

Sustainable Practices for Virginia Wineries

A pilot project to assist Virginia's wine industry in their efforts to be more sustainable.



*Funding for the pilot project is from the U.S. Environmental Protection Agency.

Sustainable Practices for Virginia Wineries is a pilot project funded through a grant from the U.S. Environmental Protection Agency. The project is administered through the Manufacturing Technology Center in Wytheville, Virginia and it involves partnerships and support from Virginia Tech's Grape Chemistry program, the Virginia Department of Environmental Quality, and Virginia Green, the state's partnership program to encourage green practices in its tourism industry.

The goals of the project are to (1) document ongoing sustainable practices at several Virginia wineries; (2) identify opportunities that will reduce environmental impacts, save money, and improve profitability; and (3) publish a report that details these findings so that other Virginia wineries might learn from these techniques, including summary fact sheets of the wineries involved with recommendations for future research.

Each winery included in the project receives a technical assistance visit from the project team. This summary provides only preliminary findings as the project team continues to work with the winery to research and propose specific practices and projects that will result in environmental benefits and cost savings.

Subject Winery:

Cooper Vineyards Louisa, Virginia



Cooper Vineyards is located in Louisa, Virginia. It is owned and operated by Geoff Cooper & Jacque Hogge, who have owned and operated the winery since 1998. In 2011, they opened their tasting room, which achieved LEED-platinum certification. The production and storage operations are all housed in 2000 square foot metal structure. Current production is 6-7000 cases annually. The evaluation team visited North Gate on May 19, 2013.

Sustainable Practices in Place

Certifications

- Building is built to meet LEED-PLATINUM certification standards.
- Cooper Vineyards is a certified Virginia Green Winery*.
- Cooper Vineyards won the 2012 Green Travel Star Award.



Wastes

- Winery collects recycling and staff takes to local transfer station that is 4 miles away.
- Cooper collects recycling in tasting room year-round and composts food wastes and disposables from certain events.
- Residuals from production are composted on-site in the vineyard.

- Recycling of cork and use of composite corks.

Energy

- Solar-Power
 - The tasting room generates 15% of its electricity from 8 south-facing solar panels that are mounted adjacent to the building.
- Geothermal HVAC system is very efficient
- Insulation
 - Tasting room utilizes a *Structurally-Insulated Panel System (SIPS)* that provides 70% greater insulation value over traditional frame construction.
 - EnergyStar-rated windows and doors in tasting room.
 - Production & storage facility has spray foam insulation.
- Extensive use of natural lighting in the tasting room
- EnergyStar-rated dishwasher, refrigerator, and hot-water heater in tasting room.
- Programmable thermostats in several zones in tasting room
- Efficient Lighting
 - Solar lighting tubes in tasting room
 - LEDs, T5 fluorescents and LED exit signs in tasting room
 - Metal halides in production / storage area.



Water

- Rainwater harvesting system in the tasting room filters rainwater for irrigation and flushing of toilets
- Native and drought tolerant landscaping
- High-efficiency toilets and fixtures



Additional Sustainable Practices

- Over 50% of building materials in the Tasting Room came from locally-sourced, reused, and/or sustainable building materials such as:
 - Concrete countertops and floor
 - Wood beams reclaimed from local barns
 - Fireplace from local stone
- No / low VOC building materials, including paints, sealants, and adhesives
- Sustainable, non-toxic cleaning supplies



Customer Engagement Areas

- Well-labeled recycling and trash containers located together
- Cheeses, breads, and other food items are from local farms, shops, etc.
- Single stream recycling
- Virginia Green certificate and decals displayed

Opportunities for Improvement

Environmental Program Tracking

Currently, only energy use is tracked. We generally recommend tracking and/or metering of environmental data so it might be used to set goals and gauge continued progress over time.

- **Wastes & Recycling.** Currently no information available.
 - Recommend waste audit or estimates using average weights (reference EPA site)
- **Energy.** Solar energy system is certainly doing this, but “net zero” can be tracked for positive income.

- **Water.** Water is well water and there is currently no information available on water use.
 - Recommend water metering during wine production and for other uses.
- **Carbon Footprint.** Waste, energy, and water data (and some other factors such as travel) can be used to calculate overall carbon emissions.

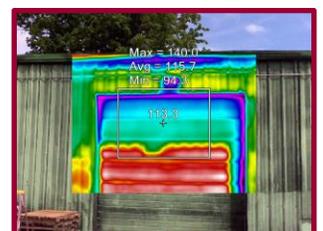
	2011	2012	2013	Goals for 2014
Wastes				
+Recycling				
Energy Used				
Water Use				
Carbon Footprint				

Energy

- **HVAC Systems.** Cooling and heating systems are older and inefficient. Models indicate an efficiency factor of significantly less than 50%. Additionally, items placed against or near the exterior heat exchanger are impeding air flow and creating additional system drag.
 - Recommend consideration of full system replacement with high-efficiency system that is potentially augmented by glycol cooling system.



- **Refrigeration.** 5-ton glycol cooling system is more than sufficient for cooling during tank stabilization.
 - Recommend considerations to use in order to augment HVAC.
- **Tanks.** Tanks are constructed with a minimal blanket and some have been wrapped in a plastic blanket of sorts.
 - Recommend full consideration of tank blankets, sprays, and other measures.
- **Lines.** Refrigeration and chiller lines are isolated.
 - Recommend that all chiller lines be insulated.
- **Winemaking / Stabilization.** Currently, stabilization occurs through refrigeration.
 - Recommend full consideration of bitartrate stabilization techniques that will minimize refrigeration demands.
- **Winemaking / Chilling of Grapes.** Currently the winery does refrigerate grapes for certain types of dessert wines, but does not generally refrigerate other grapes prior to production.
 - Recommend pre-chilling all grapes that will need stabilization in order to minimize cooling needs.
- **Door & Seals.** The main door to the production & storage facility had significant gaps around it where the seal needed repair or was missing. This heat sensor graphic shows the temperature differential and associated cooling loss.
 - Recommend replacing and repairing door seals and adding door insulation if practical.
- **Solar Block & Roof Coatings.** While the roof of the production & storage facility is fully insulated, the roof is fully exposed to sunlight and does not currently have any sort of reflective coating. Preliminary thermal readings indicated temps in excess of 140 degrees F for the roof and for the south-facing walls of the building.
 - Recommend:
 - Coating roof with reflective paint.
 - Building some sort of solar block that shades the south side of building from direct sunlight.
- **Compressor.** Tank transfers occur with help of compressors that adds to heat load in the production and storage area.



- Recommend operating the compressor outside.
- **Natural Lighting.** Currently, no natural lighting in the storage / production area.
 - Recommend consideration of installing sky-lighting.
- **Lighting.** Metal halide lighting in storage / production room is a significant producer of heat.
 - Recommend practices to limit use, such as motion-activated sensors.



Water

- **Barrel and tank cleaning.** As mentioned, there is currently no available data on water use. Owners are aware of water cleaning needs and use high-pressure cleaning process.
 - Recommend installation of a meter and documentation of water use in cleaning procedures.
- **Stormwater.** Wineries are categorically required to get stormwater discharge permits if wastewaters from production, parking areas, or other operations are directed directly to streams, ponds, wetlands, etc.
 - Recommend full consideration of this regulatory requirement prior to future expansions.

Wastes

- **Universal and hazardous wastes.** Currently, there is no system for documenting the generation and management of spent fluorescent lamps, solvents, aerosol cans, batteries, pesticides, and other-potentially hazardous materials. In certain work areas within the production and storage facility, solvent cans, testing equipment, and other materials were visibly disorganized and unlabelled.
 - Recommend:
 - Improved housekeeping and organization related to storage of hazardous materials.
 - Development of a policy, log, and records that document proper handling of these items.
 - Include development of a green purchasing policy that requires consideration of hazardous properties, regulatory considerations, and a hazardous materials inventory.
- **Recycling Rates & Management.** Currently, all wastes and recycling are managed by the staff, and there is no central accumulation area / dumpsters. All materials are taken to the local transfer station once a week. No estimates of weights have been made.
 - Recommend:
 - Contact local haulers for pricing on waste and recycling services. As winery continues to expand and popularity grows, hauling to local transfer station will become inefficient process. It is likely that local haulers will charge much less than labor / time and effort for hauling to “free” drop off.
 - Develop estimates of generation based upon weight standards and consider “how full” the containers are. This will provide an implied recycling rate and insight for adjusting hauler services, saving money, etc. Below is an example of how a recycling rate might be calculated (assuming 96-gallon totes).
 - Consider performing a **waste stream audit** to determine actual weights of trash and recycling and to identify waste reduction opportunities and needs for specific waste items.



	Containers	AVG wt	Weekly	Annual
Mixed Recycling	4 (full)	80 lbs	320	16,640 lbs
Trash	2	110 lbs	220	11,440 lbs
Implied Recycling Rate = 60%				
(http://www.epa.gov/osw/conservation/tools/recmeas/docs/guide_b.pdf)				

- **Pallets.** Currently, more than 100 wooden pallets are stored outside / behind the production & storage area. Recommend:
 - Contracting with pallet hauler to recycled / reuse pallets.
 - Consider purchasing / use of plastic pallets.
 - Require suppliers to unload materials and take pallets back after deliveries.



- **Bottles & Corks.** Currently, the winery uses a combination of real / composite corks for all of its varietals (and it does provide for cork recycling). It has also uses standard-sized bottles.
 - Recommend consideration of corking options that minimize wastes:
 - Screw tops
 - Plastic corks
 - Sleeveless (eliminating use of metal wrappers)
 - Recommend consideration of bottles that are lighter, from recycled glass, or from other materials (ie, boxes, etc).

Customer Engagement Areas

- **Communication of environmental information.** Consider installing a monitor or posters providing environmental data related to the LEED certification attributes; Virginia Green and nearly green attractions / lodging opportunities; or the winery's continued operational progress related to reduced environmental impacts.

Future Development

- Owners have plans for upgrading the production area and moving wine storage to a new facility that is adjacent to the tasting room. We support the owners concepts that would include:
 - An earth-sheltered storage / barrel room that would greatly reduce HVAC needs by making use of passive heating.
 - Gravity-fed lines that would facilitate production and minimize pumping.



*Virginia Green Winery certification is achieved through self-certification process and all green practices and commitments are documented in the winery's Virginia Green "profile" that is available to the public at http://www.deq.virginia.gov/Portals/0/DEQ/PollutionPrevention/VirginiaGreen/Cooper_Vineyards_Profile_3-17-2011.pdf

The Virginia Green program challenges consumers to provide constructive feedback that will encourage its partners to continuously improve over time.