U.S. Coast Guard
Office of Energy Management (CG-46)

Combined Heat and Power + Kitchen Sink at Coast Guard Academy

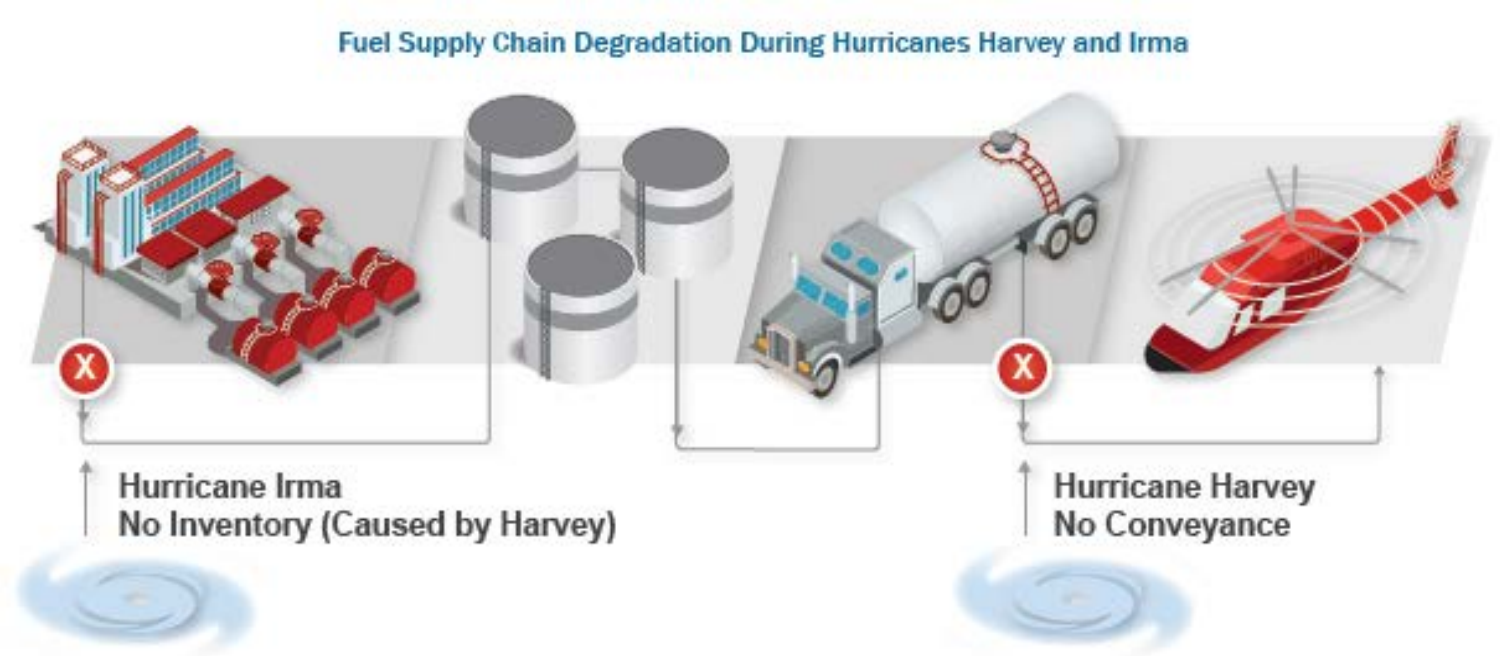
Office of Energy Management
COMDT (CG-46)

FUPWG – Spring 2019 | Sam Alvord

Presentation Outline

- Review of contingency status quo & need for resiliency
- Why are these projects so difficult?
- U.S. Coast Guard approach to projects
- Coast Guard Academy (New London, CT) Case Study

Contingency Energy prior to Maria



Challenges to Fuel Logistics

(aka the generator's Achilles heel)

- All aspects of fuel logistics were disrupted and/or exacerbated
  - Fuel demand increased
  - Inventory management, burn rate (gals/hour) analysis, ordering, acceptance, delivery, payment all disrupted
  - Quality assurance limited, test kits/filter supplies exhausted
- Loss of electricity at USCG locations and at Sources of supply
  - Fuel transfer pumps, and potentially purification systems INOP
  - Increased need for back-up and portable generators to provide electricity
  - Not enough on-site fuel storage for increased fuel demand
- Loss of phones (land line & mobile), loss of internet
- Roads and bridges not passable
- Personnel mismatch & lack of personnel
  - Surge operational/security personnel vice petroleum logisticians
- New or increase in waste streams

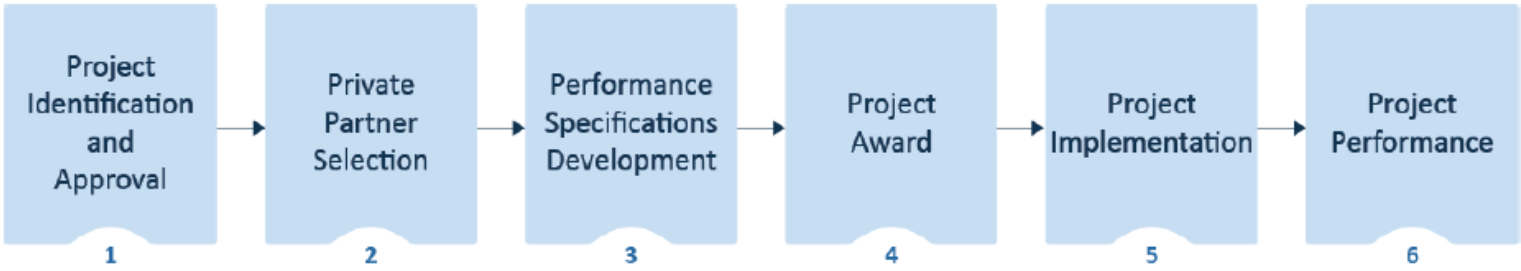
Major Types of Alternatively-Financed Projects

Utility Energy Service Contract (UESC)	Energy Savings Performance Contract (ESPC)	Power Purchase Agreement (PPA)
42 USC 8256	**42 USC 8287**	**40 USC 501 FAR Part 41**
With a servicing electric, natural gas, or water utility	**Alternatively-financed project with an Energy Services Company (ESCO)**	**Power generation project, various potential providers**

These contracts represent the most robust performance-based public-private partnerships within the federal government.

*But there are others and we **need** to remain creative (e.g. Cyber).*

Why so difficult?



- Typically longer payback items centered well past normal 5 (or even 10) year budget cycle
- Multiple interdependencies
  - Electromechanical obviously
  - But also geographic specific constraints/opportunities
- Impact to mission
  - Needs to address likely “overdue or immediate need”
  - Yet needs to be able to evolve over the entire contract term

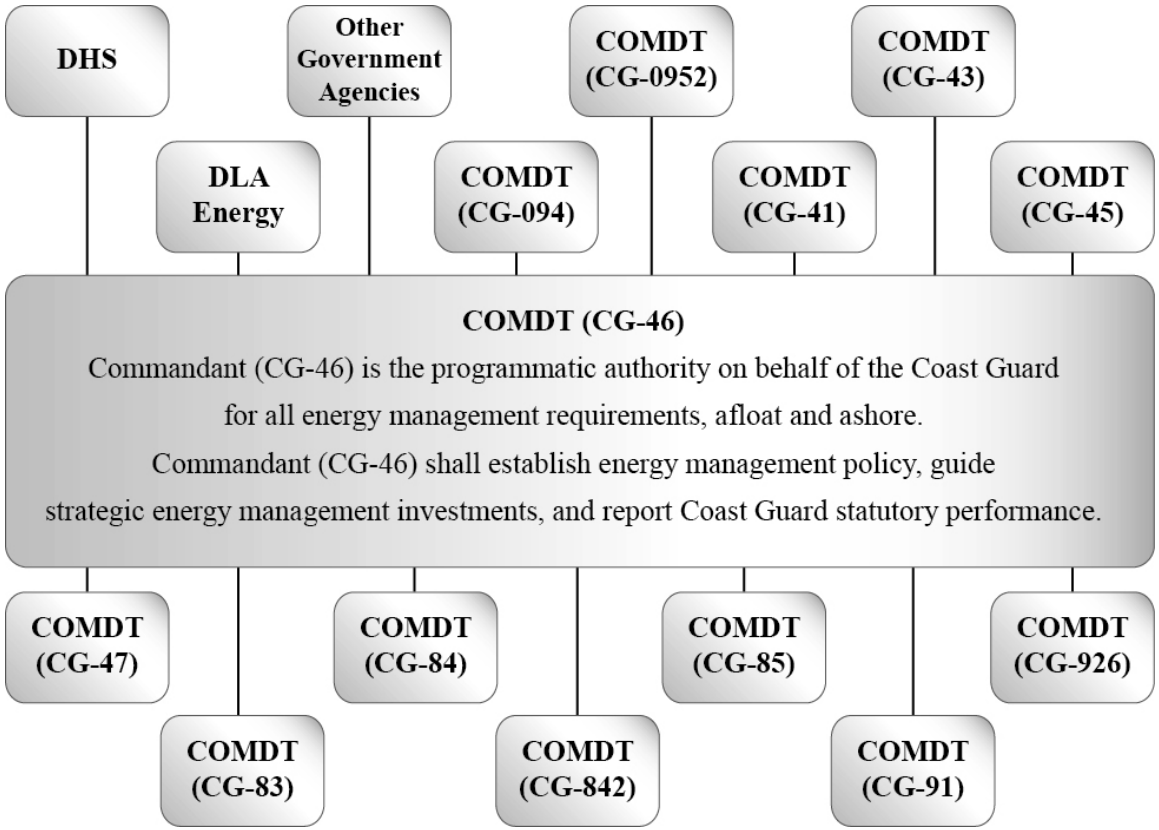
How to navigate the complexity

- Define simple roles and responsibilities
- Shift work through phases
  - It shouldn't feel like a sprint for everyone at the same time all the time
- Engage multiple stakeholders
- Define performance objective end state, not just the problems
- All funding streams should be considered
- Combine/collapse/accelerate multiple acquisitions

"It will all have to get fixed with my signature anyway…"

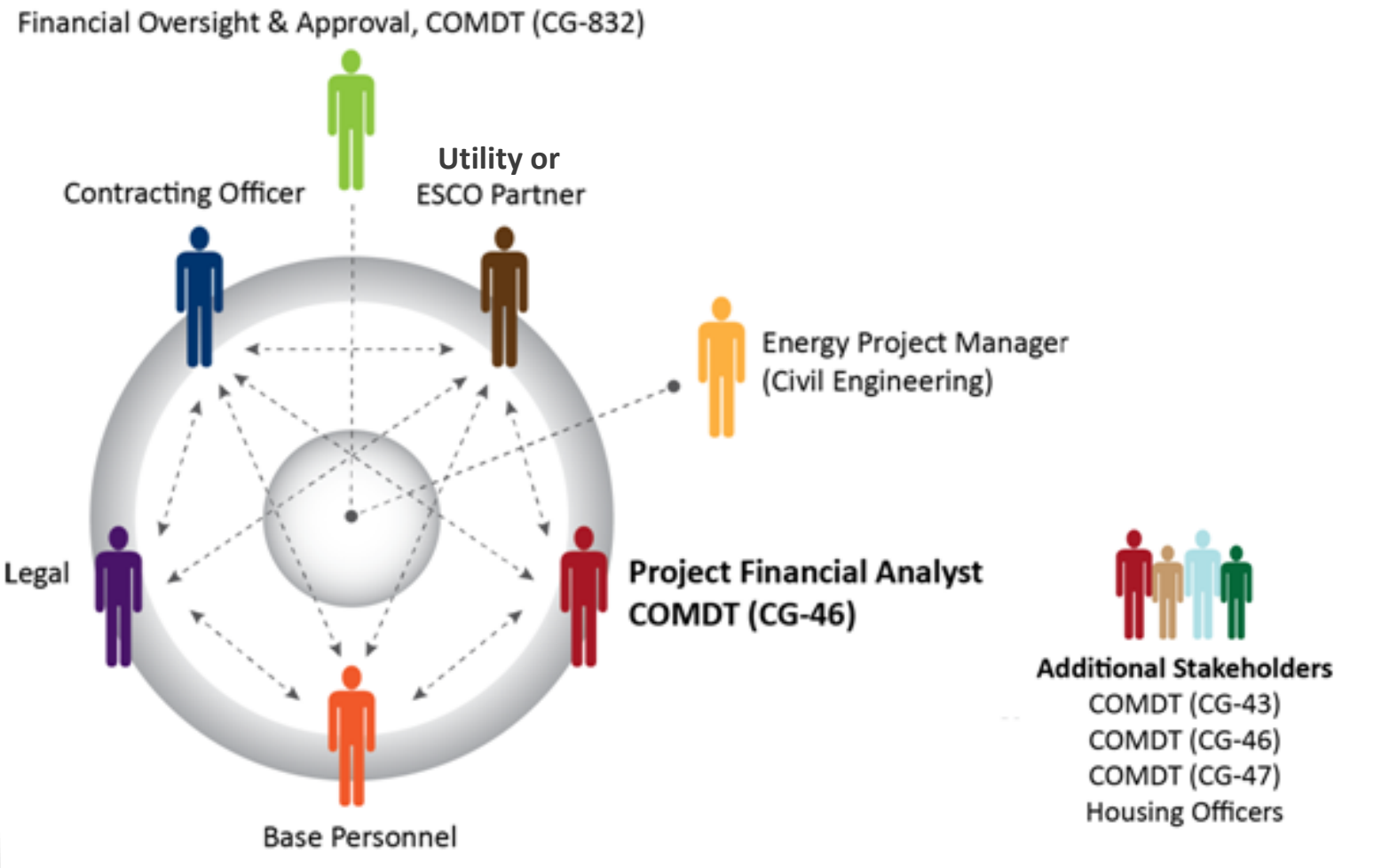
– *USCG Alt-financed project Contracting Officer*

Some CG-46 Stakeholders

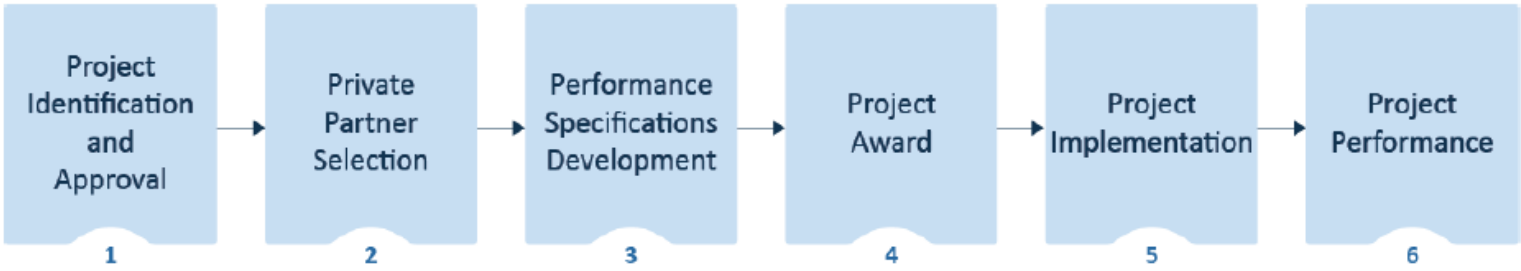


Deep understanding of tactical asset energy informs robust facility energy options.

Core Acquisition Team



CGA UESC – Largest in DHS portfolio



- Academy is 3rd largest energy consumer in Coast Guard portfolio
- 26-month selection and specification development phase
  - COMDT (CG-46), COMDT (CG-43), SILC, CEU, LSC, utility (20+ member team)
- Academy UESC has a two-year construction post award
  - Largest modernization of academy infrastructure since 1938
- ~$2M annual energy cost avoidance during performance

Natural gas line installation through main gate, down Tampa Drive and Harriet Lane.

CGA – How it started vs Results

- ***COUPLED TO PLANNED WORK (e.g. acquisition team formalization)***
  - $2M boiler retrofit project approval
- $39M capital investment, entirely self-funded through savings
  - Included $1M state incentives + $500K credits
- Major infrastructure improvements
  - Central boiler plant RENEWAL and fuel switch
  - Chiller plant expansion and optimization
  - Resilient and distributed electrical power generation (1 MW micro turbine)
  - Expansion of main electrical feeder to Smith and Waesche Hall transformers
  - Chemistry laboratory hood replacement and exhaust modifications
  - Reduction of environmental liability (removal of #6 fuel oil tanks)

CGA – Engagement Points

1. Facility Engineering Branch
2. CGA Superintendent (Flag Officer)
3. Utility and contingency operational folks
   - "What is our restoration priority?"
4. Academic Department Heads (Chemistry and Mechanical Engineering, etc)
5. Alumni Association
   1. Offered capital potential
   2. Brought "brand image" and parental perspective [example: To have visible or non-visible PV arrays?]
6. Board of Directors
7. Recruiting / Public Affairs / New London municipality stakeholders
8. U.S. Navy

Impacts to CGA

- Fence to Fence, Street to River – looked at entire property, not just a subsection
- Microturbine and solar power reduce utility power by 82%
  - Solar was evaluated to be both visible (carport) and hidden (roof)
- Net energy demand ↓ 16%, water ↓ 7%
- Smith Hall chemistry lab hood replacements double student capacity, enhance safety, and broaden curriculum
- Operations and maintenance burden for major systems dramatically reduced
- 2,933 water, 17,882 lighting fixtures, insulation
- Smoke stack is being demolished – BIG DEAL!
  - Cost avoidance to the budget for demolition, and enabling MAJOR alumni project to advance years ahead of schedule
- Roof membrane on Roland Hall two years faster, $600K cheaper

CGA UESC – Highlights

- Had to fight for the mission impact (e.g. Chemistry HVAC)
- No loss in Agency "technical authority" – 15+ design iterations
- Fuses specifically not changed to breakers (It's a college after all.)
- Student population not able to evacuate during predominate risk (e.g. Blizzard.) Must shelter in place.
- "Uninterruptable" NG line vs. No 2 diesel backup
  - Muscle memory / cultural change is hard
- Full term O&M is the leadership directed mandated goal
  - … which of course means savings must be huge and projects therefore driven to be more complex and comprehensive.

Point of Contact

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