Sweet Potato Sto VFD Analysis NC style

4 3hp fans=12hp , 16,800 CFM per fan at .5" static pressure

Project Name	**XYZ Potato Shed**	Blue = User Inputs	Fan output in cfm	16800	CFM per fan	
Contact	Sweet Potato grower		at different air press	4	Number of fans	
Contact Phone No.				67200	Total CFM at .5 static press	
Location	MS,AR,NC,LA,CA			80000	Total CFM at .05 static press	
Farm Name	Sweet Potatoes	**Utility Provider**	Power Utility	1.344	CFM per BU at .5 static press	
Storage Capacity (ton)	1,250	**Utility Contact**	Power Rep	1.6	CfM per BU at .05 static press	
Storage Capacity (BU)	**50,000**	**Energy Cost ($/kWh)**	**$0.100**			
Design Airflow (cfm/BU)	**1.5**	**Avg Energy Consumption**	**40,517**	**kWh**		
Total Fan HP	**12**	**Estimated Energy Savings**	**26,409**	**kWh**		
Fan Motor Loading (est)	95%	**Percent Energy Savings**	**65%**	**(range 30-60%)**		
Fan Motor Efficiency	95%	**Energy Cost Savings**	**$2,640.88**	**$$**		
Calculated Fan Use (kW)	9.0	**Estimated Project Cost**	**$2,700.00**	**$225.00**	**cost of the VFD per hp**	
VFD Efficiency	95%	**Potential Incentive**	$1,890.00	**(may need to adjust formula)**		
Total Measured Fan (kW)	**9.0**	**Payback w/o incentive (yr)**	**1.0**			
Refrigerated (Yes/No)	No	**Payback with incentive (yr)**	**0.3**	please contact PU		

No VFD (Current) Ventilation System Profile

Storage Phase	Starting Dates	Days	Fans In-Use (%)	Fan Run Time (hr/day)	Calculated Usage (kWh)	Typical Fan Operation
Harvest / Load	9/15/2006	5	100%	10	448	Start fans when loading
Cure / Suberize	9/20/2006	14	100%	24	3,008	Continuous/Recirc if no OSA
Ramp to Hold Temp	10/4/2006	30	100%	24	6,445	Run Anytime OSA Avail
Winter Holding	11/3/2006	90	100%	24	19,336	Run Anytime OSA Avail
Spring Holding	2/1/2007	60	100%	18	9,668	Run Anytime OSA Avail
Unload	4/2/2007	15	100%	12	1,611	Continuous w/ OSA or Refrig
empty	4/17/2007	0	100%	0	0	Run Anytime OSA Avail
Storage Season Length		214		**Total =**	**40,517**	**usage w/o VFD's in kWh**
					$4,051.68	**En. cost w/o VFD's in $$**

Estimated VFD Ventilation System Operation Profile

Storage Phase	Starting Dates	Days	Fan Speed (%)	Fan Run Time (hr/day)	Calculated Usage (kWh)	Typical Fan Operation
Harvest / Load	9/15/2006	5	70%	10	186	Start fans when loading
Cure / Suberize	9/20/2006	14	100%	24	3,166	Continuous/Recirc if no OSA
Ramp to Holding Temp	10/4/2006	30	80%	24	3,798	Run Anytime OSA Avail
Winter Holding	11/3/2006	90	50%	24	3,357	Run Anytime OSA Avail
Spring Holding	2/1/2007	60	65%	18	3,320	Run Anytime OSA Avail
Unload	4/2/2007	15	50%	12	280	Continuous w/ OSA or Refrig
empty	4/17/2007	0	0%	0	0	Run Anytime OSA Avail
Storage Season Length		214		**Total =**	**14,108**	**usage with VFD's in kWh/Yr**
				Estimated Yearly energy cost =	**$1,410.80**	**En. cost with VFD's in $$**
				Estimated Savings =	**26,409**	**kWh per year savings**
					$2,640.88	**Net power savings/yr in $$**
				10 year lifespan of the project as per DOE	**$26,408.75**	10 year savings $$
				Avg cost of 50,000 bu computerized system	**$38,000**	total ventilation system cost
					$11,591	vent system net cost after
					69.50%	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 50', FOR STORAGES OF 60'+ IN LENGTH FANS SHOULD CARRY min 75% OF THE TOTAL AIR AVAILABLE