



Sustainability Plan 2021

Niagara Malt LLC

Mission Statement:

Niagara Malt will produce high quality, sustainably grown ingredients for craft brewers and distillers. We are committed to minimizing our environmental impact and maintaining a personal relationship with our customers, including providing educational workshops on sustainable agriculture and craft malting.

Key Values:

- Sustainably produced brewing and distilling ingredients
- Environmentally-sensitive business operations from facilities to practices
- Personal relationship with customers
- Educating the public on agricultural products and practices

Owners' Background and relevant experience:

Robert Johnson, Ph.D. is an academically-trained plant biologist and chemist with research experience in plant secondary chemistry. This background provides a deeper understanding of the factors influencing the important flavoring chemicals in hops and their analysis, as well as the germination process and chemical changes that occur during the grain malting process.

Brenda Young, Ph.D., LEED AP is an academically-trained ecologist with research experience in plant-insect interactions and additional training in sustainability-related practices and green buildings. This background provides knowledge required for sustainable agricultural practices in pest management and crop productions, as well as the sustainability best practices for a small business.

As educators, both have experience in formal teaching related to plant biology, agricultural issues and sustainability practices. These skills provide the needed background for offering onsite informal educational workshops related to agriculture and sustainability.

Sustainability in Operations Currently

The owners are committed to operating a farm business that minimizes its environmental impact and promotes social well-being. This includes using sustainable agricultural techniques for growing crops and following organic standards for their processing. For the malting facility, carbon footprint was considered for building design and choice of materials. Malting is a resource-intensive process using

large quantities of both energy and water; ongoing modifications aim to reduce water use and carbon footprint.

As we designed our malting facility, we needed to consider where we would get fill dirt for leveling the area for the building. We constructed a 0.25-acre farm pond adjacent to the facility. The soil excavated for the pond served as fill for the building site. Additionally, water used in the steeping process can be released into the pond and the pond can serve as a back-up irrigation source.

Our building design is based on metal pole barn construction with a concrete floor. As concrete has a large environmental footprint, we selected a more expensive material from CeraTech, which is a carbon neutral product due to the 100% flyash component (exceeding LEED 4.0 standards). Energy-efficient lighting was installed. On-demand water heater was installed to reduce energy for ongoing water heating.

Water (approximately 800 gallons per steep) is required for the steeping process in malting. Most maltsters use three steep cycles; with some barley types, we have been able to reduce to two steep cycles. Additionally, we can divert and reuse water from a second or third steep.

Malting is energy-intensive due primarily to the kilning process. We also need to heat or cool the building to ensure that the grain temperatures are suitable for the process. While we have insulated the malt tank and its components, our initial electricity use exceeded our original estimates and we were reclassified into a higher utility demand rate due to use of more than 2000kWh per month.

After a NYSERDA energy audit, we researched and purchased a hydronic heating system which uses a biomass boiler (wood pellets) and thermal water reservoir to provide heat transfer to lower our reliance on electricity during the kilning step. This installed system has reduced our energy use by 60%-75%, allowing us to increase production at the lower rate schedule for electricity. We also entered into a purchase agreement for 100% renewable energy for our electricity, so that our malt production is carbon neutral, with plans to generate on-site renewable energy.

Monitoring resource use is critical to ensure our commitment to sustainability. Electricity usage (per malt batch and monthly) and water usage are recorded. Due to our rural location, propane is currently used for on-demand water heating and limited building heating. For our waste, we ensure that we recycle all acceptable materials and reuse those materials that can be repurposed.

Community education is part of our mission. As educators, we are committed to sharing best practices in both formal and informal educational settings. We have provided tours as part of a Cornell Cooperative Extension workshop on hops growing. Bob serves on the Advisory Committee for Niagara County Community College's program for Brewery Operations and we are a field site and teaching malt house for interns in the degree program.

Policy for Future Decisions

Construction

Any future construction onsite must consider green building principles.

Water Use

Water used for steeping grains in malting can be collected in the pond and/or used directly for irrigation if needed. Municipal water is used for steeping and meets food processing standards. Due to the tank volume and process, we are unable to reduce overall water usage for malting.

Energy Use

Building temperature is controlled primarily through an electric mini-split heat pump installed in 2020. Propane is used for backup building heating system and on-demand water heating. The rural location limits our fuel choices currently. The on-demand water heater coupled with our biomass boiler has reduced energy consumption to heat and maintain water temperature. Electricity is required for kilning (energy-intensive), lighting, and grain cleaning. The installation of hydronic heating with the thermal water reservoir has reduced our need for electricity during the kilning process. In 2018, we installed a 14.85kW roof-mounted photovoltaic system. For any electricity not generated on-site, we purchase 100% renewable energy through our electricity provider.

Agricultural Practices

Grain production typically requires fungicide application, depending on weather conditions. Any decisions for chemical applications will be based on minimizing toxicity and maximizing efficacy. Consideration will be made for timing and ideal conditions for application. Insecticides are not applied to the grain fields which are adjacent to our apiary. Weeds are managed through tillage practices, cover cropping and leaving crop residues as mulches.

Purchasing Policy

For major capital purchases, decisions should include materials, energy use, where items are produced and distance for shipping, new vs refurbished, end of use options and policies of producer.

For consumables, decisions should include recycled content, reduced toxicity, ability to be reused and/or recycled.

Paper products should include recycled content. For printing paper, paper should have Forest Stewardship Council certification or other 3rd party certifications.

Waste Reduction/Recycling

The grain cleaning and malting process generates grain by-product (rootlets, seeds which did not germinate etc.). These by-products are given to chicken and pig farmers for animal feed.

Recycling pickup is available at the facility. All glass, paper, cardboard, and metals are recycled. Plastics that are acceptable are included. For plastic packaging accepted at retail stores, wrappings are taken to a dropoff monthly. Electronics are either refurbished or recycled with responsible facilities.

We have transitioned to biaxially-oriented polypropylene (BOPP) malt bags for supplying customers and will encourage them to recycle or reuse these bags.

Community Education

We welcome opportunities to write articles, provide tours or give interviews to share our practices with the community. Additionally, we table at appropriate environmental or industry-related events to share sustainable practices.

Future Goals

- Complete annual energy/water usage reports and publicly report
- Maintain organic certification for malt facility
- Find a recycling option for pellet bags
- Establish a return collection with buyers for used malt bags or a list of suggested reuses