**

*ECM Lessons Learned*

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Responsibility: PF

**ECM Lessons Learned - For Energy Generation, Power Purchase Agreement, and Emerging Technology ECMs**

***Energy Generation Technologies***

**All Energy Generation Technologies**

1. Investigate National Environmental Policy Act (NEPA), National Historic Preservation Act, State Historic Preservation Officers (SHPO), and other associated siting or design considerations for the technology early on to understand practicality, and costs and timeline impacts (Shah). Some projects can require local aesthetic review and approval as well (Holda).
2. If the technology is to be grid-connected, grid connection should be thoroughly investigated and considered early in project development as connection requirements can be significant and their costs sizeable (Sharp, Holda).
3. If the technology is to be grid-connected, review the interconnection agreement carefully. Utilize GSA Areawide Contract Exhibit D. Assess retail wheeling and privatization impacts if they are involved (Shah). Resolving indemnification issues within interconnection agreements can take considerable time (Coleman).
4. New energy generation technologies may add new and unfamiliar equipment to the customer’s infrastructure which could increase maintenance costs. Agencies should assess their ability to O&M these systems and determine if their current annual O&M budget will be impacted. It is recommended that O&M responsibilities be assigned where they are best managed and that project economics consider any change to O&M costs (Sharp).

**Combined Heat and Power (CHP) Systems**

1. If not already part of agency review process, agencies might consider requiring ESCO's to provide reliablity/perfomance history data from OEM's on advanced technologies (e.g., technology categories 10 & 11). Lack of reliability/performance data will help to highlight new technologies on market and/or new OEM's to technology space. (reference: multiple examples of up-time issues on small CHP ECMs typically NG fired recip-engines).
2. Avoid use of blended rates, even at the Preliminary Assessment (PA) – use actual rate structure to better estimate economics.

**Biomass Systems**

1. Agencies should strongly consider having the ESCO perform O&M and be responsible for repair and replacement for these systems. Not only are these systems unfamiliar to most agency sites, some have proven to be operationally challenging and have equipment reliability issues.
2. Define who is responsible for biomass feedstock early. The government should be very cautious about accepting responsibility for biomass feedstock. It’s availability can fluctuate with demand which can result in a lack of continuous feedstock and/or intense price swings. In addition, quality of the feedstock can vary widely which could put considerable savings at risk if the quality degrades (Holda, Sharp).
3. The risk of unplanned outages and particularly the costs of acquiring alternative energy sources short term should be considered.
4. The potential impact of scheduled outages for planned and unplanned maintenance should be considered carefully to best manage utility cost impacts.

**Photovoltaic (PV) and Wind Energy Systems**

1. For PV systems, many power inverters continue to have expected lives less than that of the PV grid. As a result, a plan for replacement and that associated cost should be considered in the planning and economics of a PV measure (Sharp/Dahle/Coleman).
2. Compare renewable generation to load. If some export is expected, research net metering rules carefully (Shah).
3. Utilize very conservative (if any) demand charge savings estimates, unless the contractor is willing to guarantee savings (Shah). This appears to be related to the potential for intermittency of PV and wind energy.
4. Tailor project and the implementation approach based on your tariff and regulatory environment (standby charges; possible tariff changes due to load characteristic changes; if electricity sale planned (beyond net metering), what regulations apply, such as feed-in tariff, Public Utility Regulatory Policies Act of 1978 (Shah).
5. Review the Buy America Act and determine how it may affect your project. Buying modular overseas and assembling in America is sometimes done (Wolf).
6. If renewable project shades the ground, remember to consider the many potential siting needs such as: fencing, lighting, guttering/drainage, ground cover, ground maintenance (Coleman).
7. Investigate available incentives for renewable energy projects (Shah).

**Renewable Energy Credits and Solar Renewable Energy Certificate (SREC) Sale Considerations**

1. Carefully consider SREC sales if part of project. Not always permissible. Project ownership is important (private vs. government) – ASBCA decision (see <http://energy.gov/eere/femp/downloads/fupwg-winter-2014-meeting-agenda-report-and-presentations>)
2. SREC markets are volatile – best to award contract quickly to avoid problems associated with significant SREC price reductions
3. Consider retaining RECs in out years since SREC values may be low (re-negotiate contract if it turns out they are valuable)

***Power Purchase Agreements***

1. Ensure that your state and utility allow PPAs if this is planned implement method (Shah).

***Emerging Technologies***

1. If the agency has an interest in emerging technologies , seek out the ESCOs experience early such as at the NOO. Perhaps even put a requirement in the NOO (Hattery).
2. Consider a limited-scale demonstration of the technology during the IGA phase before the technology is locked in on a wider scale (for more information: Holda)
3. The ESCO experience, inexperience, or need to contract out associated with emerging technologies can affect pricing so an agency might want to consider these in advance (Stetz)
4. Look for cooperation among project partners. Emerging technology measures often require a mix of motivation and tolerance between partners. Partners are either motivated to incorporate the technology into the project or tolerant to have it as part of the project.
5. Perceived risks need to identified, managed, and/or mitigated. Risk can be reduced by being properly shared among the parties, and by acquiring more detailed technical information
6. Consider leveraging technology experts from the USDOE National Labs and/or private sector to educate stakeholders, and emphasize value and benefits.

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