

Rocky River Vineyards On the Road to Sustainability



Sustainable Business Walker College of Business

APPALACHIAN STATE UNIVERSITY

By Brittani Eichelberger, Antoine Guillaume, Morgan Hargett, & Harmony Tatro

Rocky River Vineyards



Rocky River Vineyards is a family-owned and operated vineyard and winery located in Midland, North Carolina. The basis of the project is centered around using **sustainable technologies** to improve **operational efficiency** and **reduce negative environmental impact** from the vineyard. We have identified four main areas in which we think implementing changes could have a significant impact.

→ Producing wine requires a lot of water. By implementing **water harvesting strategies** and **rain sensor technology** the vineyard can **reduce water waste by 15%**.

→ The vineyard has many optimal surfaces that would be ideal for capturing the sun's free energy and producing solar energy. **Switching to renewable energies** will reduce both costs and greenhouse gas emissions.

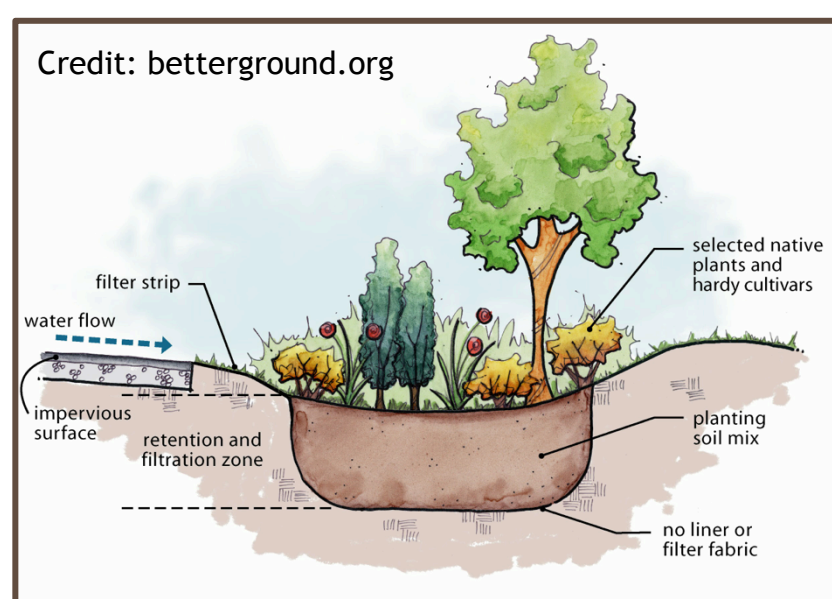
→ Viticulture produces a variety of waste products that can be reused through **composting and mulching**. By reusing these outputs as soil nutrients, the vineyard can lower costs by **reducing synthetic fertilizers** and **chemical herbicides**.

→ The vineyard can apply for different **labels** and **certifications** in order to market these sustainable efforts and capture the value necessary to raise its product prices.

Water Management

A Rain Garden will:

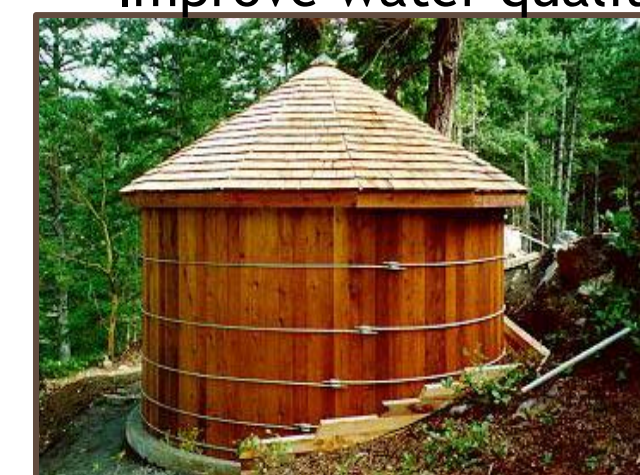
- Provide a place for people to enjoy nature
- Create natural habitat
- Conserve water
- Filter runoff pollution
- Protect lakes and streams
- Replenish local groundwater
- Improve water quality



Water Cistern:

- The vineyard produces 84,000 gallons of wine a year.
- 4.75 gallons of water produce 1 gallon of wine, so the vineyard needs 400,000 gallons of water per year.
- The average rainwater per year in Midland is 43.79 inches.
- Using the available 2,200ft² of roof surface to capture water for the cistern, the average rainwater collected would be 60,000 gallons a year, which **decreases external water usage by 15%**.

Rain sensors will **further conserve water** by cutting off the drip irrigation system when it detects rain.



Credit: thesolar.biz



Credit: toro.com

Energy Management

• Solar Panels:

The payback period for solar panels is 8 years in North Carolina, considering the tax benefits and the decrease in electricity bills.



Credit: itekenergy.com

• Production:

The energy provided by the solar panels could be sold, reducing monthly energy costs.



• Methods of Management and Tillage:

The correct and natural use of weed management could reduce production costs, time on the tractor, and gasoline use.

Waste Management



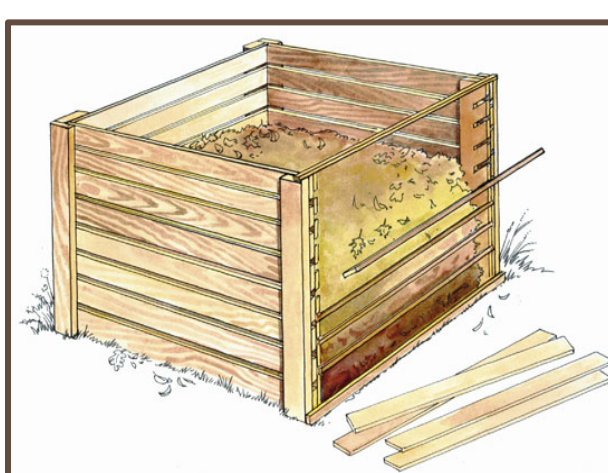
Agricultural waste such as grape skins, grapevines, leaves, and grass can be reused. By composting and mulching these by-products, the vineyard can reduce their need for synthetic fertilizer and chemical herbicide inputs.

Compost bins can be made from basic and affordable materials. Composting agricultural outputs will improve soil quality, eliminate waste, and lessen the need for synthetic fertilizer.

Agricultural waste (and also cardboard) can be used for mulching, which suppresses weeds without the use of harmful herbicides.

Composting and mulching will lead to improved soil quality and more productive grape yields.

The vineyard currently burns some of its trash which has negative side effects such as releasing toxins into the atmosphere. We would **educate** the vineyard's staff on the proper disposal, recycling, or reuse of their waste products.



Credit: motherearthnews.com

Certifications

Benefit Corporation

The B Corp certification is a process that evaluates the vineyard's overall impact based on factors such as waste and energy management. Based on a point system, this process leads to different levels of certification.



Organic Wine

- Provides official "organic" certification
- Encourages crop rotation, composting, & stewardship of soil
- Prohibits the use of synthetic chemicals
- Integrated pest management



Financial Impact

Water Management:

Rain Garden:

- The estimated costs for a rain garden are between \$3 and \$40 per square foot
- Using an average, the cost for a 150ft² rain garden would be around \$3,000

Cistern:

- Cost of the cistern: \$2,100
- The 60,000 gallons of water saved represent an average of \$360
- For the first year, the return on investment is **17%**

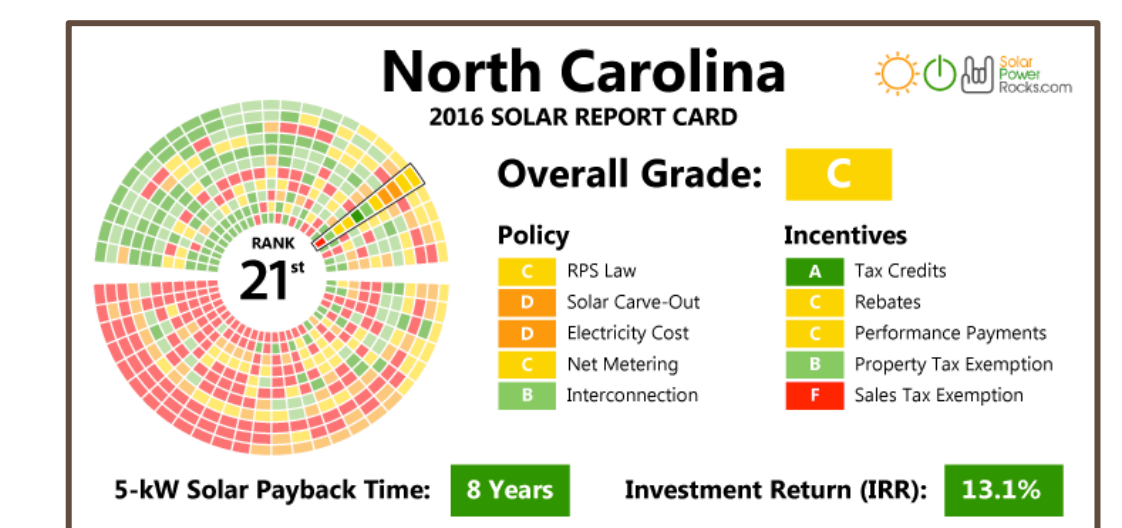
Water Sensors:

- The sensors are very inexpensive, around \$30 each

Energy:

Photovoltaic Panels:

- 5kW system is around \$20,000
- Has a **30% savings** on federal taxes, which reduces costs for the first year
- The investment would pay for itself within 8 years



Credit: solarpowerrocks.com/north-carolina

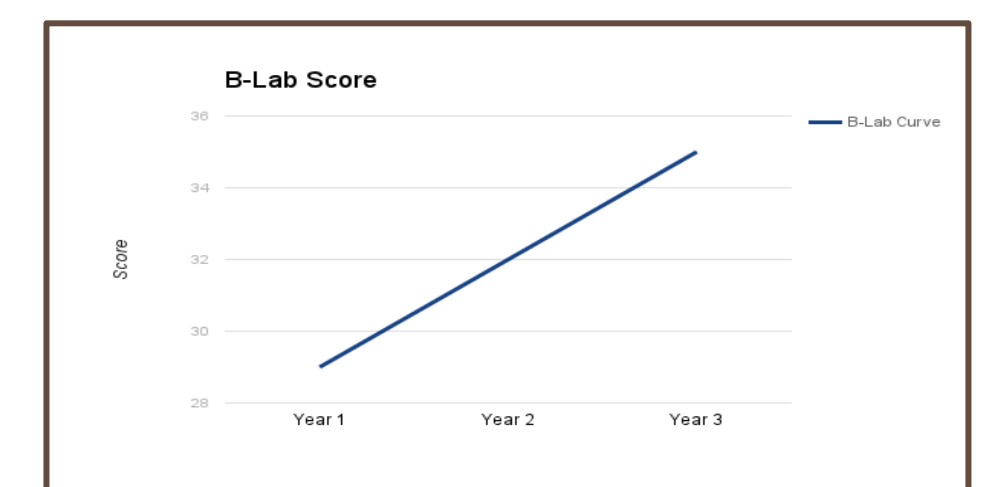
Waste Management:

- Reduces costs of herbicides and fertilizers by **15%**
- Reduces COGS resulting in higher profits

Certifications:

B Corp:

- The vineyard has a current B Impact Score of 29
- Implementing our water, waste, and energy management suggestions would result in a **20% improvement**



Organic Certifications:

- Federal Subsidy of **75%** for organic certification costs up to \$750

Conclusion & Advice

Step 1 : Waste Management + Water Management + Certifications

- The different components needed for implementing our water and waste management systems are affordable and accessible. These updates can be applied in the short-term and will propel the vineyard into its transition toward sustainability.
- Being certified is a long-term process, it is better to start early and gradually implement more data over time.

Step 2 : Solar Energy

- Solar energy will be the most expensive and time-consuming step to implement, therefore it is a long-term goal. As shown in the financial section, the installation of solar technology would support the reduction of the vineyard's operating costs. It would pay for itself within the first 8 years.