



# “Lessons Learned”

Energy Efficiency Projects



**GovEnergy**  
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# For More Information

- Would you like to know more about this session?
- Dale or Gordon
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Don't forget to fill out and drop off your session evaluations!



## Panel Member: Dale Tattersall, CEM

- UESC Team Leader, SoCalGas, 5-yrs
- General, Mechanical & Controls Contracting – Project Engineer, Project Manager & Operations Manager, 15-yrs
- BS - University of Arizona
- MBA - Cal Lutheran Univ



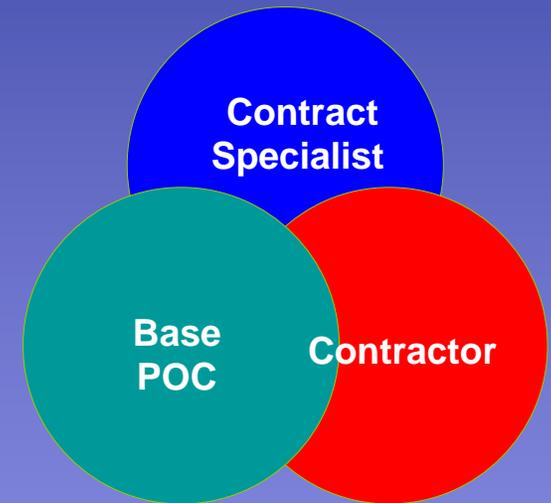
## Panel Member: Gordon Maynard, CEM

- UESC Project Manager, SoCalGas, 6-yrs
- ESCO Project Manager, 5-years
- DSM Marketing, SoCalGas, 5-yrs
- General Bldg and Solar Contractor, 9-yrs
- BS Engineering – Cal State Fullerton



# Development – “Cradle”

- The key players should meet early and strategize viable implementation strategy:
  - Contract Specialist and Base POC to discuss contract and scope development strategy
  - Contract Specialist and Contractor to discuss contract development strategy
  - Base POC and Contractor to discuss scope development strategy





# Contract Development – “Cradle”

- Preliminary Questions:
  1. How big is it?
    - What is your ‘big-picture’ cost expectation?
      - <\$100k; \$500k; \$1M; \$5M; or larger.
  2. How fast do you want it?
    - 6 mos; 1 year; 2 year, 5 years...



# Contract Development – “Cradle”

## 3. How do you intend to fund it?

- ECIP funded?
- Maintenance budget?
- Budget allocation?
- Financed?
- Combination funded and financed?
- Guaranteed-savings?



# Contract Development – “Cradle”

- Select design plan
  - Design Build versus Design Assist versus Plan Spec
- A well defined project scope limits surprises for all

**Lesson-Learned!**





# Contract Development – “Cradle”

	Pro	Con
Design-Build	<ul style="list-style-type: none"><li>•Quicker implementation</li><li>•Flexibility to make field changes</li></ul>	<ul style="list-style-type: none"><li>•Loose SOW</li><li>•Owner has less control</li></ul>
Design-Assist	<ul style="list-style-type: none"><li>•Well-defined SOW that does not require full design</li><li>•Shared risk between designer &amp; contractor</li></ul>	<ul style="list-style-type: none"><li>•Not 100% complete design</li><li>•Finding qualified contractors</li></ul>
Plan-Spec	<ul style="list-style-type: none"><li>•Well-defined SOW</li><li>•Well-defined up-front cost estimate</li><li>•Max Owner control</li></ul>	<ul style="list-style-type: none"><li>•Time (Cradle to Grave)</li><li>•Expensive design costs</li></ul>



# Contract Development – “Cradle”

- Choose your contract vehicle
  - UESC, ESPC, Title 8, etc...
  - Get buy-off from your contracting agency regarding your strategy. Make sure your contracting agency supports the preferred vehicle.

**Lesson-Learned!**





# Contract Development – “Cradle”

**Lesson-Learned!**

- Consider developing a longer term strategy for recurring energy savings
  - Multiple annual projects: Phase 1, Phase 2, etc...
  - Projects can consist of current construction and future project design
  - Easier to budget and forecast
  - Stable fixed costs
  - Repetition generates cost savings based upon lessons learned from a site perspective
  - More cost-effective to develop projects with work already happening on site



# Scope Development – “Cradle”

- Energy Efficiency Project Team Members:
  - Base Resources
    - Base Energy Manager
    - Base Decision-Maker(s)
    - Resource Efficiency Manager (REM)
    - Facilities Maintenance Manager
    - Base Planner
  - Region Support
    - Contract Specialist
    - Project Engineer
    - Tiger Team
  - External Resources
    - Your local Utility
    - Your contractor of choice
    - Vendors... but be careful – don't limit competition

**Lesson-  
Learned!**



# Scope Development – “Cradle”

- Find Energy Conservation Opportunities (ECO's)
  - Equipment maintenance cost and needs assessment
    - Interview Facilities Maintenance Manager
      - The FMM knows what equipment is old, inefficient and what needs replacement, funds permitting.

**Lesson-Learned!**



# Scope Development – “Cradle”

**Lesson-  
Learned!**

**Lesson-  
Learned!**

- Interview Base Planner
  - What are the impending Base maintenance projects?
    - » No need to develop a project 2x
    - » No need to engineer a project 2x
  - Is the building you intend to retrofit on the Base’s demolition list?
- Government Audit (Tiger Team) report
  - Utilize government resources for audit report



# Scope Development – “Cradle”

## – Utility bill analysis

- Target buildings with high energy intensities (energy usage / sqft)
- Projects generally have a maximum simple payback threshold.

Annual energy cost times 10, can conservatively yield 10% energy savings – especially on buildings with higher than normal energy intensities.

**Lesson-Learned!**



# Scope Development – “Cradle”

- Energy Audits
  - Drive-by Audit
    - As a follow-up to a utility bill assessment
    - Create diverse list of potential opportunities
  - Preliminary Baseline Audit
    - Target specific ECO's based on drive-by, Tiger Team Report or other audit
    - Estimate baseline energy profile and potential savings using historic energy usage and load factors
    - Estimate ECO costs

**Lesson-Learned!**





# Scope Development – “Cradle”

## – Investment-grade audit

- After you have a definitive contract and scope implementation plan
- Not free! Consider combining the engineering design with the investment grade audit. For ~10% of the anticipated project cost, you can nail down design, budget and savings!
- Must have full access to rooms with equipment to be retrofitted – even secure areas. Otherwise, the risk of change orders increases radically

*Lesson-Learned!*

*Lesson-Learned!*



# Scope Development – “Cradle”

- Project costs – did you consider?:
  - The contract vehicle and typical overhead costs for that particular vehicle?
  - Time to implementation i.e., inflation?
  - Davis-Bacon wages?
    - Make sure any piece-meal work exceeds the hourly Davis-Bacon wage
  - The number of contracts versus the number of different contractors? Beware of mark-ups on top of mark-ups, etc...

Lesson-Learned!

Lesson-Learned!

Lesson-Learned!



# Scope Development – “Cradle”

- **Project costs** – did you consider? (continued):
  - Time delays and cost impact to the contractor due to Base security requirements?
  - Costs associated with USACE Construction Quality Management requirements?
  - One year warranty costs?
  - The cost of performance bonds?

**Lesson-Learned!**



# Scope Development – “Cradle”

- Project costs - did you consider? (continued):
  - Sales Tax
    - Sales Tax exemptions are great for the government, but dangerous for the contractor
  - Interest expense, if financed (Financing should be a pass through cost without mark-up or fees)
  - Government administration fees

Lesson-  
Learned!

Lesson-  
Learned!



# Scope Development – “Cradle”

- **Project costs** - did you consider? (continued):
  - The impact this project might have with your existing utility contracts?
    - Will energy savings be offset by increased rate cost due to take or pay utility contracts? (like cogen)
    - Will energy savings result in a higher rate for remaining energy to cover fixed costs?
    - Could there be a Rule 2 impact with your regulated utility?

**Lesson-Learned!**



# Scope Development – “Cradle”

- Project costs - did you consider? (continued):

**Lesson-Learned!**

Did you know that rental equipment is based on a 13-month year?

**Lesson-Learned!**

Scheduling your project to off-peak time could yield good cost savings

**Lesson-Learned!**

If possible, schedule heating retrofits in the summer and cooling retrofits in the winter!

– Commissioning program costs



# Scope Development – “Cradle”

– ‘Buyer-Beware’ of vendor-supplied cost and energy saving estimates

**Lesson-Learned!**

- Remember the old adage – if it’s too good to be true, it probably is
- Gather all the information you can, but let your engineer evaluate vendor input during design
- Consider having your engineer compete major components and lock in vendor pricing before you compete contractors. Requires an estimated implementation date that the price is good till
- Should be avoided if it limits competition



# Scope Development – “Cradle”

- How do you rank ECO's?
  - Life Cycle Cost Analysis
    - Maintenance savings - Make it real
    - Weights may be different depending on the fuel source
      - A \$ saved of electricity does not equal a \$ saved of natural gas!
        - » \$1000 electric savings = 28 million Btu (\$0.12/kWh)
        - » \$1000 nat. gas savings = 111 million Btu (\$0.90/therm)
      - Understanding what's important to your decision-makers will guide your ECO selection
      - Be aware of how your project competes with other projects

**Lesson-Learned!**

**Lesson-Learned!**



# Scope Development – “Cradle”

– Just picking the low hanging fruit may not be the prudent choice

**Lesson-Learned!**

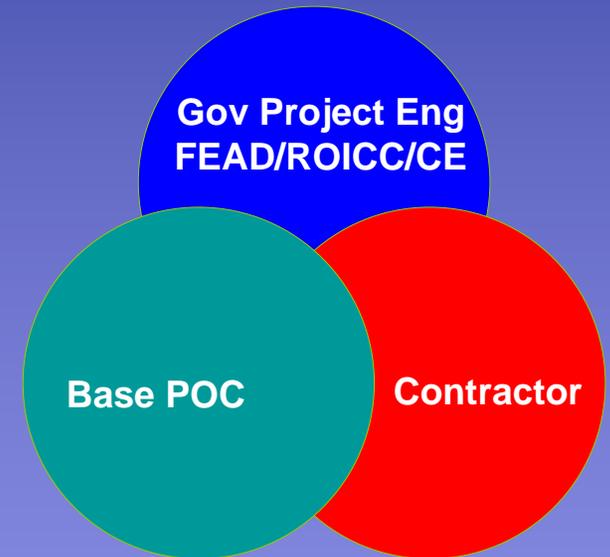
- Blending ECO’s by mixing higher paybacks with lower ones, could maximize the total amount of energy projects you can do and still achieve your simple payback hurdle.





# Implementation & Execution

- The key players:
  - Gov Project Engineer (Design Projects)
  - FEAD – ROICC (Construction Projects)
    - Safety & Quality Assurance
  - Base POC
  - Contractor
    - Safety & Quality Control





# Implementation & Execution

- ECO's become Energy Conservation Measures (ECM's) under contract
- No surprises! Nobody likes them – communicate often

**Lesson-  
Learned!**

– Clearly state what you want, otherwise you might get what they THINK you need!



# Implementation & Execution

- Limit change orders
- Have some form of contingency for

**Lesson-Learned!** 1. Budget &  
2. Time





# Implementation & Execution

- Lesson-Learned!** – RFI's that potentially involve cost changes should include a cost breakdown
- Lesson-Learned!** – Contract Modification proposals should have energy savings impact in addition to scope and cost changes



# Implementation & Execution

- Quality Assurance / Quality Control
  - Utilize government training classes for your lead on-site personnel
    - USACE Construction Quality Management Training (EM385-1-1)
    - Construction Safety and Health (OSHA 30-hr course)

**Lesson-Learned!**



# Implementation & Execution

## – FEAD / ROICC / CE

- Balanced and level-headed oversight. Micro-management will lead to increased construction costs.
- QC and Safety Plans
  - No plans, no work!
  - No AHA, no work!



# Implementation & Execution

- AHA Do's and Don't's

**Lesson-Learned!**

- Do NOT overly boiler-plate it. Tailor the AHA for each building and DFOW
- Do NOT use big words. Make sure it is understood at a basic level
- Do NOT reference anything not stapled to it
- All workers read and sign it
- Locate it at actual work site for easy reference



# Implementation & Execution

- Schedule – No surprises
  - Identify long lead items
  - Identify ECM's that require site approvals and submit early
  - Schedule your utility outages and road closures
  - Project coordination with tenants

**Lesson-Learned!**





# Implementation & Execution

- Equipment Submittals
  - Line items identified with large arrows, pages tabbed, major equipment directly identifiable with equipment schedules on plans





# Implementation & Execution

- Logistics

**Lesson-Learned!**

For small projects, Base can reduce project costs if they provide facilities for QC Manager and project meetings





# Implementation & Execution

- QC Meetings

**Lesson-Learned!**

- Separate your QC meetings

- Don't waste time – tailor your QC meetings to your target audience

- QC meeting for subcontractors, followed by the:
- QC meeting for Base/customer

**Lesson-Learned!**

- Open items remain on QC meeting minutes until closed out

- Identify party and action required





# Implementation & Execution

- QC Meetings (continued)

**Lesson-Learned!**

– Utilize your QC meeting minutes to update and track:

- RFI log
- Submittal log
- Preparatory Meetings
- Contract Modification Log
- Project Completion status
- Commissioning status
- Close-out documentation status





# Closeout – “Grave”

- Commissioning program per contract
  - Plan
  - Complete PCC and FPT commissioning test forms
    - Manufacturer start-up and testing of major equipment
    - Independent TAB
  - Perform commissioning tests
  - Final commissioning report



# Closeout – “Grave”

- Measurement & Verification per contract
  - Can range from cursory to extremely detailed
  - Extreme cost ranges depending upon complexity
- Make sure that installed controls support the M&V program

**Lesson-Learned!**



# Closeout – “Grave”

- Operations and Maintenance Manuals
  - User friendly – not just a collection of cut sheets
    - Make it easy to understand

**Lesson-Learned!**

– Warranty section – Major equipment and who to call





# Closeout – “Grave”

- Training
  - Document who you train
  - Make sure you train the right people
  - Make sure the people you turn the equipment over to understand the need for energy efficiency! i.e., do not immediately put everything into hand operation!
  - Make sure the project does not negatively impact existing O&M services.
    - i.e., regular watering means the grass could grow more, and need more cutting
    - Existing O&M contract performance based, not energy based. (The grass must be green at all times)

**Lesson-Learned!**

**Lesson-Learned!**



# Closeout – “Grave”

- As-Built drawings

**Lesson-  
Learned!**

– Get alignment between the Base CAD person and the contract regarding level of detail. (Watch out if curvature of the earth is an issue!)





# Closeout – “Grave”

- Warranty

**Lesson-  
Learned!**

– Make sure these questions are answered up front so no one is surprised at the end:

- When does the warranty start?
- When does the warranty end?
- When does beneficial use begin?
- Is the period of time between beneficial use and project acceptance gratis with regard to warranty?



# Funding

**Lesson-Learned!**

- The government could be liable for interest accrued, if invoice payments are not timely received by contractor
  - FAR 52.232-27 Prompt Payment for Construction Contracts
  - Please make your payments on time



# Financing

- Assignment of Claims

- Please check if the contract has been assigned to a lender. Lender invoices should be paid to the lender!

**Lesson-Learned!**

- Sometimes the contractor erroneously receives payment even though an Assignment of Claims was filed
- FAR 52.232-23 Assignment of Claims



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# Questions – maybe answers?



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**New Orleans**

**August 5-8**