

Economic Justification Workbook
Data Bulletin 653-90
Example 2: Manufacturer of lithographed Cans

This workbook contains three worksheets:

- 1. Cost of Power Quality Problems.** Edit this worksheet by entering, in the gray boxes, customer-supplied data relating to production losses. To guide data entry, comments are included within the cells and instructions are provided to the right of the data fields. If the installation presently includes a standby generator, then enter 0 (zero) in the "Outages" field.
- 2. Investment Costs of a UPS System.** This sample worksheet summarizes the costs associated with installing an 1875kVA/1500kW PureWave UPS System. Data can be entered for another type of UPS system under consideration. If the installation presently includes a standby generator, enter 0 (zero) in the "Generator, Base Tank, Enclosure, and Transfer Switch" and "Installation" fields.
- 3. Cost Comparison and Payback for a UPS System.** This worksheet calculates the payback period for a PureWave UPS System as well as for another type of UPS system under consideration.

ECONOMIC JUSTIFICATION FOR A PUREWAVE UPS

CUSTOMER:

DATE:

Cost of Power Quality Problems	Events Experienced Annually		
	Voltage Sags or Interruptions less than 1 second	Interruptions > 1 second, < 30 seconds	Outages >30 seconds
Number of Events:	56	1	4

Production Losses

Material Costs	Scrapped Parts/Material:			
	Cost per part/Material	\$ 0.50	\$ 0.50	\$ 0.50
	Number of parts/material	4000	4000	4000
	Scrapped Parts/Material cost	\$ 2,000	\$ 2,000	\$ 2,000
	Product Disposal	\$ 200	\$ 200	\$ 200
	Material Costs Subtotal	\$ 2,200	\$ 2,200	\$ 2,200

Labor and Indirect Cost	Labor and Indirect Cost			
	Product Rework	\$ -	\$ -	\$ -
	Machine cleanup	\$ 400	\$ 400	\$ 400
	Machine startup	\$ 200	\$ 200	\$ 200
	Administrative	\$ 200	\$ 200	\$ 800
	Lost Labor from Downtime	\$ 400	\$ 400	\$ 1,600
	Overtime	\$ -	\$ -	\$ -
	Labor and Indirect Cost Subtotal	\$ 1,200	\$ 1,200	\$ 3,000

Lost Revenue and Other Costs	Other Costs			
	Lost Revenue per event			
	Number of parts	4000	4000	16000
	Revenue per part	\$ 0.10	\$ 0.10	\$ 0.10
	Total Lost Revenue	\$ 400	\$ 400	\$ 1,600
	Other Costs Per Event			
	Equipment Damage	\$ 200	\$ 200	\$ 200
	EPA emission fine	\$ 1,000	\$ 1,000	\$ 1,000
	unplanned overhauls	\$ 300	\$ 300	\$ 300
	Additional shipping charges	\$ -	\$ -	\$ -
Other costs Subtotal	\$ 1,500	\$ 1,500	\$ 1,500	

Cost of Power Quality Problems	Events Experienced Annually		
	Voltage Sags or Interruptions less than 1 second	Interruptions > 1 second, < 30 seconds	Outages >30 seconds
Number of Events:	56	1	4

Total Cost

Total Cost of Disturbances	Cost per event	\$ 5,300	\$ 5,300	\$ 8,300
	Number of annual events	56	1	4
	Annual cost of events	\$ 296,800	\$ 5,300	\$ 33,200
		<u>Annual Cost</u>		
	Total cost of events of all types	\$ 335,300		
	Unrealized Savings			
	Insurance Rate Reduction	\$ -		
	Utility Rate Reduction	\$ -		
	Peak-Load Shaving Savings	\$ -		
	Load Shedding Savings	\$ -		
Total Annual Unrealized Savings	\$ -			
Total Cost of Power Quality Problems	\$ 335,300			

INVESTMENT FOR A PUREWAVE UPS

CUSTOMER:

DATE: 0-Jan-00

Investment Cost		UPS	S&C	UPS
		Model	PureWave	UPS
		kVA	1875	2000
		kW	1500	1600
Equipment Cost	Equipment Cost			
	UPS System	\$632,000		\$237,000
	Batteries	\$0		\$174,000
	Bypass Switchgear	\$0		\$68,000
	Air conditioning	\$0		\$72,000
	Subtotal Equipment cost	\$632,000		\$551,000
Installation Cost	Installation Cost			
	Cost of Construction--Interior Floor Space	\$0		\$112,000
	Equipment rigging and placement	\$9,000		\$6,000
	Battery installation including exhaust/H2 gas detector	\$0		\$20,000
	Power and control wiring	\$35,000		\$49,000
	Mounting pad with conduits	\$17,000		\$0
	Installation Subtotal (UPS only)	\$61,000		\$187,000
Generator	Generator, Base Tank, enclosure, and transfer switch	\$260,000		\$374,000
	Installation	\$30,000		\$39,000
	Total Installed Cost of Generator	\$290,000		\$413,000
Total	Total Installed Cost of UPS and Generator	\$983,000		\$1,151,000

COST COMPARISON AND PAYBACK FOR A PUREWAVE UPS

CUSTOMER:

DATE:

0-Jan-00

Cost Comparison and Payback	UPS	S&C	Conventional UPS
	Model	PureWave	UPS
	kVA	1875	2000
	kW	1500	1600

UPS Life Cycle Cost Comparison				
UPS Life Cycle Cost Comparison	UPS Maintenance and operating expense (5 years)			
	Maintenance (24-hr. response)	UPS	\$9,200	\$17,616
		Energy storage	\$0	\$3,000
		A/C unit	\$0	\$2,000
	Energy cost of system losses @ customer's cost per kWh/efficiency	\$0.06	\$80,449	\$573,382
			98%	88%
	Five-year operating cost		\$89,649	\$595,998
	Total Cost of ownership, 5 years		\$1,072,649	\$1,746,998
	Normalized cost per kVA of ownership for five years		\$572	\$873

Simple Payback Analysis				
Simple Payback Analysis (Net Benefit less Taxes - Capital)	Number of annual disturbances			
		voltage sags	56	56
		interruptions	1	1
		outages	4	4
		total disturbances	61	61
	Cost per disturbance			
		voltage sags	\$5,300	\$5,300
		interruptions	\$5,300	\$5,300
		outages	\$8,300	\$8,300
	Annual cost of disturbances		\$335,300	\$335,300
	Estimated annual savings		\$335,300	\$335,300
	Estimated annual operating costs		\$17,930	\$119,200
	Net Annual Benefit		\$317,370	\$216,100
	Simple Payback (Years)		3.1	5.3
	Capital cost of UPS	Year	\$983,000	\$1,151,000
	1	\$ (665,630)	\$ (934,900)	
	2	\$ (348,260)	\$ (718,799)	
	3	\$ (30,889)	\$ (502,699)	
	4	\$ 286,481	\$ (286,598)	
	5	\$ 603,851	\$ (70,498)	
	6	\$ 921,221	\$ 145,603	
	7	\$ 1,238,591	\$ 361,703	

Note: The Net Benefit does not consider the time value of money, depreciation costs, or tax rate.

