

Leading The Way
an update on
Sustainable Viticulture in Nebraska

NWGGA Conference

1 March 2014

Kearney, Nebraska

Introduction

- Nebraska Renewable Energy Systems was founded in 2005 to help develop renewable energy in NE
- Operated and off-grid farm since 2006
- Produced first biodiesel in Nebraska and many other firsts.
- Spun off two other projects, a renewable fuels filling station and a seed processing facility
- The seed processing facility, called Nebraska Screw Press has been involved with oilseed expelling for many years now.

How Nebraska Screw Press got here

- Oils from the farm remain a strong part of Nebraska history which we sought to redevelop
- Strong interest in sustainable Biofuels was the reason for our initial involvement with vegetable oil recovery systems in 2004
- 2008 saw biofuels essentially disappear in Nebraska, activities all but ended
- 2010 saw us get involved with food grade oils and equipment that has seen increasing popularity
- Transfer of NRES research to NSP for development

Energy Balance in the Vineyard

- Energy to grow
- Energy to harvest
- Energy to crush
- Energy to ferment
- Energy to bottle
- Energy to market

Can this be offset?
What extent?



Energy in a bottle

- Average kWh consumption per case of finished wine varies from 6-20kWh per case.
- Most inputs are fossil fuel based
- Opportunities for conservation are limited
- Winery size does not correlate to energy investment in the wine
- Nebraska rates are rapidly increasing due to reliance on imported energy sources, recently moving from 5th lowest to 17th lowest in US.

Renewable Energy and Viticulture are a great mix

- Those involved in viticulture have expressed a strong interest in sustainable energy inputs to their process in our three state survey
- Customers of the tasting room appreciate the value of sustainable and locally grown products
- Renewable Energy and pomace recovery products can help differentiate the tasting room experience and increase traffic to the winery

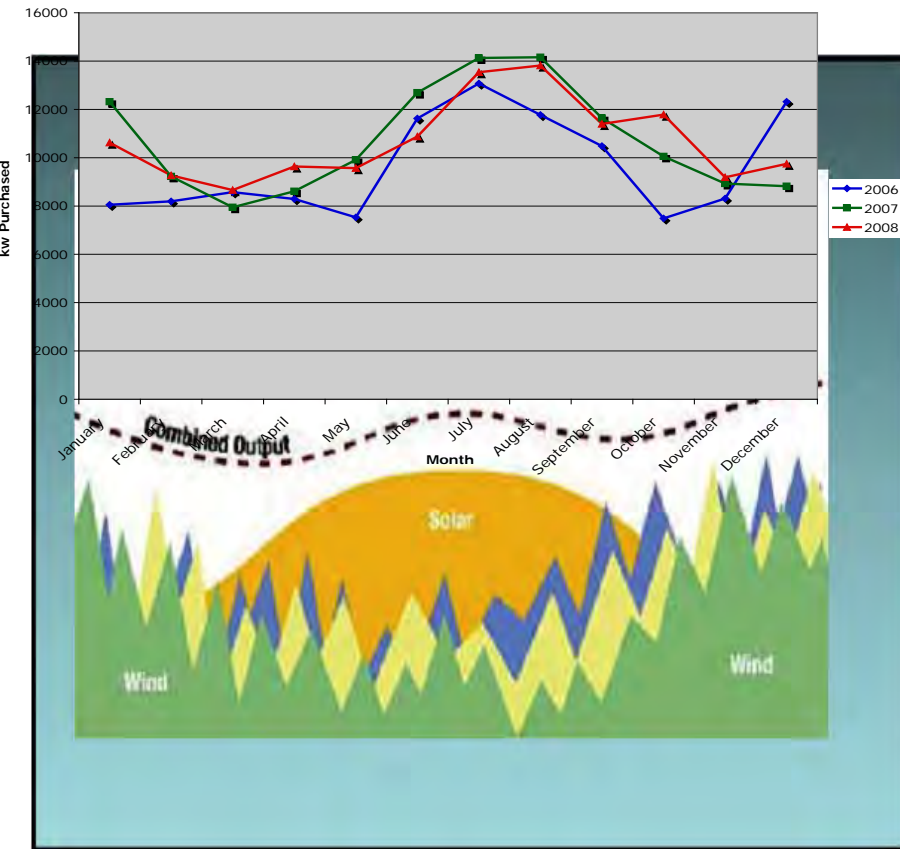
Silver Hills Winery



- Performed full energy audit
- Had energy intensity calculated at 6kWh/case
- Installed 6.6kw of solar to offset winery energy usage
- Added 3kw of wind in 2013 with energy back up system
- Recycles Pomace annually
- Supports Intern education projects
- Became energy neutral Winery

Renewable Energy Systems

Electricity Consumption



- Two years remain for 30% Federal tax Credit
- Net Metering Expansion likely
- Solar warranties out to 25 years
- \$5/watt for installed rooftop or ground mount solar
- Hybrid technology now mainstream
- Vertical south face walls are solar collectors for thermal solar
- Grape seed biomass energy conversion well documented

Anticipated Program Benefits

- Reduce energy expenditures
- Generate tax credits on energy infrastructure
- Visible commitment to sustainability
- Accentuate prepared food at wineries with grape seed flour and oil materials
- Expand product offerings from Nebraska Vineyards
- Create economic activity and job creation through recycling grape seed pomace

You want what? What do you want that for?

- Pomace recovery an excellent example of recycling and adding value
- Reminiscent of used fryer oil recovery discussion
- Excellent opportunity to create additional products from the vineyard
- Material is created annually
- Many challenges needed to be overcome

Program roots

- Began field research back in 2009 when Mac's Creek dumped a truck load of pomace at a potential biodiesel site in central Nebraska
- Shelf stability primary concern when produced
- Silver Hills early interest and support
- NRES internship program adopted vineyard energy survey projects
- Collection and processing began in 2011
- NET/NDEQ grant support in 2013

2013 Season

- Infrastructural investments made to enable expanded pomace recovery, about \$40k
- Recycled 25 tons of material
 - Soaring Wings 8 tons
 - Milleta Vista 7 tons
 - Silver Hills 5 tons
 - James Arthur 5 tons
 - Big Cottonwood 1 ton

2013 Season

- Solar powered process
- Many fractions created from seed cleaning process
- White grape seed oil, types
- Improved flour texture
- Feed trials ongoing with dried materials
- Market development work ongoing
- Identified pomace collection system needs
- Began development of grape seed blended products.
- Drying step limiting factor

Major Lessons Learned

- Properties of oil
- Wet Separation techniques
- Solar Drying
- Cleaning and Grinding
- Manual labor demands are high
- Mileage investment in pomace can be high without good planning and coordination
- We are grateful for contributing winery support

Future Work - 2014

- Increase Macro bin inventory (looking for used!)
- Larger recovery trailer, better coordination
- OSU optimization study results
- Improved drying techniques
- Marketing
- Packaging
- Expand collection to 50 tons
- Recipe expansion
- Further Grinding
- Consolidate nutritional features

NSP Sustainable Viticulture Support Services

- Vineyard and Winery Energy Assessments
- Renewable Energy offset/backup systems
- Pomace recycling services
- Oil/flour marketing and branding in the Tasting Room
- Permits, tax credit and grant technical support services

Thank you to all our Partners

- Nebraska Environmental Trust and NDEQ
- Silver Hills Winery
- Contributing Wineries
- UNL Biochemistry and OSU
- NRES Student interns
- NWGGA /Jennifer Montgomery for this time

- We appreciate the opportunity to work with the viticulture industry



GRAPE
POMACE
ONLY

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2013/9/3













Fraction #1 - Uncleaned Seed



Fraction #4 - Light Impurities



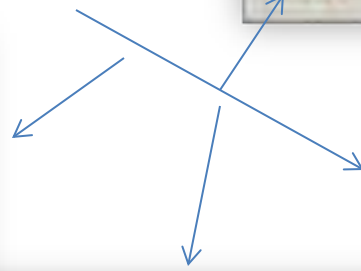
Fraction #3 - Fine Impurities



Fraction #2 - Scalped Impurities



Fraction #5 - Cleaned Seed







2013/8/3















