

Presenter: Mark Dougherty, BSME, FACHE April 21, 2016 HJFMSNJ Chapter Meeting

The Business Case for Distributed Energy in Healthcare



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Hospital Facilities Managers: Energy Challenges

• **Question**: What do these have in common?

- **Deferred Maintenance** (age of plant)
- High Energy Costs
- Negative Environmental Impact
- Constraints in the Capital Budget
- Debt Limit/Covenants
- Risk related to Power Outages



Energy Challenges

Answer:

For Hospitals, a Distributed Energy Resources (DER) strategy can reduce all of these.

OK, <u>but</u> what are "Distributed Energy Resources"?

Hint: Your local utility is a "Centralized" energy resource......





What is DER?

Distributed Energy Resources = Onsite Power Generation





Mission: Safety & Health

- DRIVERS FOR HOSPITALS
 - Power Reliability (ASHE "Powered for Patients")
 - Reduced Environmental Impact
 - Reduced Energy/Operating Costs
 - Reduced Capital Budget/Debt Constraints
 - Reduced Risk/Liability from Power Outages











Options

DER TECHNOLOGIES







- Combined Heat and Power (most common in Hospitals)
 - Cogeneration (to make Electricity and Steam/Hot Water)
 - Trigeneration (to make Electricity, Steam/Hot Water and Chilled Water/Air Conditioning)
- Wind (to make Electricity)
- Solar Photovoltaic (to make Electricity)
- Solar Thermal (to make Hot Water)
- Geothermal/Ground Source Heat Pumps (using the earth for Heat-Transfer)
- Fuel Cells (to make Electricity and Recovered Heat)
- Advanced Energy Storage (Ice, Batteries, Geothermal)

Each of these technologies has its strengths and weaknesses, and each has different incentive dollars available. These technologies can be integrated in a campus "MicroGrid" approach.

Cogeneration Benefits



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What a beautiful sunset!!





The next morning..... Is this the road that leads to your hospital?









DER SCOPE DEVELOPMENT PROCESS: Beginning With the End in Mind

- Your Goals
- Partner vs. Vendor
- Doing it "Right"
- Evidence-Based DER Solution Development







ENGINEERING, PROCUREMENT and CONSTRUCTION (EPC)

- Once the scope, estimated pricing/ROI/IRR and Financing Solution are confirmed, it is time to perform final engineering design, procurement and construction (EPC).
- Specialized firms are engaged to perform this work on your behalf, acting as Developer and Construction Manager.
- The project can be priced as Lump Sum, Guaranteed Maximum Price, Open Book, etc. If a Third-Party ownership model is employed, the pricing would be structured differently than a traditional Construction Project.



Key Considerations for Distributed Generation

- Interruptible Rates
 - Demand Response Economics
 - Interruptible rate credits vary from \$2 \$12/kW/Month
 - Participation in regional energy markets
 - Cost/Benefit analysis between tier 2 and tier 4 requirements



Key Considerations for Distributed Generation (continued)

- Avoided Cost of Downtime (First Cost/Avoided Losses)
 - Cost of outages between \$40 \$68 per kWh unserved
 - For 500K sq. ft. hospital, \$1.1 MM \$1.9 MM per day
 - For 60% load facilities
 - Worse for facility meeting minimum code requirements
- FEMA/Other Governmental Incentives



Yes, I saved the Best for Last!

FUNDING YOUR DER PROGRAM

• Financial Incentives

- New Jersey Clean Energy Program (www.njcleanenergy.com)
- NY State Energy Research & Development Authority (NYSERDA)
- Local Regulated Public Utilities (PSE&G, JCP&L, ACE, PPL, ConEd, etc.)
- Independent System Operator (PJM, NY ISO, etc.) "The Grid Operator"
 - Demand Response, Ancillary Services (can be very lucrative)
- Federal Incentives (typically Tax Incentives, i.e. ITC, Accel. Depr.)



Other Funding Sources

- Cash (I'm *sure* your CFO will give you some !!)
- Your Bank (refinance existing debt, traditional leases)
- NJHCFFA (or your state's debt conduit) www.njhcffa.com
- NJ Energy Resilience Bank (ERB) www.njerb.com
 - Hospitals are 2nd on their list..... LMI, 40%, Sept. '15
- Municipally Sponsored
 - NYCEEC, PACE others?
- MicroGrid Incentive Programs
 - DEEP Connecticut MicroGrid Program
 - NYSERDA NY Prize MicroGrid Competition
 - NJ? PA?



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U.S. DEPARTMENT OF ENERGY CHP Technical Assistance Partnerships

MID-ATLANTIC

http://www.midatlanticchptap.org/index.html CONTACT: Bill Valentine at 215-353-3319 or wjv3@psu.edu

The Mid-Atlantic CHP Technical Assistance Partnership is based at the Navy Yard, Philadelphia. It was created with funding from the US DOE to promote the use of CHP in the Mid-Atlantic Region. The objectives of the Center are to reduce the perceived risk of CHP to users, foster CHP as a viable technical and economic option for the participating region, and to capitalize on existing regional CHP resources.



U.S. DEPARTMENT OF ENERGY CHP Technical Assistance Partnerships MID-ATLANTIC

Mid-Atlantic CHP TAP focuses on providing information to all who are interested in CHP technologies or applications. This information, which is available on this website or by contacting Mid-Atlantic CHP TAP directly, includes:

Search

- Technology and application descriptions
- Screening tools
- Case studies
- State CHP baseline information
- Project development guidebooks
- Lists of local resources



Protecting Debt Capacity/Covenants

- DBOOM, PPA (Power Purchase Agreement)
- 501(c)(3) Partnerships (P3)
 - 100% tax-exempt, can be non-recourse to end-user
 - Can fund "bricks & mortar" scope, too!
- PACE (Property Assessed Clean Energy) <u>www.PACENow.org</u>
 - www.c-pace.com www.energizeny.org www.newjerseypace.org (S1510)







Here is an idea....DER

- 20% to 60% energy savings, 5-8 year payback
- System efficiencies of 60%-80% (typical grid efficiency is 25%-40%)
- Improves reliability and resiliency of the hospital
- Provides peak demand relief for the hospital (\$\$) and for the local utility distribution network
- Mature technologies with extensive operating history
- Takes advantage of projected long-term stability in natural gas prices
- Financial Solutions are available to fund the project in a fiscally conservative manner with a solid business case.
- Incentive dollars are available to reduce the project's design and capital costs



CONCLUSION

- A Distributed Energy Resources (DER) project can be a very valuable strategy for your hospital and the community you serve. The benefits include dollar savings, reduced risk, a healthier community and an improved environment. Federal, State and Utility incentive dollars have been made available to promote adoption of DER for these reasons, as well as to improve the reliability of the electricity grid. The technology has matured; the ability to analyze whether the "right solution" exists; and numerous attractive funding solutions are now available, including most recently, the NJ Energy Resilience Bank (ERB) and PACE.
- A DER Strategy can support key goals for hospitals and should strongly be considered in your strategic facilities planning process.





THE END - THANK YOU!!

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