sit on shelves anywhere from 1 week to 5 weeks while the root system takes hold getting ready to “fruit” the mushroom body.

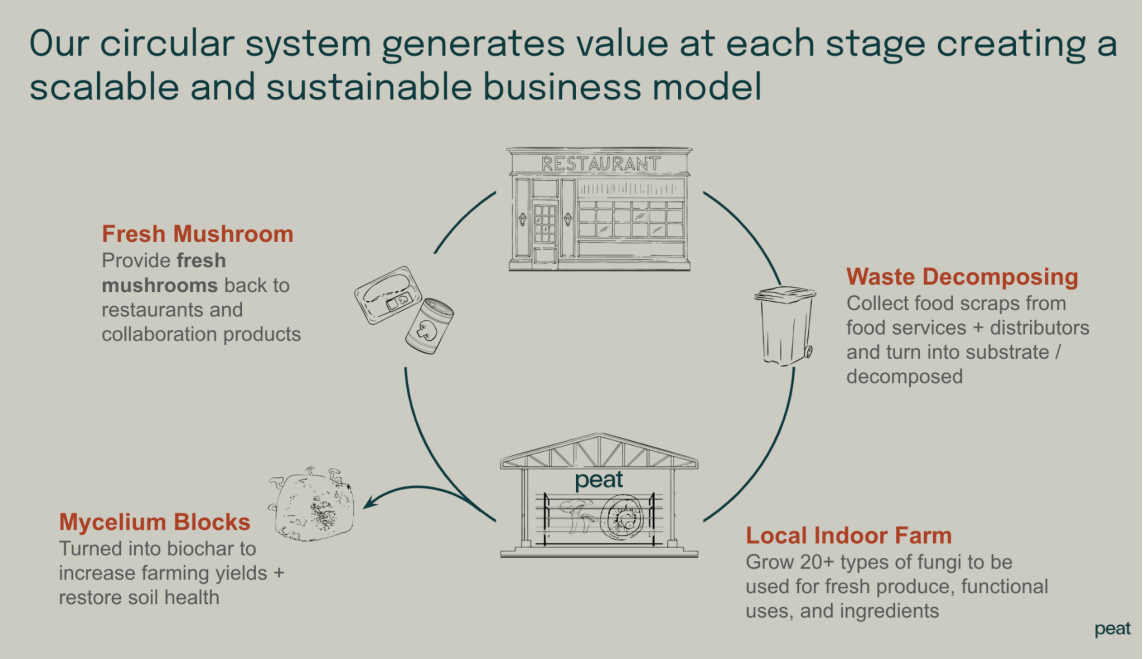
Fruiting/Harvesting

We transfer the blocks of mycelium and waste to environmentally controlled clean rooms for the next phase where the mushroom body, the portion that ends up on your plate, grows, and we harvest the mushrooms here.

We sort the mushroom blocks by strain in this process with the goal of controlling the environment to recreate the same environment a mushroom grows outdoors.
An oyster mushroom grows in a different environment than a Lions Mane. Some grow in trees, some outside trees, some on the forest floors. Some in the northeast while others grow in the south and others in the tropics. We need to replicate these environments.

This is where the grow-rooms come in with the below specifications:

- Rows of shelving for mushrooms to fruit sitting from 2 weeks - 5 weeks depending on the strain
- Temperature controls
- Humidity Control
- Clean air exchanging in and out of the room (intake + exhaust)
- CO2 and Oxygen control
- Air purification system



Biochar Technology

Link to spec sheet(s) - we are working with multiple reactor production companies inclusive of biomass control systems who are based out of CT. The technology is an automated pyrolysis unit that allows for different feedstocks to be converted to usable biochar which is pure carbon.

The process can be broken down into three main components which is detailed below.

1. Feedstocks
2. Drying
3. Pyrolysis

Feedstocks

Feedstocks are a key factor in biochar production. The feedstocks determine both the conversion volume of feedstocks to biochar as well as the nutrient makeup of the finished biochar.

We plan to utilize food waste collected from restaurants, the Spent Mushroom Substrate left over from our mushroom production facility, and woody feedstocks sourced locally in our biochar production process. This should give us a unique finished biochar product with a relatively high carbon content packed full of beneficial nutrients.

Majority of input

- Hardwood Sawdust
- SMS
- Fruits, Veg, Coffee, etc
- Meat & Bones

Drying

Because of the moisture content of both our Spent Mushroom Substrate and the food waste collected from restaurants, we will need to have a robust drying process in place prior to pyrolyzing the feedstocks. The pyrolysis reactor we plan to use has built in drying technology which allows us to reuse some of the biogases created during the pyrolysis process to power the drying process.

Pyrolysis

Our pyrolysis process will be set to the most beneficial temperature to maximize both the volume of the feedstock to biochar conversion as well as the beneficial nutrient concentration of the finished biochar. The system is automated and we plan to run each train for 24 hours a day/ 6 days a week. The finished biochar will be bagged in 2 cubic yard sacks ready to be transported to our customer base.

3. What kinds of site characteristics are needed for your operation? a. Acreage needs b. Utility connection availability needs and facility usage requirements including, power, water, sewer, and gas c. Access needs including transportation modes and proximity requirements (road, rail, port, etc.)

Mushroom Farm Site Characteristics

Overall the facility is very resource efficient compared to traditional agricultural and other indoor farms like hydroponic farms .Indoor mushroom farming is one of our planet's most efficient future food sources as our agricultural growth in traditional farming methods begins to degrade. Our soil output will also help to regenerate farm land.

All of the water consumption for the mushroom farm comes from the water source in the food waste as does the nutrient inputs from the waste products and secret ingredients.

Gas, electrical, water just for cleaning, and water drainage for low humidity buildup are needed. We can also run our boilers on electric on a higher load and are open to a renewable facility run on solar power and battery storage as well as energy generation from our biochar facility steam production.

Detailed Requirements for the The Mushroom Farm

- Size
    - 50,000 sq ft for the mushroom farm
- Height
    - The higher the better. 11 ft is the lowest but we prefer above 16 ft ceilings
- *Space Requirements and build-out*
    - Floor drains and/or floor connections
    - Gas lines for boilers/sterilizing or high electrical load capacity.
        - We are open to and prefer full renewable energy. Our steam production from the biochar facility will offset a portion of production.
            - We will also incorporate solar and batteries into the system to run on renewable energy.
    - Electric for equipment/processing + HVAC needs for fruiting rooms

        - 1250-2500 Amps
    - Water + slop sinks around the facilities for cleaning and maintenance
    - Clean-air exchange system
        - Intake and exhaust system
            - HVAC system intakes fresh oxygen rich air from outside to feed mushroom fruiting chamber while simultaneously exhausting stale spore laden air in order to maintain high oxygen levels for the developing mushrooms. Generally this will entail 6-8 air changes per hour in order to keep CO2 levels below 800ppm.
    - HVAC system
        - Processing space HVAC is for comfort levels
        - Incubation is for comfort levels as well
        - Harvesting/colonization will need very detailed environmental control systems.
            - 100-180 tons for HVAC for fruiting rooms
    - Humidity
        - We will be requiring humidity being pumped into the units through our air exchange/HVAC systems
    - Walk-in refrigeration to be installed among other fitout/construction improvements if not included
- Access to space
    - Loading docks available for waste hauling trucks to load waste into the site
    - Loading docks available for outgoing mushroom and biochar deliveries
    - Proximity to highway routes and major cities with the most food production (Stamford, Hartford, Bridgeport, New Haven)

Biochar Facility Site Characteristics

Ideally the biochar reactors can be located outdoors on open land with available space to store feedstocks ready to be used in the biochar process, all the equipment required to run the biochar reactor, and a weather protected place (building or shed) to store the equipment and the finished biochar product before is its transported to the customer base.

We will place the reactors, which are housed in shipping containers, directly next to the mushroom farm for direct input and flow-through as a tipping point for haulers.

We will need propane/natural gas as well as electricity to run the biochar facility and will need a road usable by 53 foot container and dump trucks for feedstock drop off and biochar pickup. We will also need a water source (city or tank) to have as a safety measure for the pyrolysis unit.

The biochar unit can self-generate a majority of its own electricity as well as produce excess energy to supply back to the grid. We would be looking to work with the state and municipalities to interconnect to the grid or directly sell energy to local facilities.

The 20 trains of reactors we are proposing produce about 3,916,800 kWh of electricity per year which can power roughly 300 homes.

Detailed Requirements for the Biochar Facility

- Size
    - 2 acres
- *Space Requirements and build-out*
    - Roads
    - Electricity
    - Propane/Natural Gas
    - Water
- Access to space
    - Proximity to highway routes and major cities with the most food production (Stamford, Hartford, Bridgeport, New Haven) and close to farrmers/forests etc that can utilize the biochar output at scale.

4. What are the input and output requirements to make development feasible? *What type of feedstock is required for your facility? ii. Are there any specific characteristics needed to make the feedstock viable or processing limitations (e.g., food scraps must be source separated)? iii. What are the tonnage/ volume needs to make your facility viable? Provide a range or a minimum if applicable.*

For the mushroom farm we use multiple feedstock sources and are open to adjusting based on the state's needs in some areas. The most ideal scenario uses:

1. Back of house, pre-consumer, food scraps from restaurants. This also plays into our business model as restaurants/food service love that they are buying mushrooms from the same company that is helping them “compost” the food scraps.
    a. contamination is not a huge issue in mushroom growing so we can take care of that on-site
2. We can take in post-consumer food scraps as well mainly used in the biochar facility and checked for contamination or build in a “scaled up” contamination process on-site of our facility if required
3. We will take in wood chips/saw-dust and other wood products

We are proposing a facility that can process 50,000 tons of inputs with the following break down of inputs below for the mushroom farm (our two proprietary formulas - % are not included since it is our IP and some secret ingredients)

- Sawdust / Hardwood
- Food Waste
- Secret Ingredient
- Secret Ingredient
- Biochar

We can scale down with a minimum input of ~3000 tons for a small biochar facility and would like to keep the smallest footprint for mushroom farming at 10,000 sq ft which would intake around 800 tons of food waste per year for a total of 3800 tons of waste products.
We can scale up both facilities with ease.

Our biochar facility will require two different types of feedstocks sourced locally outside of the spent mushroom blocks which we supply directly from our mushroom farm.

1. Woody Feedstocks- It will be ideal to have woody feedstocks that are contamination free. An ideal source for these will be from fresh cleared land or sawmills. There is a contamination factor risk with yard waste feedstocks from residential neighborhoods.

2. Food Waste- Mixed food waste from restaurants' back-of-house is our ideal food waste source. This would include fruits, vegetables, breads, and animal proteins (meats, fish, dairy, etc.). These must be source-separated, non-contaminated, and free from plastics or other inorganic material. Compostable plates, cups, and other compostable material can be used as well.

In order to make the facility viable, we will need a minimum of ~3000 tons of feedstock annually for one reactor. Although our proposed facility will be looking for 57,600 tons of feedstock annually.

iv. Can you provide tip fee estimates?

We will operate the facility with tipping fees of $40-80/ton of waste dropped off with one centralized location for the mushroom farm and biochar facility.

b. Outputs i. What are the outputs of your process (e.g., electricity, renewable natural gas, compost, baled material, etc.)? ii. What minimum revenues or revenue guarantees do you need for these outputs?

The outputs of the mushroom farm are edible mushrooms sold back to restaurants, mushroom blocks which we turn into biochar, and then biochar, syngas, tar, and bio-oil from the biochar facility.

We will be generating revenue of $26m and 22% net profit. It will take about 12-18 mo to scale up sales, with operating capital required in that interim period, although can be accelerated with the support of the CT government for access to food service partnerships and haulers.
We will be requiring offtake partners for both the carbon credits and biochar as a soil amendment for state farms among many other uses.

We are looking to generate $17,000,000 in annual revenue on the mushroom farm and $9,000,000 of biochar revenue inclusive of biochar, carbon credits, and energy sales.

We would be looking to partner with the state of CT to develop programs with state farms or offtake agreements directly with DEEP that utilize biochar to help rehabilitate local farm land. We can

also contract with the state to clean up hazardous sites, brown-fields, oil spills, and use biochar on local forestry to increase water retention and reduce chances of fires.

Electricity we would look to partner with the state for grid interconnection or direct sales to local energy offtake and PPA's. On our scaled up 20 train facility we produce 3,916,800 kWh of electricity per year which can power roughly 300 homes. Direct offtake with electricity contracts will create a profitable operation along with biochar sales to be self-sustaining and have a very low risk model.

Biochar is currently very expensive for the existing market. Our model indicates commoditizing biochar at a significantly lower price, from the norm of $500/ton to $60/ton, with energy offtake, tipping fees, and carbon credit sales offsetting the wholesale revenue difference.

There are many applications for our biochar output that we can discuss with the State and put towards the best use case(s) for the states objectives.

We would be looking for guaranteed carbon offtake agreements whether it's with the state or local enterprises that need to offset their emissions.

5. What are the environmental attributes associated with your facility? a. Air emissions, and mitigation thereof b. Discharges, including where discharges will occur and mitigation of discharges c. Waste material or residuals and description of disposal of such materials d. Beneficial uses e. Other

The biochar facility has minor GHG emissions and VOC's which are handled to 99% efficiency by re-using the heat/flu gas to power the system and an after-burner that has 99% destruction efficiency to any VOC's. The units do not produce any waste materials or residual - all outputs are usable.

The only downside environmental attributes is the electrical and gas consumption within the mushroom farm which can be offset and gas replaced with electricity from renewable energy sources.

The only "waste" material from our process is a mushroom block which we are turning into biochar that has significant environmental benefits.

Full LCA to be included in the data room as well for the biochar facility in July 2023.

6. Please describe how the project will minimize negative environmental and health impacts of waste management, including minimizing greenhouse gases.

Our project provides a unique alternative to traditional waste management by turning food back into food.

Our process has significant positive downstream effects; not just direct from alternative waste mgmt. We close a full circular loop which continues to turn.

We fully divert all GHG emissions associated with the landfilling or composting of waste into a consolidated and efficient process. The outputs feed our society and reduce the need for further food production thus minimizing the GHG emissions associated with agricultural needs.

The sale into food service directly educates the food service industry on proper waste mgmt techniques which has an effect across food waste but bleeds into other practices like proper recycling, oil mgmt, and more.

Our facilities can be inputted into a limited size space compared to the options on the market now and are fully modular can drive down transportation needs and associated GHG emissions for the waste industry.

Our outputs, mushroom blocks, being turned into biochar, increase carbon sequestration of our farm land, reduce the need for fertilizers, limit agricultural waste, can prevent wildfires, and much more, thus further mitigating environmental effects and the associated GHG emissions.

Biochar is one of our best present day solutions to solving our climate crisis. The reactors are modular, scalable, and profitable which make it one of our very limited economical options.

On top of this it provides the highest benefits in terms of carbon sequestration. The scientific research supports this which is why it gets the highest value at $170/ton avg on the carbon markets.

The biochar process sequesters the GHG emissions and stores it in the earth for 1000's of yrs+. The composition of the biochar, depending on feedstocks, is nutrient dense helping restore our land. All of the cellulose, lignin and other, non-carbon materials gasify and are burned away which is used as energy to power the unit and convert into electrons for power. What remains is pure carbon – 40% of the carbon originally contained in the biomass.

The detailed uses of biochar and their various benefits are outlined below. We can work with CT to identify the best use cases.

Agriculture, Forestry, and Brownfields

Biochar may be plowed into soils for farming. It has small pores that can keep water and dissolved minerals from rain or irrigation. By keeping minerals and water in the upper layers of soil they encourage more nutrient and water availability to plants. This leads to a reduction of fertility inputs with subsequent cost savings and an increase in the Crops. It also induces plant systemic responses to fungal diseases and improves plant responses to diseases caused by soilborne pathogens.

Animal Feed Additive

Biochar has been used as animal feed for centuries. The use of biochar as a feed additive can be a way to apply biochar to pastures to reduce methane emissions and increase healthy weights and outputs like milk production.

Construction Materials

Ordinary Portland cement (OPC), an essential component of concrete mix, is energy- and emissions-intensive to produce; cement production accounts for around 8% of global CO2 emissions. The concrete industry has increasingly shifted to using supplementary cementitious materials (SCMs),

additives that reduce the volume of OPC in a mix while maintaining or improving concrete properties.Biochar has been shown to be an effective SCM, reducing concrete production emissions while maintaining required strength and ductility properties.

7. Please describe host community benefits that would be provided as part of your project, and how those benefits would be shared or realized including job creation and workforce training opportunities.

Community Benefits

Peat provides multiple community benefits including community food programs, access to more nutritious food sources, and job creation/workforce training.

Job Creation

We will be providing opportunities for the local communities to train within, what we believe, is the future of the food industry on indoor agricultural techniques.

For the proposed 50k facility we will create **60 FT and 30 PT jobs** scaling up to the numbers above with expansion of operations. If we were to ramp up to a 100k sq ft facility we would create **113 FT jobs and 60 PT jobs**. The biochar facility adds another **20FT jobs** to the facility with rotational training programs to provide more job opportunities.

Community Programs

Mushrooms are the future of food. They are a highly nutritious plant based food that can replace the benefits of traditional proteins at scale. The variety of strains we grow provide individuals with your basic nutrients, advanced nutrients, and protein sources.

The adaptogenic mushrooms we grow are supported by significant medical research and mainstream in markets all around the world, growing in the US, as having significant benefits to mental health, sleep, stress levels, longevity, dietary needs, cholesterol regulation, stamina and much more.

98%+ of adaptogenic mushroom extracts and specialty edible mushrooms are grown and bought from China. We have created a sustainable growing method and source for growing these mushrooms directly in the US and bringing that to the state of CT.

At the base level we are providing affordable grocery store and food service food items for consumption.

We then propose offering a food box or as part of a CT CSA program Peat mushrooms at heavily discounted prices for low-moderate income communities and free for associated charities and distribution partners. We have reserved 50,000 lbs/yr of mushrooms for this program.

We will also work with local low-income communities and non-profits to support local gardening and educational programs to provide food at the source for communities in need. This will be in the form

of giving back a percentage of our biochar for free to the gardens and providing workshops and events for people to learn about the incorporation of biochar into soils and its production process. In NYC, we are kicking off a program with Wellness in the Schools to educate children on the importance and benefits of mushrooms and proper waste management.

8. Please describe the project team's background and experience developing waste infrastructure projects, including the proposed technology, and your track record for successful development and/or operation. Please provide information on applications of the proposed technology demonstrating how widespread and how the technology has been proven through other development projects.

Developer Experience

Peats team is composed of diverse backgrounds and individuals who have scaled and sold technology and service based companies. Our team consists of folks with expertise in indoor farming, manufacturing, agriculture, waste management, hauling and soil/compost facility expertise across decades at various firms including Peat. Across the team we have operated close to 100,000 sq ft of indoor farming capability and waste mgmt facilities in all forms.

Peat, as a company, has been operating a 2000 sq ft indoor farm, and is fully sold out to top NYC restaurants, for close to 12 months now where we perfected the food waste to mushroom technology and still perform R&D.

We are launching 11,000 sq ft of additional waste processing and indoor farming capabilities by August 15th, 2023 in NYC. Our team already has significant experience in operating farms of this size, and larger, and is on track for on-time or early launch.

Indoor mushroom farms of the proposed size and much larger form have been proven and operating for decades in the same manner Peat is performing. The big difference is that Peat has perfected the method to make their own substrate/grow medium by using food waste as an input.

Peat is partnering with a proven Biochar reactor manufacturer with a team who has years of experience in this and related industries. We are currently partnered with Arti biochar systems as well as Biomass control systems based out of CT, and Pyreg. All of whom are leading manufacturers in the space.

We are currently developing our proprietary biochar blend with these partners and placing our orders for our own modular units to be operated at our next scaled up 11,000 sq ft of waste processing and farming spaces.

There is close to zero risk to shutdown of the facility due to any foreseen or unforeseen circumstance. Indoor mushroom farming is a centuries old practice that is consistent, efficient, and closures are pretty much close to zero in risk.

Our team are also experienced entrepreneurs who have built and exited mission-driven businesses that are sustainable and profitable so it is extremely important for us to continue to have impact in work that we do and can provide back to the community that we are part of.

9. Please describe the preferred and acceptable financing arrangements contemplated for the project, including contemplated financing, development, ownership, and operation of the facility; and needed commitments (including duration thereof) from municipalities and other entities with respect to tip fees, and the marketing of other materials and byproducts of the project.

The facility as a whole (mushroom farm + biochar) will take roughly 12-18mo to scale up to 22% operating margins making it a self-sustaining waste mgmt facility.

The mushroom farm will take roughly 12-18mo to scale up to 20% operating margins. For our 50k sq ft facility we will be looking for $12,000,000 in financing which can be sourced from state programs or separate project financing which we have access to especially with pre-sales and offtake support from the state.

We would prefer state provided low interest programs and currently have planned for a 10yr loan at 12% interest in our financial model for standard project financing and construction loan terms.

The biochar facility will also take roughly 12-18mo to scale up with margins as a self-sustaining business at 33% margins. We have created a unique model significantly dropping the current market price point of biochar of $500/ton to $60/ton given carbon credit sales, electricity offtake agreements, and tipping fees. This will allow farmers a more fair price point and creative uses like concrete creation from biochar.

We would be looking for similar support in low-interest financing or with our own project financing, guaranteed offtake in this case from state supported agriculture, forestry, energy, and carbon offtake programs. The financing for startup for the biochar facility is $9,000,000. We calculated our model using a 10yr loan at 12% interest rates.

10. Does the project contemplate any energy or environmental attribute offtake agreements under state jurisdiction, or federal funding of any type?

We would be looking for support for the mushroom farm to hauler partnerships that can drop off, with tipping fees, wood waste and food waste. As well as food service partnerships and introductions and grocers/retailers for sale of our edible mushrooms.

We are looking to work with the agricultural department to identify programs currently in place that need support in any of the above identified benefit areas whether for farming, forestry, brownfield, water filtration, or other uses.

We can work with direct offtake of our biochar or through connecting with CT farms for offtake of our biochar. We would contemplate a potential subsidy program for farmers to help bridge the gap between the cost of biochar and a traditional compost. Biochar has significant benefits over time that will decrease costs, increase rev, and yields for farmers thus yielding an ROI but the initial offtake would help if supported via state and local run programs.

Electricity offtake agreements would be preferred to direct energy sales although we would be open to the latter as well. The facility will produce 3,916,800 kWh of electricity per year which can power roughly 300 homes.

Outside of this we can finance and build a sustainable and profitable business. Initial startup financing at low-interest rates would be preferred although we can source our own financing.

11. How will the proposed financing arrangement ensure stable and competitive pricing for municipalities?

Our pricing is competitive already without financing support for edible mushrooms to food service and grocers. Our pricing for biochar is competitive but can sometimes be cost prohibitive for agriculture at scale to start, although the benefits of increased crop yields and other benefits outweigh the short-term cost in the long run. Farmers would need support for pricing to be more affordable for the local use.

Alternatively, as our model outlines, energy offtake agreements with the state or local municipalities, carbon credit sales, and tipping fees will allow us to significantly drop the price point of our biochar to become more affordable for local agricultural use.

12. Within what approximate time frame (years) of contract execution would the project be able to commence operation, assuming timely state and local approvals?

We can be up and running very quickly both on the farm and biochar. We assume **8mo to first operations** based on land and space search, construction and biochar equipment manufacturing. From there it will take 12mo to scale up our operations to full capacity.

13. Please provide information on technology performance guarantees by the technology provider or project developer.

The mushroom farm has very limited risk and backup plans for maintaining operations. The risk of downtime is mostly from power outages, which we will be sourcing our power from renewable energy systems, the biochar electricity production itself, and can pair the system up with backup generators and battery storage. We also have more than duplicates of each equipment on site to reduce the risk of a single point of failure.We have a maintenance team onsite and on-call with all necessary replacement parts on-site for quick repairs to equipment.

The biochar units are built to last for over 15 years and have a one year warranty on all units. The units themselves are “battle tested” with replacement parts on-site and built-in maintenance contracts with the supplier on-call for quick replacement of any parts. There is limited down-time risk from power outages due to the unit powering itself. Since we have 20 train reactors, we can still produce biochar at scale even if one breaks down as we replace/fix them.