

Sweet Potato Storage VFD Analysis

1 1.5hp fans=1.5hp , 7600 CFM per fan at .5" static pressure

Project Name **XYZ Potato Shed**
 Contact **Sweet Potato grower**
 Contact Phone No.
 Location **MS,AR,NC,LA,CA**
 Farm Name **Sweet Potatoes**
 Storage Capacity (ton) **125**
 Storage Capacity (BU) **5,000**
 Design Airflow (cfm/BU) **1.5**
 Total Fan HP **1.5**
 Fan Motor Loading (est) **95%**
 Fan Motor Efficiency **95%**
 Calculated Fan Use (kW) **1.1**
 VFD Efficiency **95%**
 Total Measured Fan (kW) **1.1**
 Refrigerated (Yes/No) **No**

Blue = User Inputs

Utility Provider **Power Utility**
 Utility Contact **Power Rep**
 Energy Cost (\$/kWh) **\$0.100**
 Avg Energy Consumption **4,979** kWh
 Estimated Energy Savings **3,245** kWh
 Percent Energy Savings **65%** (range 30-60%)
 Energy Cost Savings **\$324.50** \$\$
 Estimated Project Cost **337.5** \$
Potential Incentive \$236.25 (may need to adjust formula)
 Payback w/o incentive (yr) **1.0**
 Payback with incentive (yr) **0.3** please contact PU

Fan output in cfm	7600	CFM per fan
at different air press	1	Number of fans
	7600	Total CFM at .5 static press
	8900	Total CFM at .05 static press
	1.52	CFM per BU at .5 static press
	1.78	CFM per BU at .05 static press

No VFD (Current) Ventilation System Profile						
Storage Phase	Starting Dates	Days	Fans In-Use	Fan Run Time	Calculated Usage	Typical Fan Operation
			(%)	(hr/day)	(kWh)	
Harvest / Load	9/15/2006	5	100%	10	55	Start fans when loading
Cure / Suberize	9/20/2006	14	100%	24	370	Continuous/Recirc if no OSA
Ramp to Hold Temp	10/4/2006	30	100%	24	792	Run Anytime OSA Avail
Winter Holding	11/3/2006	90	100%	24	2,376	Run Anytime OSA Avail
Spring Holding	2/1/2007	60	100%	18	1,188	Run Anytime OSA Avail
Unload	4/2/2007	15	100%	12	198	Continuous w/ OSA or Refrig
empty	4/17/2007	0	100%	0	0	Run Anytime OSA Avail
Storage Season Length		214		Total =	4,979	usage w/o VFD's in kWh
					\$497.86	En. cost w/o VFD's in \$\$

Estimated VFD Ventilation System Operation Profile						
Storage Phase	Starting Dates	Days	Fan Speed	Fan Run Time	Calculated Usage	Typical Fan Operation
			(%)	(hr/day)	(kWh)	
Harvest / Load	9/15/2006	5	70%	10	23	Start fans when loading
Cure / Suberize	9/20/2006	14	100%	24	389	Continuous/Recirc if no OSA
Ramp to Holding Temp	10/4/2006	30	80%	24	467	Run Anytime OSA Avail
Winter Holding	11/3/2006	90	50%	24	413	Run Anytime OSA Avail
Spring Holding	2/1/2007	60	65%	18	408	Run Anytime OSA Avail
Unload	4/2/2007	15	50%	12	34	Continuous w/ OSA or Refrig
empty	4/17/2007	0	0%	0	0	Run Anytime OSA Avail
Storage Season Length		214		Total =	1,734	usage with VFD's in kWh/Yr

Estimated Yearly energy cost =	\$173.36	En. cost with VFD's in \$\$
Estimated Savings =	3,245	kWh per year savings
	\$324.50	Net power savings/yr in \$\$
10 year lifespan of the project as per DOE	\$3,245.04	10 year savings \$\$
Avg cost of 5000 bu computerized system	\$7,900	total ventilation system cost
	\$4,655	vent system net cost after
	41.08%	deduction of 10 yr/main fan VFD savings

Notes:

Use utility billing history to help verify storage time
 Work with grower to determine tonnage/BU by month (eg unloading reduces refrigeration need)
 Please check with power utility on rebate and power filtration system requirements
 For these estimates, use 50% as the lowest VFD speed
 Savings should be based on kWh per day, however, tonnage/BU may also need to be factored in.
 Energy savings may not be reflected on power bill until later in storage season.
 For verification of savings, update spreadsheet using actual monthly VFD run time and kWh data and billing history

BOOSTER FANS ARE NEEDED TO CARRY THE AIR OVER 60' FOR STORAGE OF 80'+ IN LENGTH - FANS SHOULD CARRY 75% OF THE TOTAL MAXIMUM AIR AVAILABLE

