



**An Energy-Efficiency Workshop  
and Exposition**  
Orlando, Florida

**Distributed Generation  
at Social Security Administration**  
**Getting The Most From  
What You Have**

**Tim Corbett**



Distributed Generation For SSA

**WHAT'S YOUR PROBLEM BUNNY?**

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



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Distributed Generation at SSA

❖ MAYBE YOU SHOULD LOOK AROUND THE SITE FOR SOME HELP.

❖ HELP-- RIGHT IN YOUR LOCATION.

**RIGHT NOW !!**



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Distributed Generation at SSA

- 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



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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

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**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

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**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?



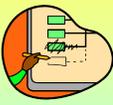
**ONE METRIC--**  
*PLACE AS MUCH CRITICAL LOAD AS POSSIBLE TO OPTIMIZE THE USE OF AUXILIARY POWER SOURCE*



GET THE BANG FOR THE BUCK!

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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...



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**2003 Energy** **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

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-  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.

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-  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 FLEXIBILITY 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



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### ***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



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### ***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.

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### ***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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**2003 Energy GOALS**

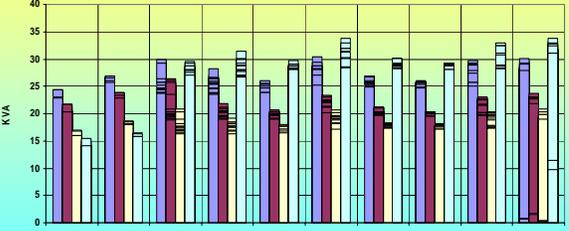
- REPLACE UPS (AGED – INEFFICIENT – TOO BIG)
- PROVIDE GENERATOR BACK-UP (REDUCE RISK)
- REDUCE ENERGY CONSUMPTION
- CONVERT TO JELL CELL BATTERIES (ENVIRONMENTAL CONCERN – O&M)
- REDUCE AREA REQUIRING SUPPLEMENTAL ENVIRONMENT



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**2003 Energy DETERMINING REQUIREMENTS**

October UPS KVA Phase Readings



■ 2729 MicroData.Logger4UPS Load Test 10/7/2001 12:00:00 10/16/2001 15:33:00 1 13174 Logging Error: Logger had a battery power failure Phase C KVA  
 ■ 2729 MicroData.Logger4UPS 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 MicroData.Logger4UPS 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 MicroData.Logger4UPS 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




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**2003 Energy 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 +



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**2003 Energy 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

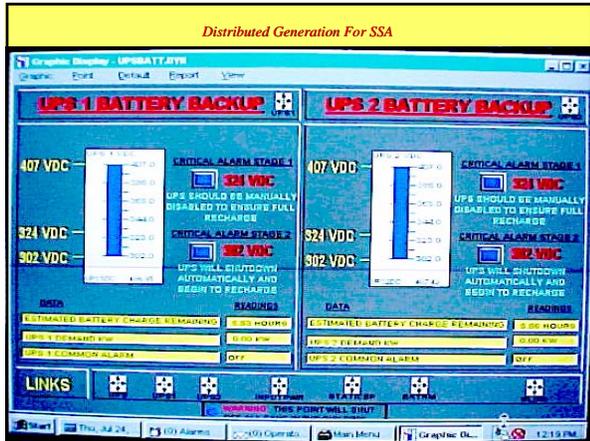
ANSWER: --- REAL TIME LOAD MONITORING



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**MODIFYING THE EXISTING BCS AS A REAL TIME LOAD MONITOR**





**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%



**2003 Energy**

**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

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**\$ 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.**

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