



PM FSS

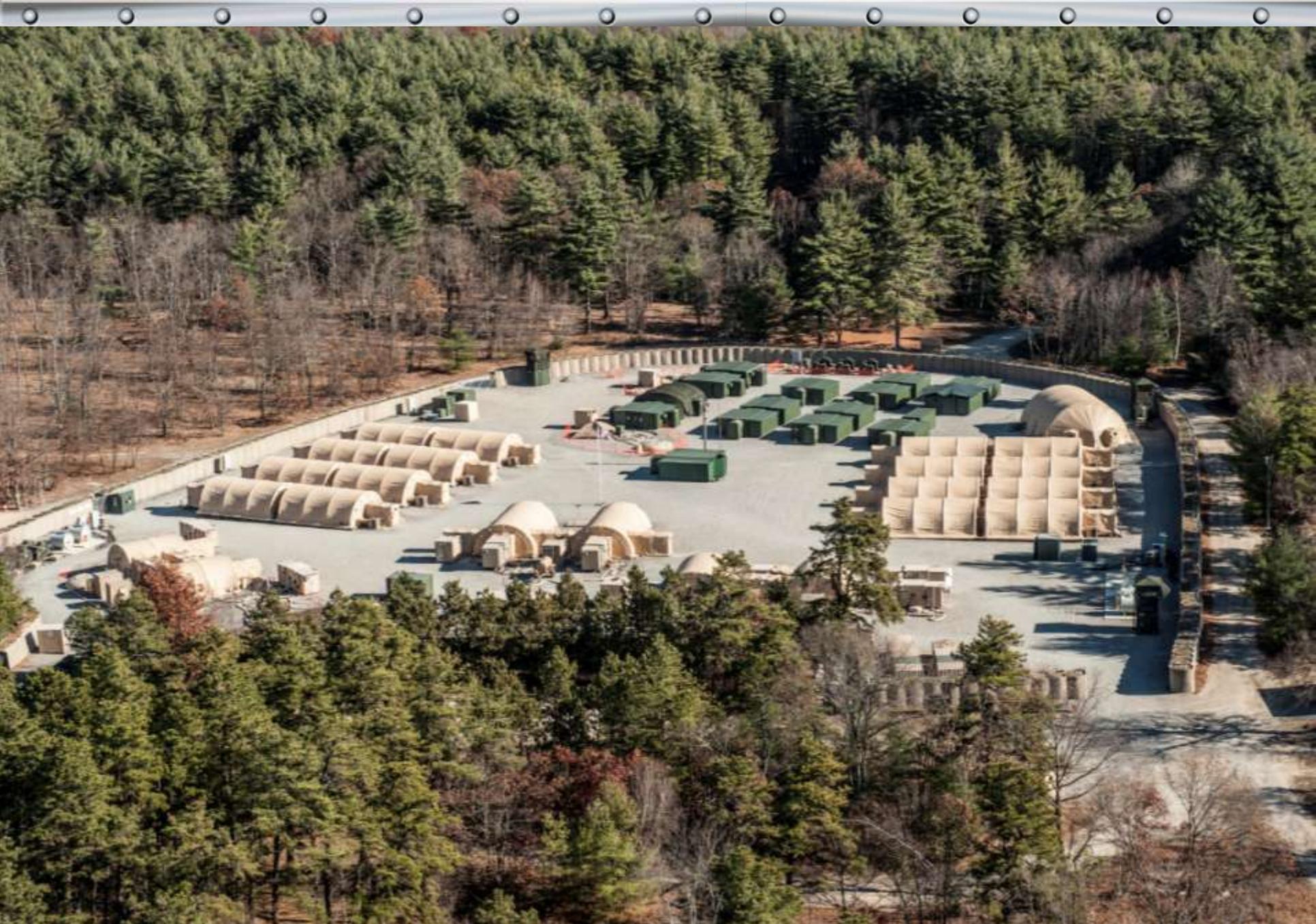
UNITED STATES ARMY
PRODUCT MANAGER
FORCE SUSTAINMENT SYSTEMS



Base Camp Integration Laboratory

Fort Devens Base Camp Integration Lab Benefits

- **Provides the Joint Expeditionary Basing Community the test area to look at common engineering standards that will:**
 - **Lower Service R&D costs (less duplication of effort)**
 - **Leverage economies of scale**
 - **Increase commonality on the battlefield**
 - **Reduce integration risk**
- **Provides the Contingency Basing community with a site to integrate and evaluate related technologies in a realistic but controlled environment**
- **Enhances the readiness of Reserve and Active Component units by providing training facilities and training support to the total force**
 - **Focuses on training without the distractions typically found at larger installations – provides both unit and individual training.**
 - **Ft. Devens supports over 30,000 soldiers, cadets, and other military agencies annually**



Force Provider Resource & Operational Energy Saving Initiatives



Base Camp Integration Laboratory, Fort Devens, MA - Allows for the integration and evaluation of immediate and future expeditionary Contingency Basing solutions providing data to substantiate and support the rapid fielding of solution sets that improve Energy & Resource Efficiencies for currently deployed and future force sustainment and basing systems

Force Provider Resource and Energy Efficiency Objectives

Solutions: Two Phase Process - Immediate and Longer Term

Capability Will be Fielded Within next 6 Months

- 35% reduction in fuel consumption
- 75% reduction in water resupply demand
- 75% reduction in liquid waste stream and 50% reduction in solid waste stream

Micro-Grid Power Distribution

Solar Shading

Energy Efficient Liner Systems

Shower and Laundry Water Reuse

Energy Efficient Lighting Systems

Efficient Heating Systems

Integrate AMMPS

- 50% reduction in fuel consumption
- 90% reduction in water resupply demand
- 80% reduction in entire (solid and liquid) waste stream
- Increased Mission Effectiveness & Efficiency

High Impact/ROI Effort

Big Payoff on Investment

Capability Can be Fielded Within next 5 Years

Solar Water Heating

TeCD-4a Transitions

Renewable Energy

Black and Grey Water Treatment & Reuse

Energy Efficient Rigid Shelters

Waste to Energy

Provides expeditionary Contingency Basing solutions that improve Resource & Energy Efficiencies for currently deployed and future force sustainment and basing systems

BCIL Evaluation Metrics

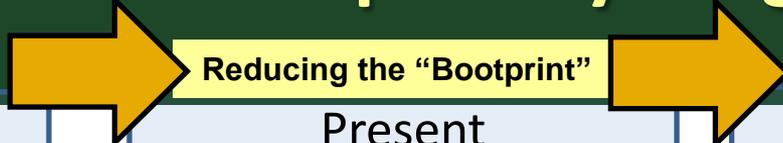
- Collecting evaluation data to obtain quantifiable components of performance when compared to current configuration
 - Overall impact on fuel requirement
 - Overall impact on water requirement
 - Overall impact on **waste stream**
 - Effect on **transportation footprint**
 - Effect on **sustainment tail**
 - Estimated **Return on Investment**
 - Assessment of **Suitability for deployment**

Overall Goal: Reduce Fuel, Water and Sustainment Support Requirements for Base Camps

Big Target: 70 to 80 percent of our resupply weight or convoy weight in theater is fuel and water

Operational Energy and Resource Efficiency initiatives may require Trade-offs in other areas

Force Provider Capability Progression



Past

(2003-2011)

- 600-Soldier Building Blocks
- Frame-Supported Tents
- Large Labor Force Required for Set-Up
- Spot Power Generation
- Large 20-foot Containerized Support Systems
- All Liquid & Solid Waste Generated Required Hauling Out of Camp



Fuel - 2,250 GPD
 Fresh Water - 22,000 GPD
 Waste Water - 20,000 GPD
 Solid Waste - 4,000 Lbs/Day



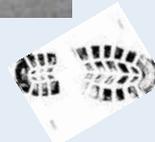
Present

(2012-2014)

- Expeditionary 150-Soldier Building Blocks
- Air-Beam-Supported Tents
- Energy Efficient Insulating Liners
- Solar Shade Systems
- Micro-grids for Efficient Power Generation / Distribution
- Shower and Laundry Water Reuse & Conservation
- LED Lighting
- Expeditionary Hygiene Systems (TRICON Based)
- Small Solid Waste Incinerators



Fuel - 1,000 GPD
 Fresh Water - 5,500 GPD
 Waste Water - 4,500 GPD
 Solid Waste - 4,000 Lbs/Day



Future

(2015-2025)

- Energy Efficient Expeditionary Rigid-Walled Shelters
- Smart Power Distribution Micro-grids
- Renewable Energy Collection & Power Storage
- Water-free Latrine Systems
- Waste-to-Energy
- Waste Reduction / Elimination at Source
- Zero-Footprint Technologies
- "Smart" Base Camp Monitoring
- Just-in-Time / Precision Base Camp Sustainment & Resupply



Fuel - 750 GPD
 Fresh Water - 1,300 GPD
 Waste Water - 500 GPD
 Solid Waste - 800 Lbs/Day



Shelter Energy Efficiency

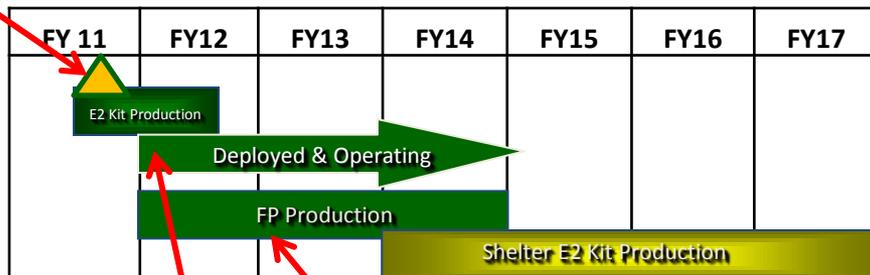
Description

- Kit consists of improved insulating liner systems and solar shade systems that will reduce cooling and heating demands on shelters in turn reducing the fuel demand to environmentally control shelters
- Shading systems will reduce solar loading by 85%
- **Combined liners and shade systems reduces fuel demand in the base camp by 30%**
- Maintains expeditionary attributes and shelter redeployment capability
- The 20 kits will be deployed to theater for retrofit into existing camps and/or new deployments
- Force Provider configuration rebaselined and modified in 2012 to incorporate E2 Kits in all new production and Reset modules
- Fourteen (14) E2 Kits have been deployed in theater to date.

Return on Investment is within 180 Days of Sustained Operations!



FY11 OMNIBUS Funding



E2 Kits part of new module production (3- FY12; 1- FY13; 3-FY14)

First 4 Shelter E2 Kits deployed - Jan 2012

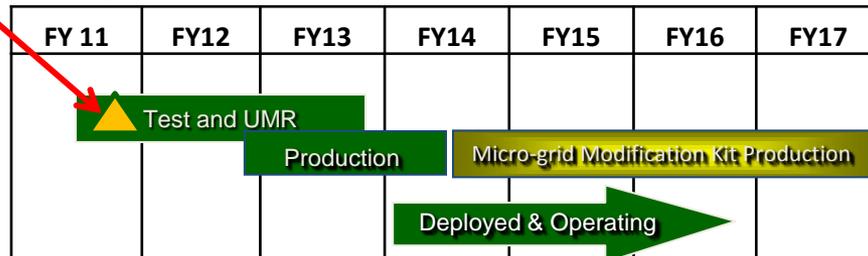


Force Provider Micro-grid Power Distribution Kits

Description

- The Load Demand Start/Stop System (LDSS) monitors power demand in the base camp and allows the shutdown of under-utilized generator sets resulting in a significant fuel savings
- Distribution boxes are connected to each generator and to each other, creating a shared distribution grid in which any generator can power any load
- These kits will be applied to the current 60kW Tactical Quiet Generators (TQGs) in Force Provider (FP) to provide auto on/off capabilities for the generators based upon load demand within the camp
- **After integrating the LDSS, the number of running generators is reduced by at least one-third resulting in a reduction of the fuel consumed to operate the base camp by over 30%.**
- FY11 OMNIBUS funded production of kits for Force Provider
- Kits will be deployed starting in 1Q FY14 for retrofit into existing camps or new deployments and/or integrated into existing modules during Reset
- Force Provider configuration to be modified in 2013 to incorporate LDSS Micro-grid Kits in FP modules that are powered with the standard 60kW TQGs

FY11 OMNIBUS Funding



LED Lighting Kits

Description

- Kit consists of Light Emitting Diode (LED) Lighting Technologies for Interior Spaces
- Total light output of an LED lighting system is greater than fluorescent lighting systems
- **Up to 40% power reduction over current fluorescent lighting systems**
- Life expectancy of LED lights is purported to be 3-5 times greater than current technology in use (50,000 – 60,000 hours of life)
- Systems are durable and maintain the expeditionary attributes of the shelter
- Force Provider configuration projected to be modified in 2014 to incorporate LED Lighting Kits in all new production modules and Reset where replacement of lighting systems is required.

LED Lighting Kit part of new module production (FY14)

FY 11	FY12	FY13	FY14	FY15	FY16	FY17
		Evaluation	FY 14 Prod			
			LED Lighting Modification Kit Production			

Evaluation ongoing at BCIL through FY13



Shower Water Reuse System (SWRS)

Description

- Containerized in an 8'x8'x6.5' Tricon container, weighs 7,400lbs
- Capable of processing 12,000 gallons of shower waste water per day (600 person camp)
- **There is a 75% recovery rate making it capable of recovering 9000 gallons per day**
- Reverse Osmosis quality product water meets Surgeon General's IP 31-027 standard
- Unattended automatic operation for approximately 3 days
- Product water is automatically monitored through built-in test equipment
- Touch-screen LCD allows real-time monitoring, instructions, and troubleshooting
- Force Provider configuration modified in 2011 to incorporate SWRS in all modules
- Testing confirmed that SWRS capable of processing laundry water

Return on Investment well within 30 Days of Sustained Operations!



FY 10	FY11	FY12	FY13	FY14	FY15	FY16
UMR						
Production						

Near Term Activities at the BCIL

- ◆ **Baseline existing base camp systems – Collect data on fuel, water, and resource requirements**
- ◆ **Conduct evaluation on ARCENT sponsored Environment and Energy (E2) project initiatives and Engineering Change Proposals (ECPs) for Force Provider**
- ◆ **Optimize generator capacity to reduce overall fuel consumption Micro-grid/Power Management systems**
- ◆ **Evaluate Energy Efficient rigid wall Camp**
- ◆ **Black Water System (CONTEC)**
- ◆ **Evaluate renewable energy systems**
- ◆ **Improve insulation and building envelope of rigid/soft-wall structures**
- ◆ **Rapid evaluation of base camp related initiatives to support the war and Operational Needs Statements**
- ◆ **Support Systems Integration activities associated with the Contingency Basing initiative**

Near Term Activities at the BCIL

- ◆ **Determine the energy efficiency of various Rigid Wall Shelter alternatives**
- ◆ **Determine the effectiveness of photovoltaic system feeding to a commercial hybrid micro grid system**
- ◆ **Evaluate and determine energy savings (fuel) through use of a solar hot water production to supplement conventional water heat**
- ◆ **Evaluate the capability, safety, efficiency, and adaptability of small incinerators to dispose of solid waste within a base camps operations**
- ◆ **Evaluate pre-filtration to remove lint enabling treatment of laundry grey water**
- ◆ **Evaluate commercial portable Flooring**

FY14 and FY15 Scheduled Evaluations

- ◆ **Modular Appliances for Configurable Kitchens (MACK) – Fuel Fired**
- ◆ **Desert Environmental Sustainable Efficient Refrigeration**
- ◆ **Automatic Chiller for stand alone bottled water**
- ◆ **Composite insulated liners – For rigid and soft wall**
- ◆ **Innovative cooling/Improved ECU's**
- ◆ **Self Powered water heater/Solar**
- ◆ **Water recycling for kitchen and sanitation centers**
- ◆ **Waste to Energy – (WEC)**
- ◆ **Power Shade/Photovoltaic integrated**
- ◆ **Solar/renewable power and LED lighting**
- ◆ **Power monitoring and data collection capability**