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The State Energy Office of North Carolina would like to thank the National Energy Services Coalition for allowing the use of this resource for USI participants. A great deal of work went into compiling this information into a single location. As you go through this program and/or have additional questions, please contact Reid Conway reid.conway@ncdenr.gov.

GESPC-U Lesson #112:

Project Development

FYI: Terms and Acronyms can be found on the last page

Summary: This lesson explores how to achieve maximum transparency and clarity of information to build consensus between the project owner and ESCO to heighten the confidence of project success during the IGA process. The Owner and ESCO come to a collective conclusion on the appropriate solutions for each measure, greenlighting the ESCO to finalize all savings and payback calculations and off for consideration the suggested measurement and verification methodology to scientifically demonstrate the achieved savings.

In this lesson we will be diving deeper into the investment-grade audit. Because of the highly technical nature of the IGA, it is important the owner has a resource with appropriate experience and expertise, whether in-house or third-party, to provide guidance that will ensure all aspects are understood and appropriately addressed. This cannot be stressed enough. Not only is this about experience, but it is about the time needed by the owner to really make this a good project. This is your project. You will live with it for many years to come. Be involved.

In previous meetings between owner and ESCO, some of the more obvious measures like lighting, water devices and steam traps may have already been agreed to as the result of a complete survey, inventory, and assessment of what is existing by specialty contractors engaged by the ESCO. By now, the ESCO should also have proposed to the Owner

bringing on these specialty contractors with which they have preferred, trusting professional relationships. Hopefully the ESCO has vetted some local contractors as well as HUB contractors to participate in this effort.

It is important to note here that when the ESCO does accept a specialty contractor's scope, cost, and savings projections, for their inclusion in the IGA, the ESCO, owns the responsibility of the measure -- its scope, cost, savings, and performance. Again, with open book pricing, as the owner you should be looking at these numbers.

Now the ESCO begins the task of gathering the same level of detailed information about the other measures that the Owner and ESCO agreed to pursue as a part of the outcomes of the preliminary findings meeting.

Some of that work may include the collection of additional preconstruction data for the additional measures under consideration. This could be flow and temperatures, consumption and load or variable load analysis, either spot or short-term monitoring, with the end goal to validate, or if necessary, update the preliminary load attributions. The scope of the project needs to be defined well enough to acquire reasonable pricing for each measure. Simultaneously, the energy engineering team must identify the utility, operational, and maintenance and savings to determine which measures make the final cut for the project proposal. Integrating these two needs into project development is an ongoing exchange of information and iterative thinking to arrive at the ultimate list of measures that fit.

ESCO engineering teams are extremely adept at conducting this investment grade level assessment and verification of current equipment status and operating parameters. This level of detail provides the ESCO the appropriate level of information to establish a

credible baseline of current utility, operation and maintenance use and cost to which forthcoming utility and utility cost savings calculations will compare.

At this point the ESCOs have already gathered field data of equipment, such as connected loads, variable loads, operating parameters, etc. During this more detailed analysis phase, the ESCO will refine this data, perhaps through additional data logging or additional field measurements, to the confidence level that they can quite accurately calculate the current utility consumption of the equipment impacting each individual energy conservation measure. As the owner ask questions as to what was logged and what was measured and if this will be part of the measurement and verification later. In the case of electrical consumption, the engineers will separately analyze both the energy, or kWh, and the demand, kW impacts. In other words, the baseline utility use.

Using the detailed utility consumption and cost information previously gathered and analyzed through extensive utility bill review, the ESCO has developed mutually agreeable baseline utility unit costs for electricity, fuels such as natural gas, water, sewer, etc. Once the engineering team has completed the utility use analysis, they apply the baseline utility costs to calculate the baseline utility costs for each individual measure to be included in the project and ultimately, the entire project.

Using the operating parameters for their recommended new equipment and appropriate operating strategies, the ESCO can perform a similar exercise to calculate this equipment's predicted utility consumption. By applying the baseline utility unit costs then, the new equipment's utility use costs are calculated for each measure. Technically, the difference between the baseline utility use and cost and the new utility use and cost results in the calculated first year

savings for each measure and the total project. Because there may remain some unknowns, it is not uncommon for the ESCO to "temper" the calculated cost savings by applying a factor that will result in high confidence guaranteed cost savings. This may be called several different things, including conservation factor, safety factor or diversity to list a few.

Let's be clear, the baseline energy use minus the new proposed energy use will equal the new energy savings. And some percentage of that is what the ESCO is going to guarantee. As the owner you would want how the project is being measured and verified to be that simple as well.

We have now arrived at the point where the ESCO has designed solutions for each measure. The ESCO now needs to reach out to the subcontractor trades to gather prices for the work defined. By way of an example of this "defined work", let's consider a single rooftop HVAC unit. The ESCO in this example has concluded that the unit can be a one for one replacement, same cooling and dehumidification capacities, same ability to provide X amount of fresh air. The ESCO should have discussed brand selection with the Owner. If the owner doesn't require a specific brand, the ESCO may solicit bids from equipment manufacturers based upon an equipment specification, efficiency, and other considerations. So, in this example, the ESCO will be buying the equipment. Then, the ESCO would develop the complete and detailed scope of work that would be required of a subcontractor. This could include things like receiving, storing, setting in place, along with disconnection and reconnection of electrical supply, and even what will be required to remove from the ductwork and the reconnection of the new unit. The new unit may require some form of collar or transition and the appropriate configuration back upon the roof mounting and any required adapting to connect and seal with both the supply and return air ductwork. The ESCO may or may not require

the replacement of the electrical disconnect and would take on the responsibility of listing all other work required and necessary appurtenances or accessories to connect with control systems or thermostats. They likely would incorporate into this measure's scope of work, any refrigerant capture from the old system and disposal and any refrigerant charging required for the new, along with testing, Owner operation and maintenance training, system startup and warranty responsibility. And finally, even the disposition or disposal of the old, proposed to be replaced system. This sort of very detailed specification would be assembled, reviewed, and approved by the Owner and prepared for distribution. The same level of detail in this example would be drawn up by the ESCO for all measures and developed into a solicitations or invitations to propose to a select group of subcontractors as agreed to by the Owner for proposal. Upon receipt of the proposals, the responses would be reviewed by the ESCO and the Owner and there would be a determination and selection of the best value for the project.

Since both the owner and the ESCO will agree on standards of comfort, then the responsibility of maintaining these space conditions is on the ESCO and the ESCO should after installation prove to the owner that the setting can be attained.

To illustrate that project development is not a "one-way fits all" methodology, we're going to now share a bit of an alternative approach.

In this example, the ESCO and Owner are in fundamental agreement about the energy conservation measures that they'd like to be included in the project because of the preliminary analysis, field investigative work and certainly the input of the Owner and occupants. The Owner has indicated they have no real brand allegiances or preferences but are simply seeking great value.

So outside of the work and scope of the specialty contractors, the ESCO assembles what's known as a performance specification to solicit to design/build subcontractors. This would look more like a broad-based description of a device or system offering an opportunity for input by the subcontractors. A general description and configuration of a measure would be defined and would be accompanied by an invitation for the subcontractors to provide a very detailed scope of what they believed to be the best value solution. Accessories, appurtenances, valves, where work specifically starts and stops, what disconnects to replace, wiring to modify, controls to add or alter -- all of it. Along with this very inclusive proposal would be the subcontractor's price to do the work. In this procurement example, the Owner and ESCO would sort through the different proposals to determine and select the best options for the Owner's needs. All the solutions proposed by the ESCO would need to be accompanied by the utility, operation, and maintenance considerations and likely a statement of benefits of why this proposal should be considered the best value for the Owner's needs.

Regardless of the approach, the Owner and ESCO must come to a mutual agreement on the appropriate solutions for each measure. With this set of measures, the ESCO is required to finalize all savings and payback calculations and offer for consideration the suggested measurement and verification methodology to scientifically demonstrate the achieved savings. This is not a simple task. All the impacting variables, load usage profiles, standards of comfort need to be considered to calculate the projected new utility consumption, operation and maintenance costs, how they relate to the existing systems and therefore the proposed avoided costs or savings. It is important that the ESCO not only document the calculations, assumptions, engineering considerations that lead them to their conclusions, but they also should explain the illustration of engineering

and math at a level that reviewers can understand what they are being asked to agree with for project success. Regardless of the process, the ESCO should guide to the solutions that provide the value intended for the project and Owner.

Said simply, the work of the ESCO team should meet or exceed the quality of any other work done through any other construction or installation methodologies. If a state agency, university, school or city has process, procedures, guides and forms, even their own construction contract templates, the Owner needs to make certain that the requirements to abide by those standards, processes or installation and construction contracts are a part of the ESCO solicitation for the project.

Knowing they will be required to verify their guaranteed utility cost savings on an annual basis, the ESCO must develop an appropriate measurement and verification process for each individual measure, and ultimately the project. At this juncture, they select to propose one of the four M&V options, as provided by the International Performance Measurement and Verification Protocol or IPMVP, to be used to validate the annual guaranteed cost savings on a measure-by-measure and total project basis. It is very important that the owner understands their potential risk level for each of the options. If the owner doesn't have this level of expertise, once again, it is highly recommended they obtain knowledgeable third-party counsel in this regard. The decisions made at this point will forever be in place for the duration of the performance period.

What we've touched on lightly here includes topics like pricing, which are impacted by things like warranty management and commissioning, construction practices and methodology, measurement, and verification all of which we'll dedicate some deeper dives to in another lesson.

Once you feel comfortable with the information above, please scroll down and complete the quiz below. Email your answers to Reid Conway at reid.conway@ncdenr.gov. If you have additional questions, feel free to include them as well.

Lesson 12 Quiz

1. Who owns the final responsibility of the measure when a specialty subcontractor provides scope, pricing and savings and solutions details to the ESCO? Why?

2. What is the best source for preconstruction data of the energy conversation measures in consideration for a project?

3. List the factors that figure into the development of a final baseline of utility consumption of equipment for each measure.

4. List some of the variables considered when predicting post construction utility consumption.

5. How are first year savings for a project determined?

6. True or False; there is no need for the owner to be involved in the review and approval of the subcontractor scopes of work or the responses from pricing invitations.

7. True or False; The work done by the ESCO, and subcontractors doesn’t need to comply with the owner’s standard building requirements and quality standards. Why or why not?

Terms and Acronyms

3rd Party	3rd Party Engineer
COS	Council of State
DOA	NC Department of Administration
DPI	NC Department of Public Instruction
ECM	Energy Conservation Measure
ESA	Energy Services Agreement
ESC	Energy Services Coalition
ESCO	Energy Service Company could be interchangeable with QP
ESPC	Energy Saving Performance Contracting
GEPC	Guaranteed Energy Performance Contracting
GESPC	Guaranteed Energy Saving Performance Contracting
GS	General Statute
GU	Governmental Unit
IGA	Investment Grade Audit
IPMVP	International Performance Measurement and Verification Protocol
LGC	Local Government Commission (Housed in the Treasurer's Office)
LGU	Local Governmental Unit
M and V	Measurement and Verification
OR	Owner's Representative
OSBM	NC Office of State Budget and Management
PC	Performance Contracting
Pre-Bid	Meeting held prior to the bid opening
QP	Qualified Provider could be interchangeable with ESCO
QR	Qualified Reviewer
RFP	Request for Proposal
SEO	State Energy Office
UNC	Refers to the UNC System
USI	Utility Savings Initiative