



*An Energy-Efficiency Workshop
and Exposition*

Orlando, Florida

*Distributed Generation
at Social Security Administration*

**Getting The Most From
What You Have**

Tim Corbett



WHAT'S YOUR PROBLEM BUNKY?

- **CRITICAL EQUIPMENT TO BACK-UP**
- **PEAK SHAVING TO CUT POWER COST**
- **POWER LOSS OR INTERRUPTIONS**
- **ERRATIC SWINGS IN POWER SUPPLY**
- **REDUCED RISK OF BLACKOUTS**

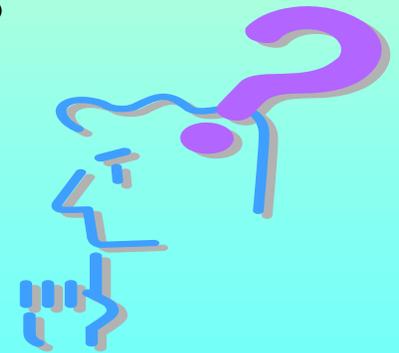


- ❖ MAYBE YOU SHOULD LOOK AROUND THE SITE FOR SOME HELP.
- ❖ HELP -- RIGHT IN YOUR LOCATION.
RIGHT NOW !!





- **FIRST SURVEY THE FACILITY AND SEE WHAT IS CURRENTLY SUPPORTED BY EMERGENCY OR AUXILIARY POWER**
- **THEN LOOK AND SEE WHAT THE CONNECTED LOAD IS?**
 - **THE CRITICAL EQUIPMENT STILL ON SITE?**
 - **CONNECTED LOAD DEMAND OVERRATED?**
 - **DIFFERING CRITICAL NEEDS FOR NEW ITEMS**
 - **NEED TO ADDRESS CHANGES IN OPERATION**





WHEN YOU LOCATE A POTENTIAL SOURCE YOU NEED TO QUALIFY THE BENEFITS. BENEFIT/RISK ANALYSIS OF THE PLUS/MINUS FACTORS.



SIMILAR TO THE WAY YOU WOULD MAKE ANY BUSINESS DECISION. LOOK AT THE COST OF RISK, O&M, OPTIMIZATION FACTORS

THE GOAL IS TO GET MORE BANG FOR THE BUCK ON YOUR COSTLY INVESTMENT.



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**DETERMINE REQUIREMENTS OF
CRITICAL SYSTEMS TO SUPPORT AND
ESTABLISH THE PRIORITY THAT FITS
INTO YOUR AVAILABLE RANGE**



**DON'T COMPROMISE
FIRE/LIFE/SAFETY REQUIREMENTS AT
EITHER A LOCAL OR NATIONAL (NFPA)
LEVEL**



**QUALIFY THE LEVEL OF RISK
ADDRESSED BY THE COST OF THE
MODIFICATION**



ISSUES TO CONSIDER IN QUALIFICATION OF COST TO RISK

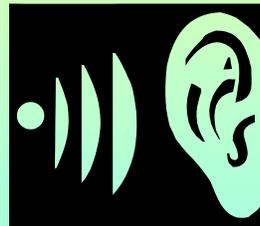
- \$ IMPACT ON O&M COSTS**
- \$ FUEL COSTS AND EPA REQUIREMENTS IN YOUR AREA**
- \$ POSSIBLE USES FOR WASTE HEAT**
- \$ APPROXIMATE HOURS OF USE**
- \$ NET METERING POSSIBILITIES**
- \$ UTILITY INCENTIVES FOR REDUCTIONS TO THE GRID**
- \$ MORE SITE SPECIFIC ITEMS**

TENANT ISSUES TO CONSIDER

➤ POWER QUALITY REQUIREMENTS OF THE EQUIPMENT BEING SUPPORTED

BUILDING ENVIRONMENTAL ISSUES

– NOISE



– ENGINE EXHAUST



– LOCAL SITE ISSUES



AND MORE...





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LET'S SAY IT'S A "GO"
NOW WHAT?



ONE METRIC--

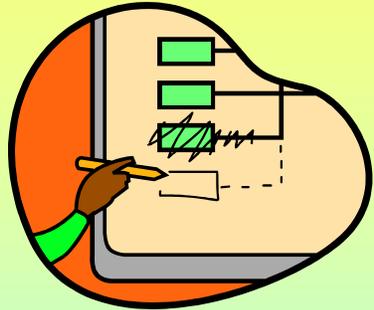
***PLACE AS MUCH CRITICAL LOAD AS
POSSIBLE TO OPTIMIZE THE USE
OF AUXILIARY POWER SOURCE***

GET THE BANG FOR THE BUCK!

August 17-20, 2003

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MAYBE THE METRIC IS TO
ADDRESS A KNOWN LEVEL OF
RISK WITHIN THE BUDGET?

THE OWNER MUST DETERMINE THE
“INTENT” OF THE WORK TO GET WHAT
HE WANTS

TO GET BEST VALUE...





BASIC CONSIDERATIONS TO FOLLOW IN ANY APPLICATION



MONITOR DEMAND LOAD OF CRITICAL EQUIPMENT TO BE SUPPORTED



HAVE ONBOARD CAPABILITIES TO MEASURE LOADS IN REAL TIME



DEVELOP LOAD SHEDDING SCENARIOS THAT MIRROR CRITICAL EQUIPMENT PRIORITIES



CONSIDER IMPACT OF BATTERY UPS



HAVE M&V CAPABILITIES TO PROVE LOAD SHEDDING AMOUNT AND SAFEGUARD EQUIPMENT.



ESTABLISH LOAD PRIORITIES, AND LOAD SHEDDING SCENARIOS THAT ADDRESS PROTECTING THE EQUIPMENT.



DON'T BITE OFF MORE THAN YOU CAN CHEW.



BENCHMARK UTILITY VS. DISTRIBUTED GENERATION COST FOR DIFFERENT FUEL AND UTILITY RATES (TIME OF USE)



EXPLORE POSSIBLE USES OF WASTE HEAT ,



ESTABLISH PEAK NUMBER OF HOURS OF ANNUAL USE.



ESTABLISH THOROUGH RISK ANALYSIS, SUPPORTED EQUIPMENT PRIORITIES.



LOOK FOR SITE SPECIFIC BENEFITS



THINGS TO CHECKOUT



**GRID COMPATIBILITY WITH THE UTILITY
DIFFERS FROM LOCATION TO LOCATION,
CHECK WITH LOCAL POWER COMPANY**

**HAVING THIS INPUT ON COMPATIBILITY HELPS
DETERMINE SYSTEM CONFIGURATION—E.G. THE
USE OF INDUCTION VS. DIRECT**



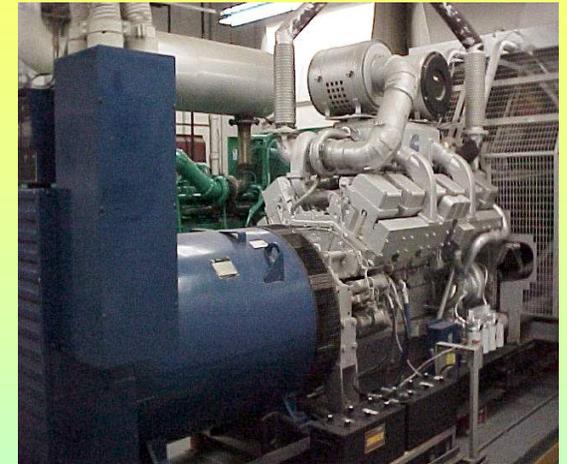
BENEFITS OF INDUCTION SYSTEM

- **IMPROVES POWER QUALITY LIKE A FLY WHEEL
UPS**
- **MORE FLEXABILITY FOR SYSTEMS
CONNECTIONS**
- **MORE ADAPTABLE TO LOAD SHEDDING**



DIRECT CONNECTION BENEFITS

- **AUTOMATIC TRANSFER**
- **DEDICATED TO SELECTED LOAD**
- **LESS COMPLICATED OPERATION**
- **FIRE/LIFE/SAFETY APPLICATION**
- **SIZED FOR CONNECTED LOAD**



CONSIDERATIONS

- ☒ **REDUCED BENEFIT FROM HEAT RECOVERY**
- ☒ **COMPLICATES LOAD SHEDDING BENEFIT**
- ☒ **PEAK SHAVING BENEFITS REDUCED**
- ☒ **HIGHER OVERALL PER HOUR O&M COST**





THE GOAL IS STILL...MAKE IT PAY



**BRAINSTORM WITH YOUR STAFF.
LOOK FOR WAYS TO DEFER COSTS
MAXIMIZE THE ABILITY OF THE
SYSTEM, INCREASING THE EQUIPMENT
SUPPORT.**

EXAMPLES OF COST SAVINGS

- ✓ **HEAT RECOVERY -- 80% OF THE ENERGY USED**
- ✓ **DISTRIBUTED GENERATION – UTILITY INCENTIVES**
- ✓ **NET METERING OFFSETS – O&M COST RECOVERY**
- ✓ **PEAK SHAVING – UTILITY COST SAVINGS**
- ✓ **MORE AND MORE**





MORE EXAMPLES OF COST SAVINGS



- ✓ **INCREASED POWER QUALITY SAVINGS ON LESS RISK**
- ✓ **LOOK AT LOAD SIZE VS. CRITICAL LOAD, MAXIMIZE SUPPORTED CRITICAL LOAD**
- ✓ **OPTIONS REQUIRE FLEXIBILITY IN THINKING AND HOW CRITICAL LOADS ARE DEFINED AND SUPPORTED.**



NEW YORK EXAMPLE



- 10 YEAR OLD 450KV GEN SET WITH NO LOAD
- PARALLEL OPERATION 15 YEAR OLD UPS RATED AT 300 KVA EACH WITH FULL BATTERY BACK-UP FOR EACH UNIT FOR 15 MIN.



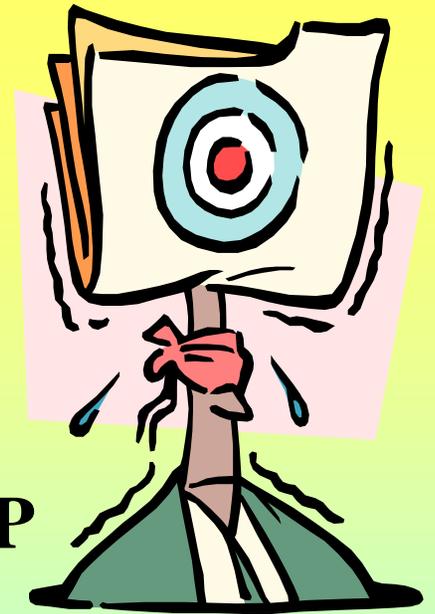
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GOALS

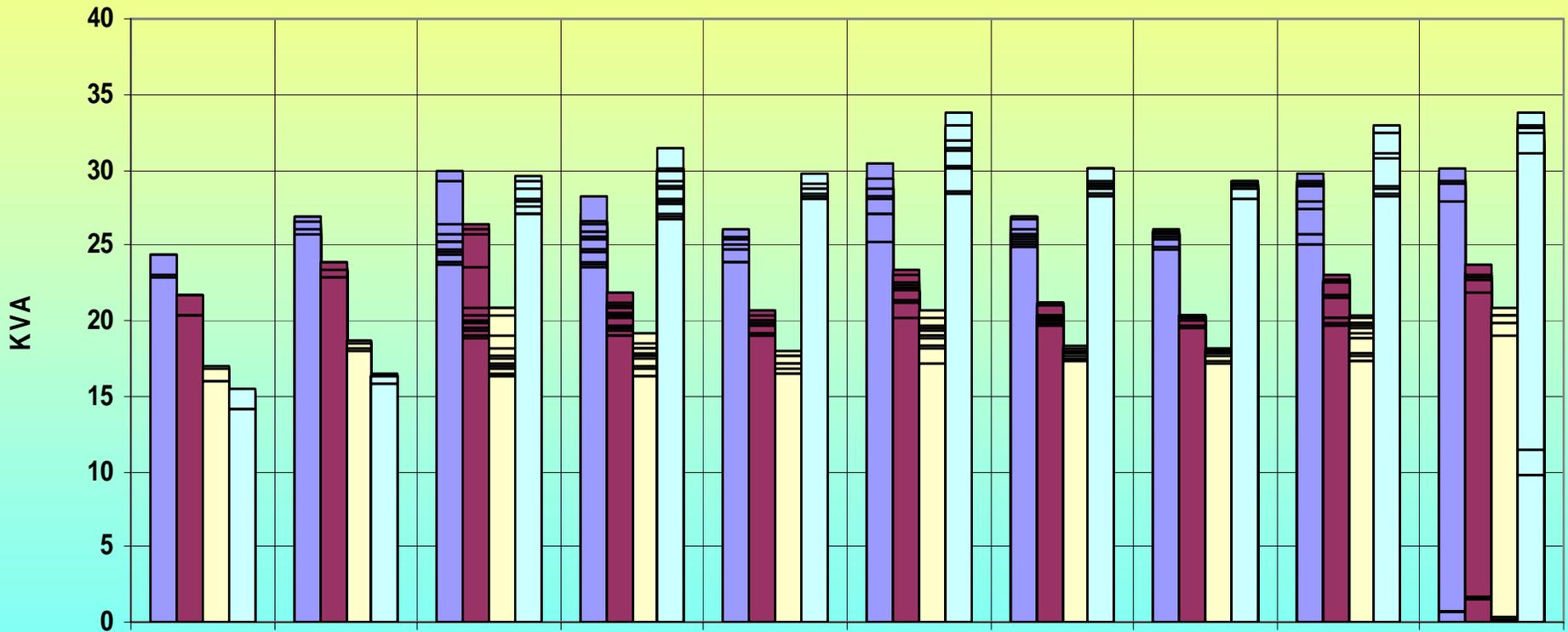
- **REPLACE UPS (AGED
– INEFFECIENT– TOO BIG)**
- **PROVIDE GENERATOR BACK-UP
(REDUCE RISK)**
- **REDUCE ENERGY CONSUMPTION**
- **CONVERT TO JELL CELL BATTERIES
(ENVIRONMENTAL CONCERN – O&M)**
- **REDUCE AREA REQUIRING
SUPPLEMENTAL ENVIRONMENT**





DETERMINING REQUIREMENTS

October UPS KVA Phase Readings

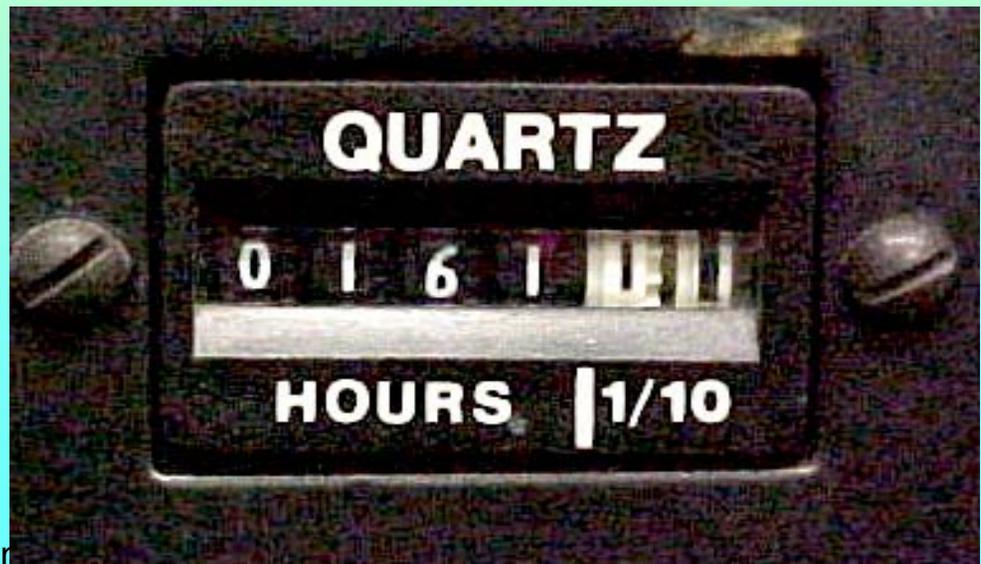


- 2729 MicroDataLogger4UPS Load Test 10/7/2001 12:00:00 10/16/2001 15:33:00 1 1 13174 Logging Error: Logger had a battery power failure Phase C kVA
- 2729 MicroDataLogger4UPS Load Test 10/7/2001 12:00:00 10/16/2001 15:33:00 MINUTES 1 13174 Push Button Start Enabled 2 333 mV RMS
- 2729 MicroDataLogger4UPS Load Test 10/7/2001 12:00:00 10/16/2001 15:33:00 MINUTES 1 13174 Push Button Start Enabled 3 333 mV RMS
- 2729 MicroDataLogger4UPS Load Test 10/7/2001 12:00:00 10/16/2001 15:33:00 MINUTES 1 13174 Push Button Start Enabled 4 333 mV RMS



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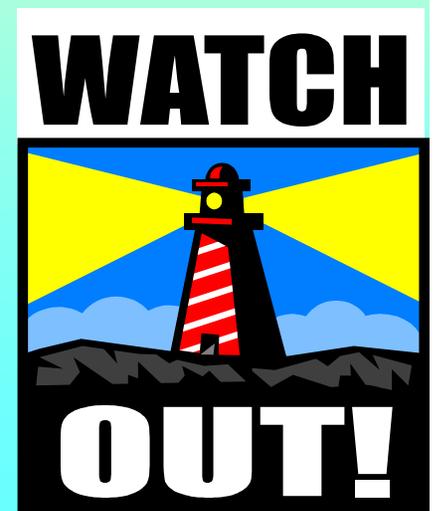
- ✓ **SURVEY AVAILABLE RESOURCES**
- ✓ **450 KVA --10 YEARS OLD – DIESEL FUEL**
- ✓ **CURRENTLY NO CONNECTED LOAD**
- ✓ **FUTURE USE TO SUPPORT THE UPS**





NEW UPS LOAD PARALLEL REDUNDANT WITH REDUNDANT BATTERY BACK UP

- **OPTIMUM UPS SIZE** = 225
- **CONNECTED BATTERY LOAD** = 450
- **TOTAL CONNECTED LOAD** = 675
- **GENERATOR UNDERSIZED** 200 +





PROBLEMS TO SOLVE

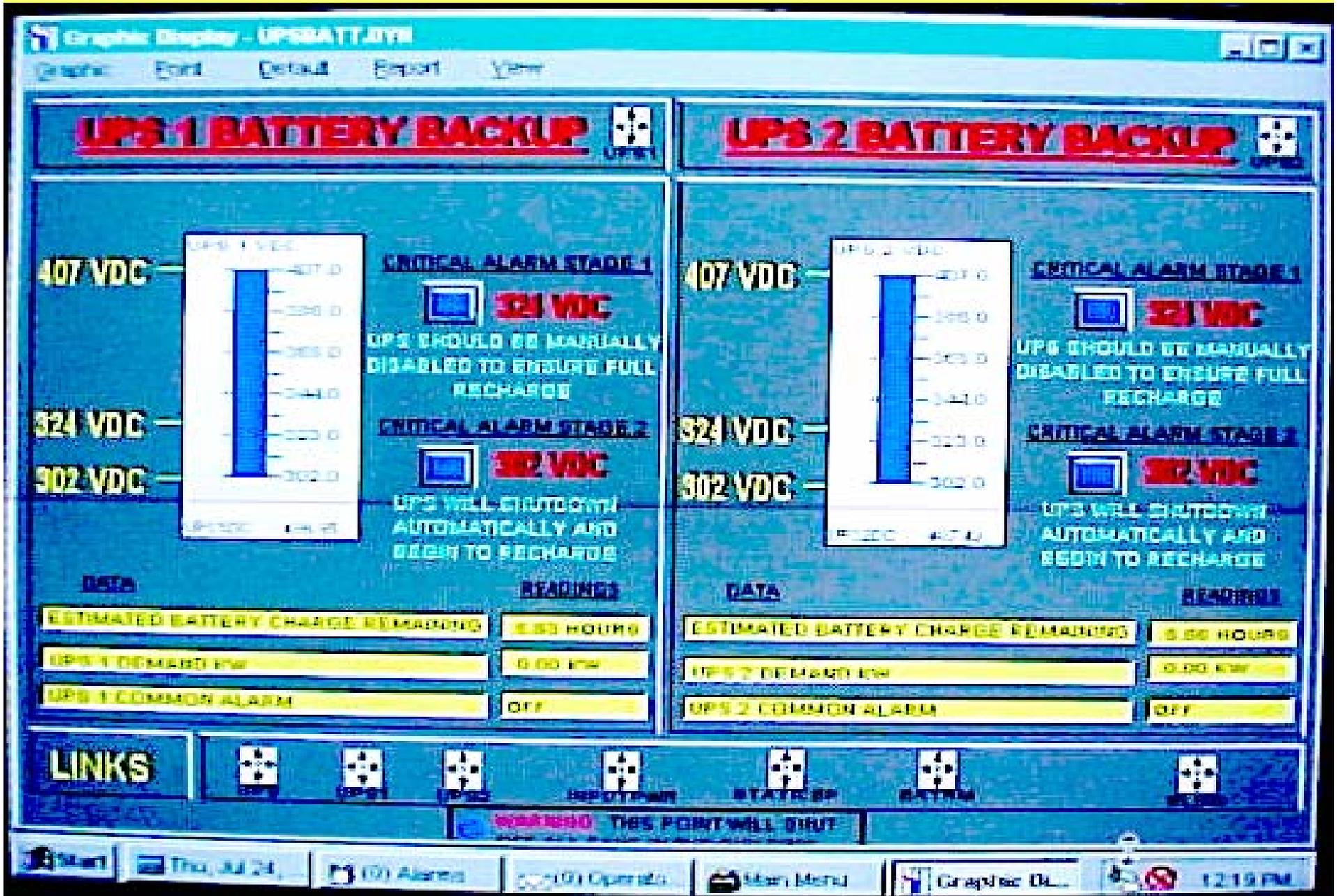
**USING A SMALLER GENERATOR
TO ATTAIN OUR GOAL REQUIRES
POSSIBLE LOAD SHEDDING**

**THE CHALLENGE IS TO CONTROL
THE LOAD ON THE EQUIPMENT
TO SAFE LEVELS**

**ANSWER: --- REAL TIME LOAD
MONITORING**



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***FOLLOWING COMPLETION OF THIS WORK
THE SITE WILL HAVE THE FOLLOWING
CAPABILITIES***

- ✓ **PROVIDE GENERATOR BACK-UP FOR UPS**
- ✓ **MONITOR ACTUAL LOAD FROM EQUIPMENT AND BATTERIES**
- ✓ **DETERMINE AMOUNT OF LOAD SHEDDING REQUIRED**
- ✓ **MONITOR INCOMING POWER QUALITY**
- ✓ **ENVIRONMENTAL SUPPORT BACK-UP**
- ✓ **SIGNIFICANTLY REDUCE OPERATIONAL RISK**
- ✓ **REDUCE ENERGY REQUIREMENTS BY 30 TO 50%**





CONCLUSION

**APPLYING THIS SCHEME, SSA WAS
ABLE TO REDUCE RISK TO CRITICAL
SYSTEMS**

- \$ REDUCE ENERGY CONSUMPTION**
- \$ PROVIDE A PEAK SHAVING OPTION**
- \$ INCREASE POWER QUALITY**
- \$ USE “GREEN” JELL CELL BATERIES**
- \$ REDUCE OPERATIONAL RISKS**





\$ THE ESTIMATED COST OF PROVIDING THESE BENEFITS, EXCLUDING THE COST OF UPS REPLACEMENT, IS > \$300,000

\$ THE ESTIMATED COST USING NEW EQUIPMENT TO SUPPORT THE UPS IN A LIKE MANNER WOULD BE APPROXIMATELY < \$700,000.



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NEWS ON THE CHICAGO PROJECT



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- UPDATES: EFFORTS IN CALIFORNIA AND BALTIMORE



THANK YOU.