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Army Installation Energy Security Plans: Project Overview

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Purpose of Briefing

To provide an overview of the Installation Energy Security Plans project, including:

- The *methodology*
- Preliminary *findings*, and
- Significant *issues*.

Background

- Energy for training, mobilization, deployment, and other key Army missions should be available at installations when needed
- Prolonged power outages due to a terrorist attack on a power plant/transmission line, or any other reason (e.g., earthquake, lightening, human error, outdated infrastructure) should not affect the Army's ability to perform its key missions
- The Army wants to increase energy security at its installations

Project Objective

Develop options to achieve the goal of a more secure energy supply for key mission areas* and show the tradeoffs among the goals of:

- Security,
- Environmental Quality,
- Costs/Finance,
- Ease of Implementation
- Appeal to Base Personnel.

***Key mission areas: training, mobilization, deployment, safety, health.**

Goals

- **Security**: Meeting key mission energy requirements over a specified period of time with on-site decentralized generation (DG) & required fuel storage.
- **Environmental**: Improving environmental quality to the maximum extent practical compared to the impacts of existing energy supply.
- **Cost/Finance**: Minimizing increase (if any) in both the absolute and percentage expenditure for energy, while maximizing the use of private sector resources for financing.
- **Ease of Implementation**: Minimizing the technical, institutional, public, legal and other potential challenges to implementation of the selected options.
- **Appeal to Base Personnel**: Selecting options that base personnel find appealing.

Four Stage Methodology

1. **Identify Key Mission Areas**
   - Utilized Installation Status Report Categories and installation interviews.
2. **Calculate Technical Engineering Potential**
   - Key mission energy demand: on-site assessments
   - DG/ECO: team expertise, vendor interviews, Renewables and Energy Efficiency Planning (REEP)
3. **Identify Financing Sources**
   - Interviewed public and private sector financing sources, including utilities.
   - Identified federal, state and utility incentives.

Methodology (cont.)

4. **Formulate Investment Strategies**
   - Developed and applied Army DG optimization model: Examines different objective functions/parameters related to project goals & evaluates tradeoffs among goals.
   - Identified opportunities to be exploited and issues that need to be addressed.

Project Outputs

Develops Illustrative Energy Security Plans for three Army installations

- With the goal of ensuring that their key energy needs can be supplied by DG that is secure and clean to the greatest extent practical.

Establishes an Analytical Capability

- To develop Army Installation Energy Security Plans for IMA (Installation Management Agency) Regions and across the US.

Project Team

- Energy & Security Group (ESG)
- CALIBRE
- Construction Engineering Research Lab (CERL)
- Center for Army Analysis (CAA)
- Sandia National Laboratories

Scope

Technical

- Consider clean fixed and mobile DG; examples include photovoltaics, wind, biomass, fuel cells, micro turbines

DG Investment Timeframe

- 2004-14 (long range planning through 2020)

Financial

- Maximize use of private resources for DG investment

Project

- 3 major Army installations (case studies): Forts Lewis, Carson and Riley

Case Studies

Numbers are estimates - not precise - and need verification.

- Orders of magnitude are probably correct and can guide approaches, decisions and future direction for work.

DG alternatives ranged from large scale (multi MW) to smaller dispersed options (few kWs)

- Could serve as primary power, retrofit of existing backup resources, onsite micro grids, etc.

Examples of Renewable Energy Financial Incentives at Federal and State Level

- Production Tax Credits
- Investment Tax Credits
- Sales Tax Reductions
- Property Tax Reductions
- Accelerated Depreciation
- Renewable Portfolio Standards
- Renewable Energy Funds
- Direct Investment Incentives (Grants)
- Direct Production Incentives
- Government Subsidized Loans
- Project Loan Guarantees

Preliminary Key Findings

Security

- All 3 case installations (& utilities) concerned about energy security threats.
- Smaller DG suitable for installation missions can be deployable & may provide first response capability in support of homeland security needs

Environmental

- Depending upon DG options selected there may be a decrease or increase in pollutant emissions compared to current energy supply

Cost / Finance

- Utility resource planning process could include (& rate base) on-site DG; can be part of RPS in some states.
- Private sector (esp. utilities) are more interested in central, larger DG options, with the potential to export back to the grid
- DG costs may be higher or lower then current costs; central, larger DG is usually less expensive than dispersed DG & more suited to private finance
- Private sector is interested in more detailed follow-on discussions, if Army is interested in bending metal.

Preliminary Findings, con't.

Ease of Implementation

- DG options will vary & should be tailored to individual installations.
- Physical location of key mission area facilities on an installation will affect DG options selected.
- Some DG options can be used for primary or backup uses
- Agreement among installations/utilities/some private vendors that microgrids may be suitable
- The more varied the DG options, the more difficult to find a single source, private financier/developer.

Appeal to Installation Personnel

- Base personnel like renewables- but prefer DG at each building and not central

Preliminary Key Issues

Security

- How reliable is the assumption that the energy re-supply chain will have fuel available in time of crisis?
- Expanding energy security (through more DG) to cover requirements beyond the key missions may be appropriate.

Environmental

- As existing backup diesel generators age, new DG options are available for either primary or backup

Cost / Finance

- Volume procurements may reduce costs of individual DG technologies
- Natural gas price volatility impacts DG options dependent on gas

Preliminary Key Issues, con't

Ease of Implementation

- There may be institutional burdens at the installation, regional, and HQDA levels
- Transmission/distribution privatization program needs to be coordinated with any onsite DG initiative
- Onsite DG initiative needs to be coordinated with energy efficiency programs

Appeal to Installation Personnel

- Some DG options could be aesthetically or otherwise unattractive

Installation Energy Security Plans (IESP) Capabilities

- *Analytical, flexible capability* that can readily assess the impact of changes in technical and cost data, programmatic assumptions, policy goals, and other parameters at an installation, regional and national level – "what if" drills
- *Tradeoff analyses* in support of resource and policy decisions addressing security, financing, environmental and other infrastructure issues
- A key first step toward tangibly implementing an *Armywide DG program* - bending metal and engaging private sector participation