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**American Recovery and Reinvestment Act
(ARRA)
FEMP Technical Assistance
U.S. Army Project 181**

**Implementation Challenges in Deployment
of an Energy Security Microgrid for Army
Reserve Facilities located on the Former
Fort Devens Army Base**

WM Warwick

September 2010



Pacific Northwest
NATIONAL LABORATORY

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Pacific Northwest National Laboratory
Richland, Washington 99352

Executive Summary

This report is the result of a request by Fort Devens Army Reserve to the Federal Energy Management Program (FEMP) for technical assistance (TA) from Pacific Northwest National Laboratory (PNNL) to procure energy from nearby renewable generating resources. Fort Devens requested additional assistance after a visit by PNNL and the Defense Energy Support Center (DESC) in April 2009. During that visit, it was determined by PNNL and DESC that Fort Devens' situation with respect to its serving utility was unique and required a greater level of effort to explore than either organization could afford. In addition, Fort Devens' interest in renewable power sources was and is directly tied to a plan it has to become a net-zero facility that can provide a safe haven in case of a catastrophe in the Boston area. Accordingly, it has contracted with Sandia National Laboratory (Sandia) to develop a secure, microgrid for its facilities. Integrating the development and procurement of renewables into this strategy further complicated the initial request. The combination of procurement complexity and net-zero secure microgrid requirements led the Army to request FEMP TA assistance.

PNNL was asked to support Fort Devens efforts to procure renewable power in conjunction with development of its microgrid strategy with Sandia. As a result, both laboratories cooperated on development of the strategy, with PNNL focusing on renewables and procurement of resources from off-site and Sandia on the microgrid strategy. With respect to power procurement, the rules and regulations governing access to competitive suppliers by retail customers are based on state laws. Fort Devens is in Massachusetts, which is a deregulated state. However, the former Fort Devens Army Base was closed under the Base Realignment and Closing (BRAC) process and the bulk of the assets transferred to Massachusetts Development (Mass Development), a state chartered economic development organization. Mass Development functions as a municipal utility under state law. This is unusual because Mass Development is not a municipality per se but a state chartered economic development agency. Under state law, municipal utilities are not required to provide retail electricity customers with "open access," and Mass Development has not done so.

A review of applicable laws and regulations concluded that Fort Devens' power procurements are governed by Federal laws and FAR regulation requiring compliance with state utility law, which given Mass Development's regulated status, implies Fort Devens has to abide by rules set by Mass Development. There are exceptions, however; on-going discussions with Mass Development throughout the course of the study have reached a point where it may allow the requested transactions so long as the Army pays all associated costs. Those discussions will continue, and hopefully conclude after this task ends in September. That will be fortunate because a number of promising renewable development options have been identified, along with the original hydropower purchase option.

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Description of ARRA Program

The Federal Energy Management Program (FEMP) facilitates the Federal Government's implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship. To advance that goal and help accelerate agencies' progress, FEMP works to foster collaboration between its Federal agency customers and the U.S. Department of Energy (DOE) national laboratories.

In 2009 and 2010, FEMP has utilized funding from the American Recovery and Reinvestment Act of 2009 (ARRA) to facilitate Federal agency access to the broad range of capabilities expertise at the National Laboratories. Funds were directed to laboratories to assist agencies in making their internal management decisions for investments in energy efficiency and deployment of renewables, with particular emphasis on assisting with the mandates of the Energy Independence and Security Act of 2007 related to Federal facilities and fleets.

FEMP provided major DOE laboratories with funding that will allow them to respond quickly to provide technical advice and assistance. FEMP applied a simple vetting and approval system to quickly allocate work to each of the laboratories in accordance with FEMP-provided funding. All assistance provided by the laboratories was in accordance with the requirements of Federal Acquisition Regulation (FAR) Subpart 35.017 and the labs' designation as "Federal Funded Research and Development Center" (FFRDC) facilities.

Introduction

This report was funded by the Department of Energy's Federal Energy Management Program (FEMP). The Federal Energy Management Program's mission is to “facilitate the Federal Government's implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship.” Although this document discusses legal issues it is not the intent to provide legal interpretations or advice. The discussions herein cannot be relied on as legal opinions.

This report is the result of two requests from the Army Reserve function located at Fort Devens in Massachusetts to the Federal Energy Management Program (FEMP) for technical assistance. The first was a request for the Pacific Northwest National Laboratory (PNNL) to facilitate a power purchase agreement (PPA); however, that request was just one part of a more comprehensive energy program at the installation. As a result, staff at Fort Devens asked for additional assistance from PNNL to both facilitate power procurement but also to support implementation of a secure microgrid and net-zero installation activities.

Background

Fort Devens Army base was closed in 1996 through the Base Relocation and Closing (BRAC) process. Typically facilities that are BRACed revert to local governments for development and/or environmental preservation. Land is often retained for use by the Guard or Reserves. This was the case for Fort Devens, which retained roughly 4,800 acres for use by the Guard and Reserves. It also retained a landfill that is a “brownfield” site. The Army Corps of Engineers is managing remediation of the landfill site and expects to do so for many more years. The remainder of the base was transferred to other Federal agencies and to Mass Development for development following the Devens Reuse Plan. The Plan envisioned commercial development with a focus on technology, research and development and similar 21st Century job creation functions.

Mass Development is the finance and development authority for the State of Massachusetts. It was formed through a merger of two prior agencies with responsibility for finance and development in 1998. It can float bonds to finance development activities and works with commercial and municipal partners to develop properties owned or controlled by the State. It has financed over 200 projects in addition to those at Fort Devens, although Fort Devens is its largest project and arguably most successful. Thus far Mass Development has attracted a manufacturer of photovoltaic panels and pharmaceutical firm and has initiated development of an affordable housing community that is supposed to achieve net-zero energy use.

Mass Development received Fort Devens’ electricity delivery infrastructure with the BRAC transfer. The State established Mass Development as a municipal utility to operate the system on the site. Actual operation is contracted to a nearby municipal utility, Wellesley Municipal Light Plant. In its role as a utility, Mass Development purchases power for customers on the site and delivers it through the former Army electrical distribution system. This includes providing electricity and other utility services to Army facilities, including the water pumps used by the Corps to manage contamination at the landfill.

Fort Devens' Energy Plan

The vision for the Fort Devens Reserve facilities in the immediate term comprises three different clusters of buildings that are not adjacent to each other (Figure 1). Two clusters currently exist and one is being constructed with BRAC funding. The three building clusters are:

- ❖ The Maloney Center – primarily a training center with support services and offices with the potential to provide medical care in an emergency
- ❖ The so-called “Ear Muffs” – a secure facility, and
- ❖ Barnum Road – new buildings under construction.

Energy staff at Fort Devens are attempting to make the base the first Reserve facility to become net-zero for energy, both power and thermal, and to do so within the context of a microgrid (or grids), that can sustain critical base operations for at least 2 weeks. This will allow Fort Devens to provide a “safe haven” for area residents, especially those from Boston, should a calamity occur. Sandia National Laboratory (Sandia) has been retained by Fort Devens to develop the strategy for a secure microgrid. PNNL’s role is to identify potential sources of renewable energy to achieve net-zero power and to advise and support its procurement. Sandia and PNNL are collaborating with Fort Devens staff to develop a comprehensive plan that incorporates renewable energy into the proposed secure, net-zero microgrid-based energy solution. The resulting concept is expected to be used as a template for other Reserve bases.

The two existing building clusters will need to be retrofit to accomplish the net-zero goal. Although the new facility could have been designed to be net-zero initially, its design was determined as part of a construction contract that did not include that requirement. Consequently, it too will have to be retrofit. Fort Devens has appropriated funds to install solar panels on the roofs of some of these structures and has requested additional funding to expand that capacity. It is also drilling wells for a geothermal heat exchange field so it can retrofit existing conventional HVAC systems with geothermal heat pumps.

When Fort Devens was active, it included a small hydropower facility (see Figure 1). That facility was privatized during the BRAC process. It has since been refurbished and provides 250 kW of power on a firm basis. This power is sold at a competitive price and delivered through the National Grid power system to a substation near the Ayer entrance to the Fort Devens/Mass Development property. The hydropower facility could be doubled in capacity, although seasonal flows would limit firm power production to approximately 400 kW. PNNL staff was originally asked to assist with procurement of power from this project. That option is still available if an economic arrangement can be made. Based on PNNL’s initial meeting and discussions with staff on the visit from the Defense Energy Support Center, wheeling fees to transmit the power to Reserve facilities may be prohibitive when added to the costs of procurement and contract management. For example, if annual power purchase costs were \$220,000, valuing the current firm generation at 10 cents/kWh, and wheeling and contract management costs each add

\$50,000, the final cost would be 15 cents/kWh, a 50% increase (which is above market price).

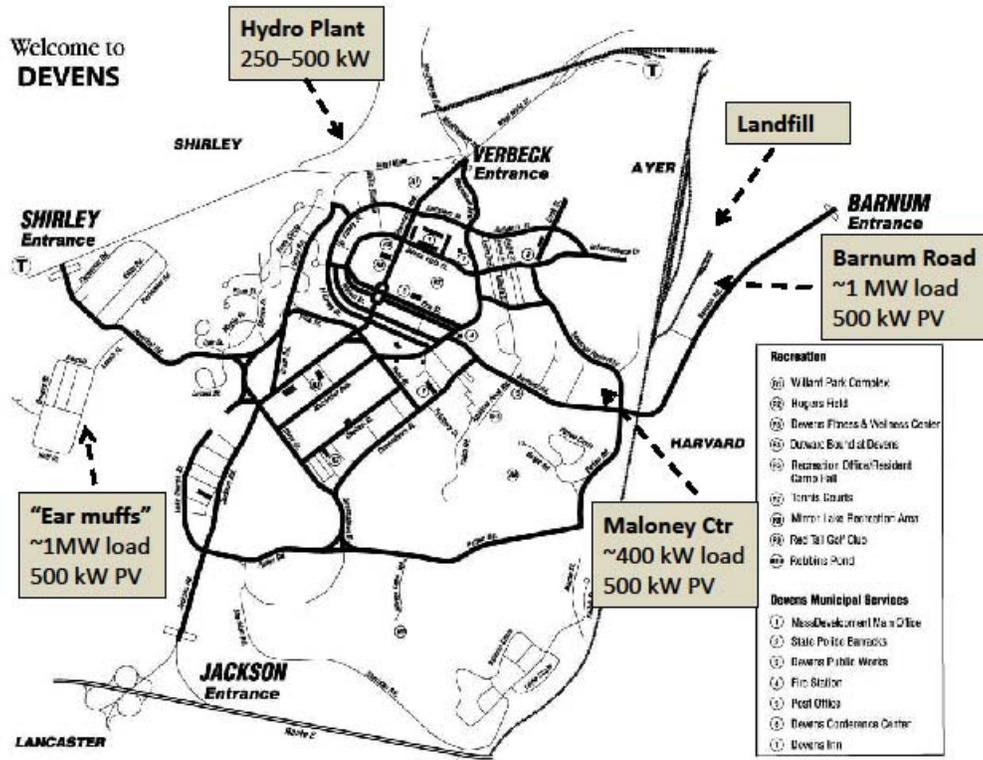


Figure 1. Map of Fort Devens' Major Facilities and Features

The brownfield landfill site is proximate to the new Barnum Road facilities (see Figure 1). It has been identified as a potential site for a renewable energy project. Because the site is both a landfill and adjacent to the municipal water supply, any renewable energy project would need to have minimal environmental impacts on the landfill cap as well as on ambient air and water. During the first visit to Fort Devens to discuss procurement of power from the hydropower project, PNNL suggested development of a photovoltaic project at this location. That suggestion was embraced by the site and remains an option.

In summary, Fort Devens has a number of opportunities to implement projects that could drive its energy demand to zero on a net (daily and seasonal average basis), and it could potentially produce excess power. The current renewable energy options include:

- ❖ Retrofit of conventional heating, ventilation and air conditioning (HVAC) equipment with geothermal heat pumps to displace almost all energy requirements from conventional heating and cooling sources,

- ❖ Heat recovery from microgrid power resources to displace HVAC energy requirements,
- ❖ Installation of rooftop solar photovoltaic (PV) systems,
- ❖ Installation of PV parking lot shade structures,
- ❖ Ground-mounted PV arrays at each building cluster and/or on the landfill, and
- ❖ Purchase of power from the adjacent small hydropower facility.

As noted, funding for some of these options has been obtained or requested. Full funding for all PV or other renewable power projects has not been requested and Fort Devens has asked PNNL to explore other procurement options. It has also been in discussions with Unicor about using financing and PV panels from the Federal Prison Industries program.

The primary barrier to procurement of power from resources not co-located with Reserve facilities, such as from the hydropower project, would be utility laws or regulations that could prohibit such purchases from an off-site source and the wheeling of that power to Reserve facilities. A review of applicable laws and regulations was included in the FEMP technical assistance request of PNNL and is provided subsequently in this report.

The Secure Microgrid Concept

Sandia's secure microgrid strategy is not yet complete although the broad outline is. To provide a safe haven, Fort Devens personnel believe their facilities need to be able to operate for approximately 2 weeks without access to grid power to provide a full complement of emergency services. Sandia and the installation have assumed a grid outage would not affect pipeline gas supplies for the first week, although supplies may be unreliable beginning as early as day two of the outage. That assumption is based on the current gas supply market, which is dependent on pipeline gas shipments from sources in the Gulf of Mexico and liquid natural gas (LNG) imports through the port of Boston. The development of unconventional gas supplies nearby will change the gas market and may result in a more favorable gas supply picture.

Sandia is exploring a number of on-site generation options that would rely on natural gas, including fuel cells, micro-turbines, "flow" batteries, and conventional storage batteries, all of which would operate in conjunction with available renewable power supplies, primarily power from PV systems. The optimal economic model for use of on-site generation and/or storage devices is as a routine part of normal operations. In that mode, reliability during emergencies is assured, and waste heat produced can be recycled increasing overall energy efficiency and improving project economics. Accordingly, the current assumption is that the microgrid will provide some fraction of installation power on a continuous basis. The power source will be sized to meet critical power requirements at minimum, subject to commercial component sizing. If the power source uses natural gas, propane may be used as a storage medium to assure fuel supplies when and if pipeline gas is unavailable.

If waste heat is to be recycled, the secure power source will need to be located close to a thermal client, typically an HVAC application. That requirement and the dispersed building configuration dictates secure power resources at each of the three major building clusters. As a result, there is more likely to be three secure microgrids than a central power resource to supply each cluster through wheeling over Mass Development's distribution lines. The use of new power lines dedicated to use by the microgrid is currently being evaluated to avoid wheeling over Mass Development lines.

In summary, energy security is expected to be provided by "advanced" power resources that rely on conventional energy sources for their operation, either natural gas or electricity. Resources are expected to be co-located with thermal clients within each of the three building clusters. These resources will be operated in conjunction with available renewable resources and will, if possible, be used to reduce the variability inherent in some renewable resources to the extent practical. Each secure microgrid will be planned to operate for up to 2 weeks using available renewable power and stockpiles of whatever conventional fuel may be required.

Complications

After the initial visit to Fort Devens by PNNL and DESC, it was obvious that applicable utility laws and regulations would complicate any PPA. Specifically, PNNL and DESC were concerned about the transaction costs for wheeling small quantities of power to the Fort Devens/Mass Development power grid, as well as how Mass Development may receive requests to both use its power grid for “retail wheeling” and the associated loss of power sales from Fort Devens. This complexity is what led to the FEMP technical assistance request from Fort Devens and this task to PNNL to review how utility and Federal procurement laws and regulations may apply in this situation.

The operation of the power system and consumer access to that system is covered by Federal, interstate, state and utility regulations and laws. The Supremacy clause of the US Constitution holds the Federal government above state and local laws. That would normally invalidate the effect of local utility laws on the government; however, Congress directed Federal agencies to be deferential to state utility laws (40 USC 591). This is often a larger barrier to Federal power supply innovation than technology. These laws and regulations are also the primary focus of this task. The Congressional restriction in 40 USC 591 is as follows:

40 USC 591. Purchase of electricity

(a) General Limitation on Use of Amounts.— A department, agency, or instrumentality of the Federal Government may not use amounts appropriated or made available by any law to purchase electricity in a manner inconsistent with state law governing the provision of electric utility service, including—

- (1)** state utility commission rulings; and
- (2)** electric utility franchises or service territories established under state statute, state regulation, or state-approved territorial agreements.

(b) Exceptions.—

(1) Energy savings.— This section does not preclude the head of a federal agency from entering into a contract under section 801 of the National Energy Conservation Policy Act (42 U.S.C. 8287).

(2) Energy savings for military installations. — This section does not preclude the Secretary of a military department from—

(A) entering into a contract under section 2394 of title 10; or

(B) purchasing electricity from any provider if the Secretary finds that the utility having the applicable state-approved franchise (or other service authorization) is unwilling or unable to meet unusual standards of service reliability that are necessary for purposes of national defense.

The customary interpretation of this provision is that a Federal facility may not purchase electricity from any source other than the local utility with exclusive rights to serve that customer unless it is allowed either by the utility or under state law, such as in a deregulated state. This interpretation is reflected in the Federal and DOD acquisition regulations. This interpretation would govern what could and couldn't be done to

implement Fort Devens' net-zero plan in the near term. It would also suggest a plan of action going forward, namely to work with the local utility within the existing legal framework or to request changes in the governing laws and regulations at the state and Federal level. The laws and regulations of interest with respect to 40 USC 591 are only those covering retail electricity service; in other words, the ability to produce, procure, and wheel power. The statute doesn't limit Federal facilities from adopting smart-grid technologies or other measures to mitigate potentially catastrophic grid outages or from development of power projects on DOD lands.

This interpretation may be customary; however it appears to ignore the exceptions noted in (b) especially the exception for DOD. The referenced US Codes are as follows:

2917. Development of geothermal energy on military lands

The Secretary of a military department may develop, or authorize the development of, any geothermal energy resource within lands under the Secretary's jurisdiction, including public lands, for the use or benefit of the Department of Defense if that development is in the public interest, as determined by the Secretary concerned, and will not deter commercial development and use of other portions of such resource if offered for leasing.

2922a. Contracts for energy or fuel for military installations

- (a) Subject to subsection (b), the Secretary of a military department may enter into contracts for periods of up to 30 years—
- (1) under section [2917](#) of this title; and
 - (2) for the provision and operation of energy production facilities on real property under the Secretary's jurisdiction or on private property and the purchase of energy produced from such facilities.
- (b) A contract may be made under subsection (a) only after the approval of the proposed contract by the Secretary of Defense.
- (c) The costs of contracts under this section for any year may be paid from annual appropriations for that year.

Although 10 USC 2917 allows "development" of geothermal resources on DOD lands, it doesn't provide specific authority to purchase power or thermal energy from a project so developed by a third party. 10 USC 2922a appears to give DOD blanket authority to enter into long term energy contracts subject to Secretary of Defense (SecDef) approval. However, it has been interpreted by some Services to be restricted to geothermal energy contracts because of their interpretation of the term "and" in (1). This interpretation asserts that "and" links sections (1) and (2) such that it only grants authority for long term contracts to geothermal energy projects. We are advised that DOD's new Energy staff is reviewing this issue and plans to provide a DOD position on the matter. Regardless, this exception has not been used to request wheeling service to date. However, it has been used to authorize long-term power purchases from on-site power projects by the Navy. These requests are pending SecDef approval.

These alternative interpretations of 591 have not been widely embraced due to the potential consequences of violating this law, specifically, from the misuse of appropriated funds. The consequences for misuse of funds could be dire especially as they apply to the contracting officers who ultimately have to sign-off on any purchase. In other words, for DOD, there appears to be a choice to pursue the exemptions allowed under (b) or acquiescing to the customary interpretation to avoid arousing the ire of local utilities and potentially Congress. It is worthwhile to review some of the applicable state laws and the history behind 591 to better understand Congressional concern.

Summary of State Utility Laws and Regulations

Fort Devens is served by Mass Development under the municipal utility laws of the State of Massachusetts. Therefore, it is allowed to adopt its own regulations with respect to how it serves retail customers. The local IOU is National Grid. It is bound by state utility law with respect to retail customer service. Massachusetts has deregulated retail electric service for all IOUs in the state. Self-regulated utilities are free to do so if they choose. Thus far, Mass Development has chosen not to deregulate. Accordingly, the applicable Massachusetts laws in this area are as follows:

Definition of what/who a “utility” is:

"Electric utility", any individual or entity or subdivision thereof, private, governmental or other, including a municipal electric department, wherever resident or organized, primarily engaged in the generation and sale or the purchase and sale of electricity, or the transmission thereof, for ultimate consumption by the public. General Laws of Massachusetts Chapter 164A: Section 1. <http://www.mass.gov/legis/laws/mgl/164a-1.htm>)

Definition of service territories:

Section 1B. (a) The department shall define service territories for each distribution company by March 1, 1998, based on the service territories actually served on July 1, 1997, and following to the extent possible municipal boundaries. After March 1, 1998, until terminated by effect of law or otherwise, the distribution company shall have the exclusive obligation to provide distribution service to all retail customers within its service territory, and no other person shall provide distribution service within such service territory without the written consent of such distribution company which shall be filed with the department and the clerk of the municipality so affected. (Chapter 164: Section 1B. Service territories for distribution companies; rates. <http://www.mass.gov/legis/laws/mgl/164-1b.htm>)

Definition “retail sales” of electricity and/or sales for resale:

(c) Effective March 1, 1998, no electric company regulated by the department and no affiliate of such electric company shall be allowed to use the distribution system of another electric company or make sales, either directly or indirectly

through third parties, to end-use customers in another electric company's service territory unless the department has approved a restructuring plan for the supplying electric company which provides for comparable direct access to end-use customers within its own distribution service territory or the supplying electric company has entered into an agreement, on or before January 1, 1997, for direct access to an end-use customer located on the border of its service territory, in which event the department shall authorize service by an electric company to such end-use customer. No electric company and no affiliate of such electric company shall be allowed to prohibit sales of electricity or restrict such sales through non-comparable distribution charges to end-use customers in its service territory by another electric company or its affiliate operating under a restructuring plan approved by the department.

(d) Beginning on March 1, 1998, each distribution company shall provide its customers with default service and shall offer a default service rate to its customers who have chosen retail electricity service from a non-utility affiliated generation company or supplier but who require electric service because of a failure of such company or the supplier to provide contracted service or who, for any reason, have stopped receiving such service, and to all customers at the end of the term of the standard offer. The distribution company shall procure such service through competitive bidding; provided, however, that the default service rate so procured shall not exceed the average monthly market price of electricity; and provided, further, that all bids shall include payment options with rates that remain uniform for periods of up to six months. Any department-approved provider of service, including an affiliate of a distribution company, shall be eligible to participate in the competitive bidding process. Notwithstanding the actual issuer of a ratepayer's bill, the default service provider shall be entitled to furnish a one-page insert accompanying the ratepayer's bill. The department may authorize an alternate generation company or supplier to provide default service, as described herein, if such alternate service is in the public interest. In implementing the provisions of this section, the department shall ensure universal service for all ratepayers and sufficient funding to meet the need therefor. (Chapter 164: Section 1B. Service territories for distribution companies; rates. <http://www.mass.gov/legis/laws/mgl/164-1b.htm>)

A plain reading of these statutes (which is not always the prevailing legal view), indicates the state has the asserted authority to define utilities and utility service and to define service territories and to regulate utilities it has created. It provides for exemption for self-regulated utilities elsewhere. Accordingly, the phrase "regulated by the department" applies only to IOUs; thus, Mass Development is exempt from the retail access requirements of Chapter 164: Section 1B. It is not clear that Mass Development is aware of the 591 restrictions. Nevertheless, it has rejected requests to allow Fort Devens to purchase power from third parties. It has indicated that applies to PPAs used to finance on-site projects as well. Mass Development may be taking this position based on a misunderstanding of how the retail choice law applies. If an IOU allows one customer a choice of supplier, it must allow all customers that choice; however that is not how the law applies to municipal utilities. They are free to allow choice selectively according to an informal opinion provided by regulatory commission staff.

The state also has authority over the siting of power generation facilities, which applies to all utilities and to independent power producers (IPPs), the entities most likely to enter into PPAs. The primary siting statute is:

980 CMR 1.00: RULES FOR THE CONDUCT OF ADJUDICATORY PROCEEDINGS

Facility means any “facility” described in M.G.L. c. 164, §69 G including:
(a) any generating unit designed for or capable of operating at a gross capacity of 100 megawatts or more, including associated buildings, ancillary structures, transmission and pipeline interconnections that are not otherwise facilities, and fuel storage facilities; Generating Facility means any generating unit designed for or capable of operating at a gross capacity of 100 megawatts or more, including associated buildings, ancillary structures, transmission and pipeline interconnections that are not otherwise facilities, and fuel storage facilities.
(<http://www.mass.gov/Eoca/docs/dte/siting/procrule.pdf>)

None of the projects envisioned by Fort Devens are large enough to fall under this statute; nevertheless, they will still be subject to utility interconnection requirements. Because the projects envisioned are small, they will likely fall under the distributed generation rules, although they may be large enough to require actually interconnection studies. A flowchart of that process is presented rather than repeating the regulations here (Figure 2).

Does 40 USC 591 Apply?

Congress adopted 40 USC 591 as Section 8093 in the DOD Appropriation Act of 1988. It was inserted in response to a jurisdictional dispute over utility service won by the Air Force (Black Hills v Weinberger). At issue was the right of the AF to procure power competitively in an area where utility service areas were undefined. Ultimately the US Supreme Court found in the government’s favor. The case was revisited subsequently in West River Electric v. Black Hills in which West River Electric asserted it had exclusive rights under state law to provide service to the air base, and therefore a supply contract with Black Hills should be voided. The Federal district court declared that because the air base is a Federal enclave state law does not apply. This decision was appealed and the Eight Circuit found that the assertion of state jurisdiction over power purchases was insufficient to overturn the body of Federal procurement law requiring competition:

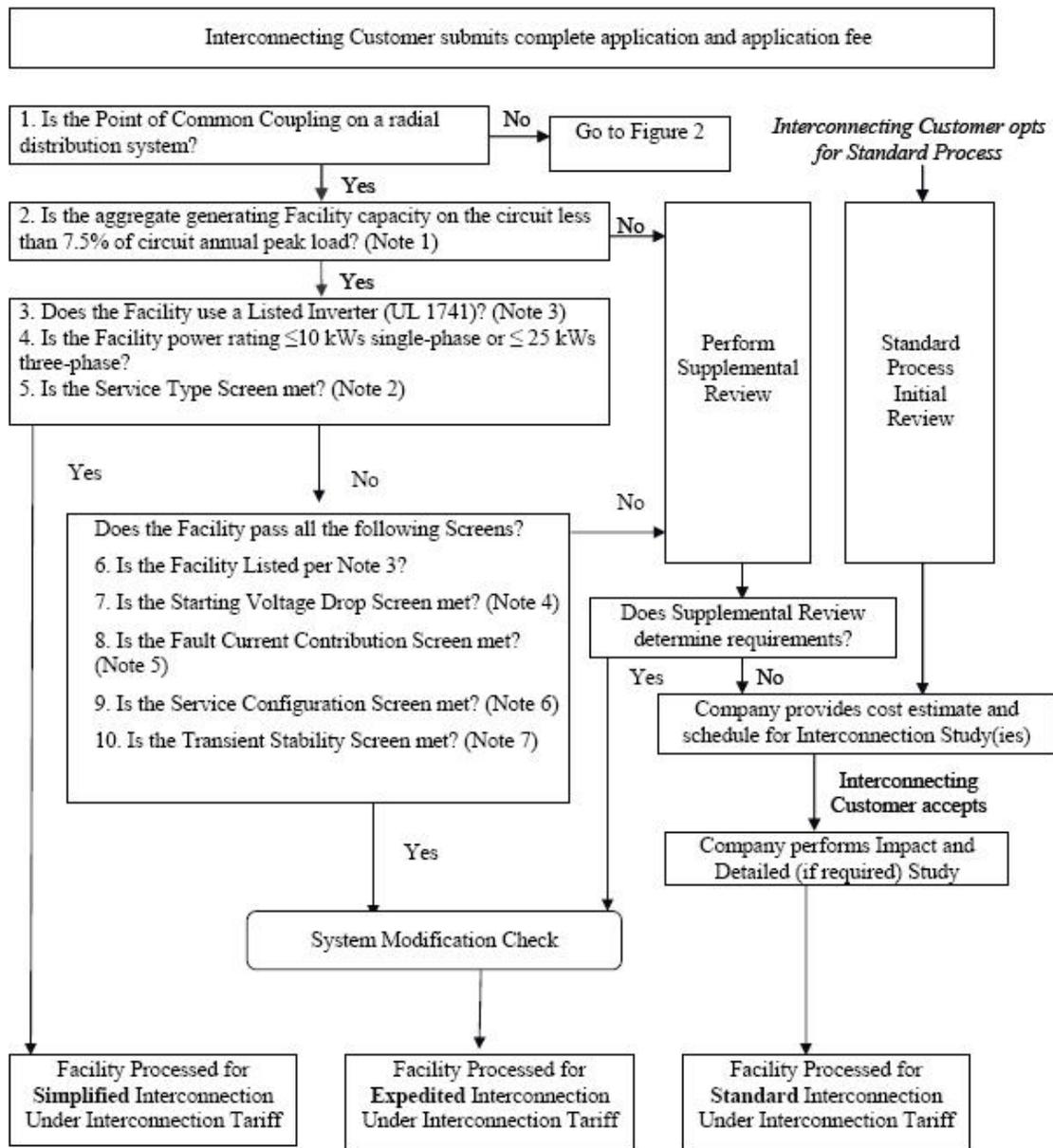


Figure 2. Interconnection Process for Distributed Generation (from [http://nuwnotes1.nu.com/apps/wmeco/webcontent.nsf/AR/ir_dg_wmeco/\\$File/DFG%20Interconnection%20Tariff%201039D.pdf](http://nuwnotes1.nu.com/apps/wmeco/webcontent.nsf/AR/ir_dg_wmeco/$File/DFG%20Interconnection%20Tariff%201039D.pdf))

We conclude that Section 8093, as part of an appropriations bill, is insufficient to defer the exclusive grant of federal jurisdiction, nor was it intended to amend the extensive body of federal procurement law which established that federal agencies must use full and open competitive procedures in the procurement of their property and services.

The key finding is that the basis for the initial suit was an assertion of state supremacy with respect to utility services. The Court found that Congressional direction to be

deferential wasn't sufficient to offset the public benefits to be had from competition. Also of interest is the view of the Court that highlights the concern Congress intended to address is the revenue loss by utilities for investments made on behalf of the customer. This is a reference to *Black Hills v Weinberger*, where the Eighth Circuit concluded:

We do not believe that Congress intended to prevent the use of competitive procedures in this situation. Had Congress wanted to mandate that state franchise law governs the determination of when a utility is in a "sole source" position, it could easily have done so. Congress has specifically provided that agencies may use other than competitive procedures if a statute requires that procurement be from a specified source, 10 USC 2304 (c)(5). However, Congress has never enacted a statute requiring that the United States purchase utility service from local franchise utilities.

Presumably in response to this decision, Congress adopted 8093 by statute as 40 USC 591. Or did it? The controlling language in 8093 and 40 USC 591 is identical. Therefore, the conditions noted by the Eighth Circuit above appear to be valid still. Otherwise Congress would have done what the Court said it did not do, which was explicitly state that state utility law should guide power purchases, not the Competition in Contracting Act (CICA). Specifically, 40 USC 591 does not contain any additional language that directs Federal agencies to procure power solely from local utilities with the service area franchise. Decisions of the Eighth Circuit are only binding within its jurisdiction. Nevertheless, it appears DOD facilities can use this decision to assert their right to procure power from other sources based on the fact power markets are deregulated so competition is available and therefore required under CICA.

The Eighth Circuit's decision still appears to leave installations that take service from another source vulnerable to law suits for lost revenues for facilities or power supplies dedicated to their service, so-called "stranded costs.". An example of how this might work is provided by the experience of Edwards AFB in California. Edwards AFB enrolled in "Open Access" when California deregulated its retail power market. It subsequently signed a supply contract with Enron that was breached when Enron declared bankruptcy in the midst of the California energy crisis in 2000 and 2001. The State of California stepped in to provide power on long term contracts at prices more reasonable than available at the time to customers who lost their competitive supplier. While this restored order to the California energy market, it also saddled the State with an obligation to pay for power supplied to local utilities. Once market order was restored, Edwards asked to return to the competitive power supply market. In order to do so Edwards negotiated an exit fee with its local utility that would compensate the utility for its share of the high-cost power contracts. It was not obligated to pay for planned resources not yet constructed for example or for transmission and distribution facilities because it intended to use those under posted tariffs to transport power from competitive suppliers to the base.

If 40 USC 591 Applies, Then What?

A restrictive interpretation of 40 USC 591 still allows DOD facilities flexibility to explore options to utility power service. It specifically allows the following exemptions:

- Energy savings under 42 USC 8287
- Energy purchased under 10 USC 2394 (now 2922a)
- Purchases when the local utility is unwilling or unable to meet “unusual standards” for service reliability for national defense as determined by the SecDef.

Each of these is recognized as legitimate exceptions in the FAR (Part 41.201). The FAR calls out “2394” for military departments in 41.201 (d)(2)(ii) as distinct from other agencies not covered by “2394” in 41.201 (d)(3)(i-iii). However in 41.201 (e) it notes that such transactions be “consistent with section 8093 [now 40 USC 591]” as determined by legal consultation with serving utilities and/or state regulatory commission *prior* to acquisition of any power or utility service. This view is reinforced in FAR Part 52(a) which largely parrots the language in 8093; “Section 8093 of Public Law 100-202 generally requires purchase of electricity by any department, agency, or instrumentality of the United States to be consistent with State law governing the provision of electric utility service...” This is also reflected in the DOD FAR Supplement (DFAR) Purposes, Authorities, Issuances (PGI) in PGI 241.103 which indicates “Section 8093 of Public Law 100-202 specifically precludes the Federal Government from expending appropriated funds to purchase electricity in a manner inconsistent with State law and regulation” for “energy commodity” procurements. These regulations do not over-ride Federal law or Court decisions that clarify Federal law, so as a practical matter these should not be interpreted to preclude competitive acquisition of electricity, but to do so within the exclusions provided in the law as supported by legal review of the specific circumstance.

There may be other options. One is to obtain service competitively in a manner that is not “inconsistent with state law governing provision of utility service including” commission rulings and territory agreements. There are a myriad of commission rulings that can be mined for other exceptions. Because the apparent purpose of 8093 was to prevent stranded costs, one option would be to agree to reimburse the former utility for those costs, which would be consistent with ratemaking practice to prevent cross-subsidies. Per the FAR’s “consistency” language, that would be part of the discussion with the local utility and/or state regulatory body. If either or both rejected the proposal to reimburse the utility for stranded costs, it would appear the government could proceed at the risk of being sued for stranded costs at a later date. Alternatively, it could proceed based on an identified national defense purpose that was endorsed by the SecDef.

In summary, Fort Devens has limited options it can pursue depending on how aggressive it wants to be asserting Federal supremacy claims. If it wants to be aggressive, it can find comfort that the US Court of Appeals for the Eighth Circuit provided in *Black Hills v Weinberger* that the interests of the government in competition for power services trump the rights provided to states to protect utility service areas in 8093 (now 40 USC 591).

Regardless, it is likely an installation that tries to bypass the local utility will be required to repay the utility for stranded costs, if any.

Options

State law does not prohibit development of on-site power projects owned by the government. Mass Development has asserted power sales from on-site projects as a financing mechanism are retail power sales and therefore prohibited. That would appear to rule out use of PPAs for on-site projects. It does not appear to eliminate the use of Federal-to-Federal transactions however, such as power that may be supplied via a Unicom contract. In addition, Mass Development opposes off-site purchases and the associated wheeling over Mass Development power lines. Reviewing the following list of potential projects only the last two potentially require wheeling across Mass Development lines.

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- ❖ Retrofit of conventional HVAC equipment with geothermal heat pumps to displace almost all energy requirements from conventional heating and cooling sources,
- ❖ Heat recovery from microgrid power resources to displace HVAC energy requirements,
- ❖ Installation of government owned rooftop solar PV systems,
- ❖ Installation of government owned PV parking lot shade structures,
- ❖ Government owned, ground-mounted PV arrays at each building cluster and/or on the landfill,
- ❖ Power purchases from on-site projects, and
- ❖ Purchase of power from the adjacent small hydropower facility.

The landfill is located across Barnum Road from the new facilities being built at the “Barnum Road” site. Mass Development’s West Main circuit 52 A4 138 is adjacent to the site and could be used to wheel power to the Barnum Road building complex from a solar project at the landfill. Alternatively, it may be possible to route a power line directly to the Barnum Road buildings avoiding wheeling over Mass Development power lines.

The small hydro project is across the installation from the facilities at Barnum Road and Maloney Center, making it closest to the West Main distribution circuit leading to the “Ear Muffs” complex. The hydro project is on private property across West Main Street from Fort Devens proper. Generally, only utilities are allowed to bring power lines across public roadways. However, the hydropower property used to be part of Fort Devens and an historic easement to it may remain. It may also be possible to bring power from the project under the road through an existing conduit. Doing so would avoid

having to wheel power approximately 1 mile on National Grid power lines to the West Main Substation serving Mass Development's grid. Although that wheeling transaction is allowed under current law, there are charges involved; it would be good to avoid these given the small amount of power involved compared to the transaction costs and wheeling charges to do so. Because the output of the power plant is so small, it may also be practical to run a dedicated line directly to the "Ear Muffs" complex (see Figure 3). That option has merit because it provides a dedicated power resource to the site for power assurance. Because "Ear Muffs" is a mission critical facility, a dedicated power resource for it is more highly valued.

Further discussions with Mass Development have resulted in estimates for constructing dedicated power lines between the Barnum Road and Maloney Center facilities so the two can share government-owned generating resources. Discussion have included use of a "buy-sell" agreement that would allow Fort Devens to negotiate long term power supply terms for third party power supplies that would be purchased by Mass Development and resold to Fort Devens on a cost basis. That would allow a purchase of power from the hydropower plant and wheeling of it directly to the "Ear Muffs" facility over a new, dedicated power line with Mass Development playing its customary utility role and therefore, not violating 591 or Mass Development's stated opposition to prohibiting retail wheeling. It should be noted that Mass Development has not agreed to such transactions, it has merely not ruled them out at this stage.

Preliminary estimates for a dedicated power line between the hydropower plant and "Ear Muffs" are roughly \$275,000. National Grid would charge \$19,000 at current rates to wheel the same amount of power to the nearest Mass Development substation. That charge translates into roughly 9 mills/kWh (\$0.009/kWh). If the costs of the power line as proposed by Mass Development are amortized over a 30 to 40 year period, the costs would be comparable to the National Grid tariff rate. However, the Mass Development proposal is superior in that once the line is built the costs will be fixed, whereas the National Grid tariff may increase over time. Of course, it will require up front funding by the Army. The proposal is also superior in terms of energy security.

Summary and Conclusions

The fundamental issue presented by the Army's goal of off-site renewable resource acquisition is that power would have to be wheeled over Mass Development power lines to each of the three critical facilities. Mass Development is under no obligation to do so and, thus far, has indicated reluctance to entertain this notion. Its primary concern is the loss of revenues it derives from power sales to the Army and the potential of expansion of such transactions to other Mass Development customers. A direct connection could be made to bypass Mass Development power lines to tap either the hydropower facility or a renewable energy project to be developed at the landfill site; however either trenching for underground power lines or erection of overhead power lines would still have to be approved by Mass Development if not actually done by Mass Development. Mass Development has developed estimates of those costs and expects to be fully reimbursed for its expected costs. It is unwilling to finance those costs in the form of a rate adjustment, so the Army will need to secure the necessary funding. Another complication is that crossing public roads with power facilities is governed by state laws and regulations. Current law would make it difficult to do so for the Army, but partnering with Mass Development on the construction of these facilities should solve that problem.

In summary, the situation presented at Fort Devens is unique because the "serving utility," Mass Development, doesn't conform to generally applicable state utility laws and regulations. If it did, few barriers to Fort Devens' procurement of power would exist. A review of applicable laws and regulations indicates resources can be developed on Army lands, but probably not using PPA financing mechanisms. Wheeling power among Army sites over Mass Development lines appears to be out of the question at this point. It is, however, evaluating Fort Devens' requests and discussions are on-going. Their proposal to construct dedicated power lines to interconnect critical facilities with secure power sources is a step in the right direction.

Revenue loss is a common concern among all utilities, but especially not-for-profit utilities like municipalities and cooperatives. These institutions typically cannot operate at a loss and do not have access to reserves like private, regulated utilities do. Fortunately, there are tools that have been developed to reduce the risk of revenue loss that may be applicable in this case. The challenge then is to identify a way to eliminate or reduce Mass Development's concerns about lost revenues so the Army can supplement its microgrid with renewable power. That is the next logical step in this process.

