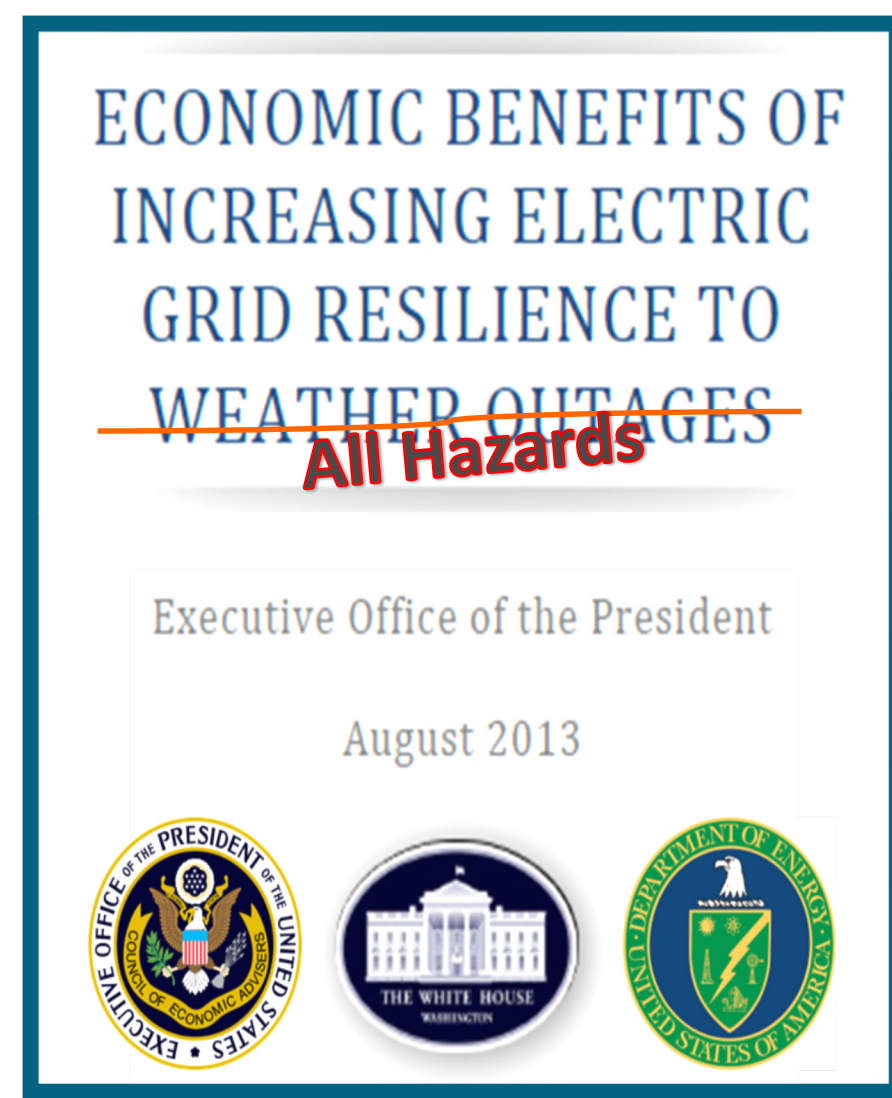
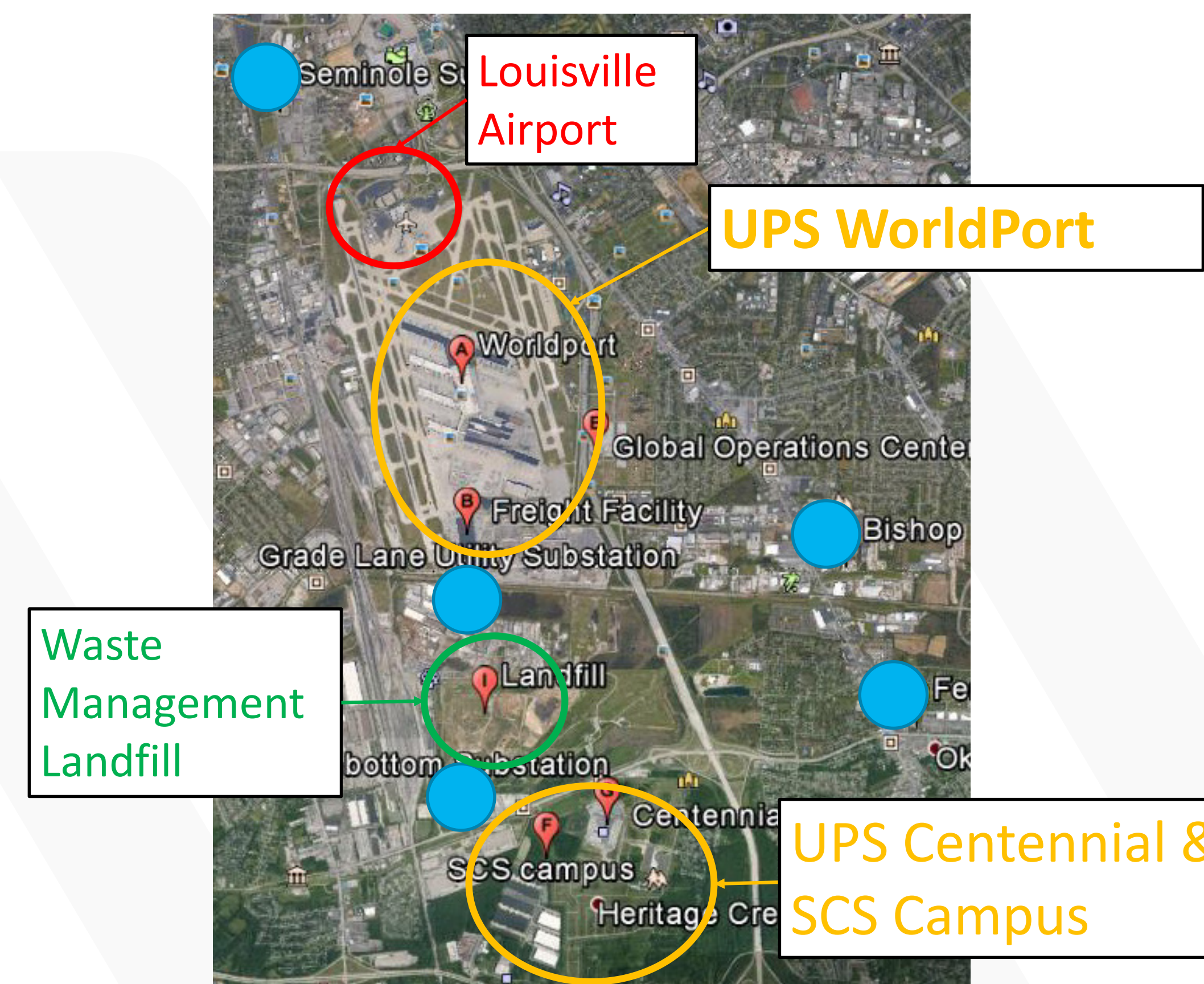


GMLC 1.3.4 – Industrial Microgrid Design and Analysis for Energy Security and Resiliency



Project Description

ORNL and SNL will design and perform cost/benefit analysis of an industrial-scale microgrid with the goal of sharing lessons learned and best practices with other industries and utilities. The analysis will be performed on the UPS Worldport facility in Louisville, Kentucky.



Expected Outcomes

- All-hazards risk analysis of facilities
- Cost/benefit analysis of industrial-scale microgrids
- Potential for grid services provision
- Roadmap to industrial microgrid deployments & lessons learned
- Aim to deliver the results to the hands of industrial consumers and utilities interested in microgrids to stimulate conversation on grid modernization.
- Expect results can be used as lessons learned for other grid modernization projects

Option	Facility A	Facility B	Tie	Cost (\$K)	Overall Availability (Ci)	Post-Startup Availability (Ci)	Post Startup Occurrences with Load Loss (Ci)	Overall Diesel Efficiency
Baseline	550 kW	550 kW	No	\$740,000	97.909024%	97.914717%	4.67%	24.03%
Baseline with Tie	550 kW	550 kW	Yes	\$1,255,000	99.989214%	99.995262%	4.55%	25.91%
Baseline with Additional Facility A Gen	550 kW (x2)	550 kW	No	\$1,509,500	98.879204%	98.88567%	2.91%	24%
Baseline with Additional Facility B Gen	550 kW	550 kW (x2)	No	\$1,509,500	98.222782%	98.228565%	3.18%	23.7%
Baseline with Additional A & B Gen	550 kW (x2)	550 kW (x2)	No	\$2,279,000	99.939886%	99.945881%	1.02%	23.96%
Facility A Microgrid	550 kW (x2)	550 kW	Yes	\$2,024,500	99.993829%	99.999745%	2.59%	25.82%
Facility B Microgrid	550 kW	550 kW (x2)	Yes	\$2,024,500	99.994035%	99.999988%	0.15%	25.72%
Facility A-B Microgrid	550 kW (x2)	550 kW (x2)	Yes	\$2,794,000	99.993963%	99.999995%	0.2%	25.69%

Progress to Date

- Analysis utilizes open-source software
- Two site visits to UPS Worldport to tour facilities and infrastructure
- Met with utility and industry stakeholders to discuss rate programs and partnerships
- Identified critical industrial and electrical infrastructure
- Performed microgrid analysis on a critical industrial facility
- Data collection underway for two more microgrid sites
- Modelling and simulation have resulted in upgrades to existing DOE tools

Significant Milestones	Date
Initial Microgrid Design	10/1/16
Risk Analysis Completed	4/1/17
Energy Efficiency and Ancillary Service Analysis	10/1/17
Cost/Benefit Modelling and Analysis	10/1/17