Federal Aviation Administration

Retained Savings Program Proposal

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Federal Aviation Administration Retained Savings Program Proposal

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Summary

Federal legislation allows federal agencies to retain up to 50% of the savings associated with implementing energy efficiency and water conservation measures and practices. Given budget pressures to reduce expenditures, the use of retained savings to fund additional projects represents a source of funds outside of the traditional budget cycle. The Southwest Region Federal Aviation Administration (FAA) has tasked Pacific Northwest National Laboratory (PNNL) to develop a model retained savings program for Southwest Region FAA use and as a prototype for consideration by the FAA. PNNL recommends the following steps be taken in developing a Southwest Region FAA retained savings program:

Establish a retained savings mechanism. Determine the level at which the retained savings should be consolidated into a fund. The preliminary recommendation is to establish a revolving efficiency loan fund at the regional level. Such a mechanism allows some consolidation of savings to fund larger projects, while maintaining a sense of facility "ownership" in that the funds will remain within the region.

Establish revolving fund guidelines, administrative procedures, and tracking procedures. Issues include promoting facility involvement, designing low overhead administrative procedures, determining how fund oversight will be conducted within the existing management organization, and establishing performance measures to determine if the revolving fund concept results in tangible, long-term savings to the Southwest Region FAA. Web-based tools can probably be applied as part of this implementation.

Identify potential projects. Use tools, such as Federal Energy Decision Screening (FEDS), to identify cost-effective energy projects and estimated savings associated with those projects (PNNL 1996). Savings should be verified by estimating baseline and post-implementation energy consumption through metering. Alternatively, the baseline and savings can be estimated using the measures outlined in the U.S. Department of Energy's (DOE) Federal Energy Management Program's (FEMP) workshop, "Successful Energy Savings Performance Contracting."

As agency budgets continue to tighten and traditional sources of energy efficiency and water conservation investment funds dry up, the need for an investment-funding mechanism fueled by savings will continue to increase.

Acronyms

AFH	Army Family Housing
APF	Appropriated Funds
B-SMART	Breakthrough Special Monetary Account for Reinventing Training
BOLD	Base Operations Opportunities Leveraging and Development
CDAP	Community Development Assistance Program
DoD	Department of Defense
DOE	U.S. Department of Energy
ECAP	Environmental Compliance Achievement Program
EO	Executive Order
EPAct	Energy Policy Act of 1992
EPER	Energy Price Escalation Rate
ESPC	energy savings performance contract
FAA	Federal Aviation Administration
FEDS	Federal Energy Decision Screening
FEMP	Federal Energy Management Program
FIF	FORSCOM Investment Fund
FORCAST	FAA Operations Requirements Cash Flow Analysis Tool
FORSCOM	U.S. Army Forces Command
MFF	Materials for the Future Foundation
NAF	Non-Appropriated Funds
O&M	operations and maintenance
OBDC	Oakland Business Development Corporation
OMA	Operations and Maintenance, Army
PNNL	Pacific Northwest National Laboratory
ROI	return on investment
SRV	State Revolving Fund
TRADOC	U.S. Army Training and Doctrine Command

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1.0 Introduction

Federal legislation allows federal agencies the opportunity to retain a portion of the savings acquired through the implementation of energy efficiency projects. Although the opportunity is delineated, mechanisms for capturing the retained savings must be developed. The Southwest Region Federal Aviation Administration (FAA) has tasked Pacific Northwest National Laboratory (PNNL)^(a) to develop a model retained savings program for Southwest Region FAA use and as a prototype for consideration by the FAA.

The primary purpose of a retained savings program is to provide a monetary incentive for implementing energy efficiency and water conservation measures and practices at the facility, regional, or agency level. Depending on the guidelines, the retained savings can be used to provide funds for additional energy efficiency projects, morale and recreation projects, or various other facility needs. Current legislation (see Section 1.1) requires that retained savings from energy and water conservation projects be used to fund other energy and water conservation projects. Because these savings could be used to establish a revolving efficiency fund, the concepts associated with such a fund are also discussed in this report.

1.1 Legislative Review

Executive Order (EO) 12902 requires that each federal agency reduce energy consumption by 30% by the year 2005, relative to the agency's 1985 energy use, and implement all cost-effective water conservation projects. (The Energy Policy Act of 1992 [EPAct, 16 USC 1531] provides energy reduction targets of 10% by 1995 relative to consumption in 1985, with an additional 10% reduction for a total of 20% by 2000.) Additionally, the EO requires that guidelines and procedures be developed to allow agencies to retain utility rebates and incentives received, as well as savings from energy and water conservation efforts.

Section 625 of the Treasury, Postal Service, and General Government Appropriations Act (42 USC 3771) allows federal agencies (except the U.S. Department of Defense [DoD], which has its own enabling legislation) to retain 50% of utility rebates received for implementing energy efficiency and water conservation measures and 50% of the agency's share of measured energy savings resulting from energy savings performance contracts (ESPCs). Funds retained are to be credited to accounts that fund energy and water conservation activities at the agency's facilities. While not explicitly stated in the legislation, it is assumed that retained savings could also be extended to projects funded

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either "internally" through FAA appropriations or with retained savings from previous projects. Thus, because the agency would retain 50% of the savings generated, this type of funding would be preferable to an ESPC or loan.

Within the FAA, Order 1053.1A describes the policies and procedures for complying with federal mandates associated with energy efficiency and water management (DOT 1996).

As part of the Order, the FAA is required to

- audit, monitor, evaluate, and compile data on its facilities' energy consumption, including establishing and maintaining before-and-after consumption with respect to the implementation of energy efficiency measures and practices
- identify and apply all cost-effective and feasible energy efficiency measures to FAA buildings and facilities
- identify funds requested in the annual budget submission for energy conservation improvements
- pursue ESPCs when agency funding is not available and determine whether the facility is eligible for any utility rebates
- promote and recommend awards, incentives, and training programs associated with energy and water conservation
- submit data reports on annual energy consumption and cost.

1.2 Revolving Efficiency Loan Fund Concept

A revolving efficiency loan fund represents one source of funding for energy efficiency and water conservation projects. A revolving fund provides financial support to proposed efficiency projects that do not receive funding from other sources. The seed money for this fund could come from a variety of sources, including the shares of utility rebates, ESPCs, and FAA-appropriated funds. If successful, the revolving fund concept would provide an ongoing source of funding to finance viable energy efficiency and water conservation projects that would otherwise go unfunded. Used in conjunction with other funds, revolving funds could also be used to lessen the amount of funding requested for any given project.

1.3 Overview of Report

Section 2.0 presents an overview of programs incorporating retained savings or revolving fund concepts. Section 3.0 presents the issues and design considerations associated with retained savings and revolving fund programs. Section 4.0 presents recommended steps for developing a Southwest Region

FAA retained savings program. Section 5.0 is a list of publications referenced in this report. The Appendix describes the FORCAST computer model's inputs, outputs, and use for modeling cash flows associated with proposed revolving fund scenarios.

2.0 Overview of Similar Programs

Programs incorporating the retained savings concept, as well as revolving funds established to fund efficiency projects, were bench-marked to understand how they operate and how implementation obstacles were resolved. These programs are described in this section.

2.1 Breakthrough Special Monetary Account for Reinventing Training (B-Smart)

Organization: U.S. Army Training and Doctrine Command (TRADOC)
Contact: Jim Curtin
(757) 728-5795 or (757) 728-5764

The Breakthrough Special Monetary Account for Reinventing Training (B-SMART) program is a revolving fund established in 1997. The program provides funding for training-efficiency projects at the installation level. The revolving fund was established with an initial seed money investment of about \$1 million, obtained by taking a certain percentage of the overall training budget at the TRADOC level. For example, a school at Fort Lee may request B-SMART funds to buy a high-speed printer to print training manuals, enabling them to print the required number of manuals just in time. Just-in-time printing avoids excess manuals or shortages that can result when manuals are ordered in advance from central printing. Also, manual updates can be incorporated more quickly.

The B-SMART program includes a shared-efficiency savings schedule that varies from year to year over the life cycle of funded projects. (The TRADOC budgeting process has enough flexibility to allow organizations to share the efficiency savings, evidently by determining baseline funding levels. Determining these levels prevents out-year budgets from being reduced as a result of any operating cost reductions associated with the efficiency project.) During the first two years, the installation retains all savings. In year three, one-third of the savings is repaid into the fund. In year four, one-half the savings is repaid into the fund. After year five, all savings are repaid into the fund, resulting in the shared-savings rate schedule shown in Table 2.1.

Table 2.1. Shared-Savings Rate Schedule

Year	Savings Retained by	
	Installation	B-SMART
1	100%	0%
2	100%	0%
3	67%	33%
4	50%	50%
5+	0%	100%

Funds paid into the B-SMART revolving account exceeding the amount needed for a sustainable fund of a certain size are distributed as "profits." The profits are distributed as \$5,000 awards to the installations that generated the profits. Awards are given to recognize good ideas in the area of safety and health.

To promote the new B-SMART revolving fund, information about the program is sent to installation commanders and posters advertising the program are posted. Each installation also has a reinventing/reengineering office whose staff serve as field representatives for the program.

The ultimate size of the fund and the need for additional investments will be determined after the concept is tested using the first-year seed money.

2.2 Base Operations Opportunities Leveraging and Development (BOLD)

Organization: U.S. Army TRADOC
Reinvention Center Mission Support Laboratory
Contact: Jim Freeman or Al Murray
(757) 728-5156 or (757) 728-5143

The Base Operations Opportunities Leveraging and Development (BOLD) grant program started in FY 1996 with an initial budget allocation of \$10 million. The funds for the BOLD grants come from TRADOC's Appropriated Funds (APF), Non-Appropriated Funds (NAF), Army Family Housing (AFH), and the Environmental Compliance Achievement Program (ECAP). Only reinvention initiatives funded from these sources are eligible to compete for BOLD grants. Within those sources, any project that improves TRADOC base operations service delivery methods and processes is a candidate for funding. Projects are ranked and selected based on total dollar savings and payback duration. The program is viewed as a tremendous success, having won Vice President Al Gore's Hammer award in January 1997. FY 1999 plans include a web-based project submission system.

In FY 1996, 112 submissions were received and 30 were funded at \$3.5 million with a projected one-year return on investment (ROI) of \$12.5 million and a projected five-year ROI of \$62.5 million. In FY 1997, 180 submissions were received and 59 were funded at \$7.25 million with a projected one-year ROI of \$3.8 million and a projected five-year ROI of \$20.1 million. In FY 1998, 180 submissions were received and 52 were funded at \$8.2 million with a projected one-year ROI of \$9.8 million and a projected five-year ROI of \$30 million. To date, the ROI for FY 1996 projects is \$1.48 million.

The most significant design feature is that TRADOC has managed to turn out-year cost-avoidance dollars resulting from BOLD projects into retained savings at an installation. The installation can choose how to reprogram these savings. Given declining budgets, this decision has been a challenge. Recently, there was a move to pull the savings back from the installation level to the TRADOC

level. However, because this move would remove incentives for BOLD grant program participation, savings were left intact at the installation level. Projects are monitored for five years.

Installations do not have to repay BOLD grants, but savings are tracked using quarterly reports to the BOLD grant program office. One particularly successful aspect of the program is that when grants are issued to an installation, a mock check is prepared and delivered to the garrison commander at the annual Department of Defense Garrison Commanders' Conference in Washington, D.C. This procedure has resulted in excellent public relations for the program because garrison commanders have something to bring back to their installation following the conference.

2.3 A War on Infrastructure

Organization: U.S. Army TRADOC
Contact: Unknown. For more information, contact
Jim Freeman (757) 728-5156.

This program is an effort to reduce operations and maintenance (O&M) costs by closing/removing/consolidating buildings at an installation. Half of the savings resulting from this program remain at the installation and the other half is passed back up to the headquarters level. To retain savings at the installation, the installation must have some flexibility in determining out-year budgets to translate O&M cost-avoidance dollars into budget dollars that can be reprogrammed.

2.4 FORSCOM Investment Fund (FIF)

Organization: U.S. Army Forces Command (FORSCOM)
Contact: Roger Mansfield
(404) 464-5360

The FORSCOM Investment Fund (FIF) program is a revolving fund operating on a fixed-payment basis. Installations repay only the amount borrowed in two to four years after the money is received. FORSCOM withholds the agreed amounts from the installation's funding at the beginning of each applicable fiscal year. The amount of savings is verified by the appropriate commander at each installation. Savings not used to repay the loan are to remain at the installation. The budget process appears to have enough flexibility to enable out-year cost avoidances to be translated into savings that could be retained and reprogrammed by the installation. Resource management personnel at Fort Hood express skepticism that this type of flexibility is possible. However, because TRADOC has been able to enable installations to retain out-year savings, it seems likely that this type of budget flexibility is feasible.

The FIF project is relatively new (less than two years old) and projects are just now being identified. To be eligible for FIF money, installations have to

demonstrate that the project would go unfunded without FIF support. Projects are ranked by the duration of payback and the amount of savings expected to be generated (although once funded, payback is independent of savings). Any project that reduces O&M costs is eligible, including energy efficiency and water conservation projects.

2.5 Revolving Energy Loan Programs

Organization: State of Alaska, Division of Energy
Contact: Andrea Antoine
(907) 269-4628

The state of Alaska's Revolving Energy Loan Program is made up of three separate funds:

- bulk fuel revolving loan fund
- power project revolving loan fund
- rural electrification revolving loan fund.

All three loan funds require participants to repay the amount borrowed. Interest rates range from zero to something less than the average weekly yield of municipal bonds. The bulk fuel program requires that the loan be repaid in one year. The power project revolving fund bases the loan payback period on the life of the project. The electrification program requires a 10-year payback from the date electrical service is provided to new customers.

2.6 Revolving Loan Fund

Organization: Alameda County Waste Management Authority, State of California
Contact: Mark Cullors
(510) 614-1699

This county-level revolving loan fund is designed to finance projects that reduce the volume of wastes disposed of in Alameda County landfills. Loans are available to small- and medium-size businesses in the Alameda County area that are involved in the source reduction and recycling industry. The fund was established in 1995 and is operated as a partnership between the Alameda County Source Reduction and Recycling Board, the Materials for the Future Foundation (MFF), and the Oakland Business Development Corporation (OBDC). Within this partnership, the county acts as the overall administrator and relies on the environmental expertise of the MFF to interact with the businesses and the experience of the OBDC in handling loans.

The fund was established with \$750,000 and has received an additional \$250,000 each year, although the county is trying to make the fund self-sufficient in the next one to two years. The seed money funds are provided by a portion of a \$6 per ton surcharge on materials landfilled in the county. Loan

amounts range from \$15,000 to \$150,000 at 5% interest and a term of five years. The fund receives about \$20,000 per month in loan payments and has had no deficiencies or defaults.

To date, the Alameda County revolving loan fund has funded 15 projects for a total \$1.37 million, and an additional \$4.72 million has been leveraged as a result of the loans. The fund has contributed to the diversion of 165,000 tons of material from landfills.

2.7 State Revolving Fund (SRV) Program

Organization: Texas Water Development Board
Contact: Jose R. Rodriguez
(512) 463-8494

This State of Texas revolving fund is designed to be used for planning, designing, and constructing sewage treatment facilities, wastewater recycling and reuse facilities, collection systems, storm water pollution control projects. Loans must be repaid within 20 years with interest at less than market rates.

2.8 Energy Efficiency Project

Organization: City of Oslo, Norway
Contact: Per Arne Skjaeveland

This energy efficiency project fund was established using a tax on electricity (about 1/6 of a U.S. cent per kWh), generating about \$10 million per year to finance the fund. Energy efficiency projects that draw from the fund typically consist of a free energy audit and a report on suggested measures. Building owners have to repay 85% of the amount borrowed (15% of the amount is a grant). Projects have not kept pace with the flow of incoming funds and the balance has grown to more than \$100 million. The fund can be invested and earn 8%, meaning that \$8 million a year in energy efficiency projects can be invested without drawing down the fund. Unless more money is spent for energy-related projects, however, the money is at risk of being spent on other pressing municipal uses.

2.9 Community Development Assistance Program (CDAP)

Organization: Illinois State Department of Commerce and Community Affairs
Contact: Department of Commerce and Community Affairs
(217) 785-6181

The Community Development Assistance Program (CDAP) has awarded more than \$83 million in economic development grants over the past 14 years. Essentially, the grants provide seed money to communities to start revolving loan funds to fund future economic development opportunities. The grants are

provided to local government units within Illinois to help them provide low-interest loans to businesses locating or expanding within the local jurisdiction. As the loans are repaid to the communities, the money is recirculated through additional loans. An estimated \$50 million is back in circulation.

2.10 Proposed FORSCOM Revolving Efficiency Fund

Currently, a study is under way to examine the feasibility of establishing a revolving efficiency fund through which FORSCOM could fund energy efficiency and water conservation projects. The preliminary recommendation is to pursue a "start slow" strategy to validate the concept. The recommended steps are as follows:

- Validate that budgeting processes/mechanisms exist to allow savings to be retained at the installation level.
- Determine the practicality of prototyping the revolving fund concept under the FIF program.
- Establish revolving fund guidelines, administrative procedures, and tracking procedures to test the revolving fund concept.
- Devise an implementation strategy.

As the installation Operations and Maintenance, Army (OMA) budget picture continues to deteriorate and traditional sources of energy efficiency investment funds tighten up, the need for an investment funding mechanism fueled by savings will continue to increase.

3.0 Retained Savings Program Design Issues

A review of existing TRADOC, FORSCOM, and community retained savings and revolving fund programs has identified three significant design issues:

- Operations budgeting process constraints
- savings estimation and verification
- allocation of savings.

3.1 Operations Budgeting Process Constraints

The most significant design issue affecting the feasibility of establishing and maintaining a retained savings and/or a revolving fund program is the constraints associated with the Operations budgeting process. First, the Operations budgeting process has to have enough flexibility to translate the cost-avoidance nature of efficiency projects into cash for savings retention by the facility. Second, seed money has to be obtained to establish a revolving fund.

In terms of budgeting process flexibility, lessons learned in TRADOC and FIF should be applicable. Essentially, baseline budgets are established for the area of interest at the facility level and maintained for some period of time (i.e., several years). As efficiency projects are implemented and result in cost avoidance, a difference between actual costs and the budget is generated. A portion of this difference can then be withheld from the facility for loan repayment (as done by FIF), and any remaining savings can be allocated back to the facility in the form of money that can be reprogrammed. Alternatively, a portion of savings can be routed back to the fund itself (shared-savings concept done by B-SMART). Given the drive to reduce Operations budgets, maintaining a historical baseline budget over actual costs is a real challenge. TRADOC stated that while they have maintained a baseline budget as part of their BOLD grant program, a danger always exists that they will not be able to let savings reside at the installation at some point in time in the out-year budgets. Targeting projects that minimize the number of years historical budgets need to be maintained over actual costs to repay the fund and generate savings appears to be a prudent strategy.

Establishing a revolving fund based on the retained savings requires seed money. Current legislation provides for the retention of a percent of the savings from efficiency projects, which could be used to establish one or more revolving funds at a given level (e.g., regional). This design is similar to that used by the state of Illinois in that funding has come from a central source (such as an FAA budget appropriation), but the benefits (retained savings) would be distributed at a lower level. Another design possibility is to generate seed money by taxing budgets that would benefit from efficiency projects. This approach is used by Oslo's energy efficiency program. Another approach would be to allocate a percentage of an existing budget into the seed money account (probably

Operations dollars) as done by TRADOC's B-SMART program. No matter what mechanism is used to obtain the initial seed money investment, it is probably a sound strategy to "start slow" so that the merits of a revolving fund can be verified before the ultimate size of the fund is established. For example, an initial investment of \$1 million would be sufficient to fund six to eight reasonably sized projects distributed across several facilities.

3.2 Savings Estimation and Verification

A second significant design issue is how to estimate and verify savings associated with efficiency investments, while considering uncertainties related to baseline conditions such as personnel levels, mission changes, and variables like weather. Because Order 1053.1A requires that energy consumption for buildings and facilities be metered individually (where practical and cost-effective), it may be possible to use historical data to establish a baseline (DOT 1996). Software packages, such as Federal Energy Decision Screening (FEDS), can provide an estimate of energy consumption based on an average weather year (PNNL 1996). Also, the order provides the legislative mechanism for requiring the establishment and maintenance of before-and-after consumption data in reference to the implementation of conservation practices and measures.

In cases where baselining procedures have not been established, one answer is to use the same techniques used to support ESPC to estimate and verify savings. These techniques are as follows:

- Determine energy baseline—prediction of the amount of energy that would have been used if there had not been any efficiency project implemented. Baselines can be estimated using
 - engineering methods
 - submetered data collection
 - statistical techniques
 - calculation methods.
- Determine facility-equipment-mission baseline—list of equipment and occupant operating schedules, environmental requirements, facility mission, etc.

The site and the contract, or in the case of the revolving efficiency fund, the Southwest Region FAA and the facility, negotiate the baseline and savings. The facility-equipment-mission baseline provides a mechanism to account for factors that would alter baseline calculations.

Given the relative complexity of estimating and verifying savings associated with efficiency investments, it is recommended that the same training that has been prepared for ESPC projects be made available to revolving fund participants.

3.3 Allocation of Savings

A third design issue is how to allocate the retained savings. Because the legislation allows the savings to be retained and used to fund additional measures and practices, one possibility is to establish a revolving efficiency fund, either as a loan fund, a grant-type fund, or a hybrid of the two. An additional problem is determining the level at which the fund should operate—facility, region, or agency. All options have advantages and disadvantages.

If the revolving fund is established to lend money for efficiency projects, another design determination is whether to make it a shared-savings program (e.g., B-SMART) or a fixed-payment program (e.g., FIF). The advantage of the shared-savings concept—with some portion of the savings above the amount borrowed being returned to the fund—is that it enables the fund to grow beyond seed money investment totals. The main disadvantage is the complexity of tracking savings to support the shared-savings concept. Alternatively, the fixed-payment concept, where money is withheld from out-year budgets until the loan is repaid, is much easier to execute. Given that the savings will need to be tracked to determine the proportion available to be retained, the shared-savings concept is considered the preferred option. For a shared-savings concept, the fund would recover the percentage of the savings agreed to (similar to an ESPC) to cover the investment plus 50% of the facility's share of the savings. For the fixed-payment concept, the fund would recover the amount of the loan plus 50% of the facility's share of the savings.

If the revolving fund is established as a mechanism for providing grants for efficiency funding, it may be more difficult to sustain over time, depending on the ROI. In this case, the revolving fund would receive up to 50% of the retained savings. A hybrid fund, similar to the Energy Efficiency Project in Oslo, Norway, would allow for a more substantial fund growth while providing some "free" money in the form of a grant. Table 3.1 outlines the various returns to the fund based on the above options and an initial \$1 million investment with an estimated ROI of 25%.

The advantage of a facility-level fund is that it provides a direct incentive to the facility to finance successful projects, with the benefits remaining at the facility. The disadvantage is that the fund may not be large enough to finance larger projects, requiring additional funding through either budget appropriations, loans, or ESPCs. The advantage of an agency-level fund (e.g., FAA) is that the retained savings from several projects can be pooled, allowing for larger projects. The disadvantage is that a facility that has been proactive in implementing efficiency projects may not receive future funding in proportion to its contribution, providing a disincentive at the facility level. The disincentive is lessened, however, if the efficiency projects are funded through grants because grants are viewed as "free" money. A fund established at a regional level provides a mix of the advantages and disadvantages associated with the facility- and agency-level funds.

Table 3.1. Fund Returns

	Shared-Savings Loan	Fixed-Payment Loan	Grant	Hybrid Loan/Grant
Terms	75% of savings/yr over 6 years	\$200,000/yr over 5 years	None	85% of investment repaid over 5 years
Efficiency Investment	\$1 million	\$1 million	\$1 million	\$1 million
Estimated Cost Savings	\$250,000 annually	\$250,000 annually	\$250,000 annually	\$250,000 annually
Fund Repayment	\$1.125 million	\$1 million	\$0	\$0.850 million
Retained Savings (facility share to revolving fund)	\$31,000 annually (yr 1-6) \$125,000 annually (yr 7+)	\$25,000 annually (yr 1-5) \$125,000 annually (yr 6+)	\$125,000 annually	\$40,000 annually (yr 1-5) \$125,000 annually (yr 6+)
Total Fund Income Over 10 years	\$1.811 million	\$1.750 million	\$1.250 million	\$1.675 million

It would also be prudent to allocate the retained savings such that a stream of retained savings is maintained for future funding. Depending on how long savings are allowed to be retained, guidelines should be established to ensure that the fund is self-sustaining. The FAA Operations Requirements Cash Flow Analysis Tool (FORCAST), described in the Appendix, is a simple tool that can be used to vary savings rate schedules and time periods to determine the economics of efficiency projects.

4.0 Recommended Steps for Developing FAA Retained Savings Program

A Southwest Region FAA retained savings program, coupled with a revolving efficiency fund, is a feasible concept and offers a mechanism to finance cost-effective efficiency projects that would otherwise go unfunded. The opportunity exists to take the best features from funds used in TRADOC and non-DoD organizations and combine them into a retained savings and revolving fund concept capable of providing both incentives and financing to achieve energy and budget savings at the facility level. PNNL recommends the following steps be taken in developing an FAA retained savings program:

Establish a retained savings mechanism. Determine the level at which the retained savings should be consolidated into a fund. Based on historical information and/or planned efficiency projects, determine if sufficient savings would be generated at the facility level or if consolidation needs to occur at the regional or agency level. The preliminary recommendation is to establish a revolving efficiency loan fund at the regional level, allowing some consolidation of savings to fund larger projects while maintaining a sense of facility "ownership" in that the funds will remain within the region.

Establish revolving fund guidelines, administrative procedures, and tracking procedures. Issues include promoting facility involvement, designing low overhead administrative procedures, determining how fund oversight will be conducted within the existing management organization, and establishing performance measures to determine if the revolving fund concept results in tangible, long-term savings to the Southwest Region FAA. The number of year's savings to be accrued to the fund also need to be determined. Web-based tools can probably be applied as part of this implementation. For example, fund application and administrative procedures, cash flow tools, and savings estimating and tracking could be web-based. ESPC training material regarding baselining conditions to estimate out-year savings of proposed efficiency projects could be developed and distributed using the web. Also, a cash flow tool could be modified and distributed via the web to enable facilities to characterize the overall financial performance of their projects to determine if they meet the criteria for receiving funding (e.g., number of years to repay the fund, shared-savings dollar volume). A course, such as the National Development Council's, "Revolving loan funds: Design, Documentation, and Administration," would also be useful in designing a revolving loan fund.

Identify Potential Projects. Use tools, such as FEDS, to identify cost-effective energy projects and estimated savings associated with those projects (PNNL 1996). Savings should be verified by estimating baseline and post-implementation energy consumption through metering. Alternatively, the baseline and savings can be estimated using the measures outlined in the U.S. Department of Energy's (DOE) Federal Energy Management Program (FEMP) workshop, "Successful Energy Savings Performance Contracting."

As agency budgets continue to tighten and traditional sources of energy efficiency and water conservation investment funds dry up, the need for an investment-funding mechanism fueled by savings will continue to increase.

5.0 References

Energy Policy Act of 1992 (EPAct). Public Law 102-486, 106 Stat 2776, 16 USC 1531 et seq., as amended.

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Appendix

Revolving Fund Cash Flow Model

Appendix

Revolving Fund Cash Flow Model

As an aid to modeling the cash flows associated with proposed revolving fund scenarios for the FAA Retained Savings Proposal project, a computer tool—the FAA Operations Requirements Cashflow Analysis Tool (FORCAST)—was developed in Microsoft Excel. By specifying various inputs, such as FAA seed money, investment streams and returns, and retained savings, the user is able to view the resulting cash flow within the revolving fund over a ten-year period. This appendix describes the FORCAST model inputs, outputs, and use.

A.1 Main Input Screen

The main input screen is the environment in which the user can recall, save, and modify inputs to fund scenarios, and direct the outputs to the screen or a printer. It appears as shown in Figure A.1.

FORCAST - FAA OPERATIONS REQUIREMENTS CASHFLOW ANALYSIS TOOL

Scenario Name: <input type="text" value="Default"/>	Recall Scenario
<input type="button" value="Go To FAA Seed Money Inputs"/>	<input type="button" value="Use Defaults"/>
Choose an Investment Type:	<input type="button" value="Run Scenario"/>
☒ Enter Single Investment by Year	<input type="button" value="Save Scenario As"/>
☐ Enter Single Investment as % of Fund Balance	<input type="button" value="View Output"/>
☐ Enter Multiple Investments by Year	<input type="button" value="Print Scenario"/>
☐ Enter Multiple Investments as % of Fund Balance	<input type="button" value="Exit"/>
<input type="button" value="Go To Investment Inputs"/>	
<input type="button" value="Go To Fraction of Retained Savings Inputs"/>	

Figure A.1. Main Input Screen

The FORCAST input screen has two areas. The area to the left allows the user to enter inputs specific to a scenario. The area to the right manages scenario input and output capabilities.

A.2 Entering Inputs

The user has three choices in setting up a scenario: to use the default values (by clicking on the “Use Defaults” button), to recall a previously saved scenario (by clicking on the “Recall Scenario” button), which can be either used as is or modified and saved as a new scenario, or to input values for a new scenario.

A.2.1 Enter New Scenario Name

To enter a new scenario, the user first enters the scenario name in the box provided and hits <ENTER>.

A.2.2 Enter FAA Seed Money Amount

Next, the user can specify the FAA seed money inputs by clicking on the "Go To FAA Seed Money inputs" button. The user is then presented with the FAA Seed Money Inputs Screen (see Figure A.2).

FAA Seed Money Inputs (\$ Thousand)

Enter Seed Money Amount by Year (\$ Thousand)

Year 1	\$1,000.00	Year 11	
Year 2	\$1,000.00	Year 12	
Year 3	\$1,000.00	Year 13	
Year 4	\$1,000.00	Year 14	
Year 5	\$1,000.00	Year 15	
Year 6	\$0.00	Year 16	
Year 7	\$0.00	Year 17	
Year 8	\$0.00	Year 18	
Year 9	\$0.00	Year 19	
Year 10	\$0.00	Year 20	

Figure A.2. FAA Seed Money Inputs Screen

The user is asked to enter the seed money (the amount of funding FAA will use to start the revolving fund) by year. After entering the seed money stream, the user returns to the main input screen by clicking on the "OK" button. To cancel the inputs, the user clicks on the "Cancel" button, which will retrieve the original values and return the user to the main input screen.

A.2.3 Enter Fund Investments

Before going to the investment input screen, the user must specify the type of investment to model by checking the appropriate box under "Choose an Investment Type:" before clicking on the "Go To Investment Inputs" button.

For each investment type, the user must enter the investment amount (\$ or %), lag time, return on investment (ROI), and Energy Price Escalation Rate (EPER) for each year.

Lag time is the time (in months) it takes to realize energy savings (e.g., procuring and implementing an improvement in building insulation is expected to take 14 months, so the lag time is 14 months before energy savings will start to be realized).

ROI is the amount of expected annual cost investment amount (e.g., an investment of \$100 expected to yield savings of \$10 annually would have an ROI of 10/100 or 10%).

The EPER allows the user to incorporate any difference in anticipated fuel prices during the period compared with general inflation (e.g., if fuel prices are expected to increase 2% more than general prices, the EPER would be 2%).

A.2.3.1 Single Investment by Year

The user enters the total investment amount, lag time for savings (time it takes to realize energy savings), expected ROI, and the EPER for each year (see Figure A.3). This option allows the user to model a revolving fund with general guidelines such as fixed-investment amounts allowed each year with expected average ROIs and lag times. After entering the investment stream, the user returns to the main input screen by clicking on the "OK" button. To cancel the inputs, the user clicks on the "Cancel" button, which will retrieve the original values and return the user to the main input screen.

Input Screen - Single Investment by Year

Enter Investment Amount (\$ Thousand), Lag Time (months), Return on Investment (.2 = 20%), and Energy Price Escalation Rate (.05 = 5%)

	Inv.	Lag	ROI	EPER		Inv.	Lag	ROI	EPER
Year 1	1000	12	0.2	0	Year 11				
Year 2	1000	12	0.2	0	Year 12				
Year 3	1000	12	0.2	0	Year 13				
Year 4	1000	12	0.2	0	Year 14				
Year 5	1000	12	0.2	0	Year 15				
Year 6	1000	12	0.2	0	Year 16				
Year 7	1000	12	0.2	0	Year 17				
Year 8	800	12	0.2	0	Year 18				
Year 9	800	12	0.2	0	Year 19				
Year 10	1000	12	0.2	0	Year 20				

Figure A.3. Single Investment by Year Input Screen

A.2.3.2 Single Investment as Percentage of Fund Balance

The user enters the total investment as a percentage of the fund balance at the beginning of the year, the lag time for savings (time it takes to realize energy savings), the expected ROI, and the EPER for each year (see Figure A.4).

Input Screen - Single Investment as % of Fund Balance

Enter Investment as a % of Initial Fund Balance (.3 = 30%), Lag Time (months), Return on Investment (.2 = 20%), and Energy Price Escalation Rate (.05 = 5%)

	Inv.	Lag	ROI	EPER		Inv.	Lag	ROI	EPER
Year 1	0.9	12	0.2	0	Year 11				
Year 2	0.9	12	0.2	0	Year 12				
Year 3	0.9	12	0.2	0	Year 13				
Year 4	0.9	12	0.2	0	Year 14				
Year 5	0.9	12	0.2	0	Year 15				
Year 6	0.9	12	0.2	0	Year 16				
Year 7	0.9	12	0.2	0	Year 17				
Year 8	0.9	12	0.2	0	Year 18				
Year 9	0.9	12	0.2	0	Year 19				
Year 10	0.9	12	0.2	0	Year 20				

Figure A.4. Single Investment as Percentage of Fund Balance Input Screen

This option allows the user to invest the total fund balance each year, while still modeling a revolving fund with general guidelines such as expected average returns on investment and lag times. After entering the investment stream, the user returns to the main input screen by clicking on the "OK" button. To cancel the inputs, the user clicks on the "Cancel" button, which will retrieve the original values and return the user to the main input screen.

A.2.3.3 Multiple Investments by Year

The user can enter information for up to five investment types (see Figure A.5): Lighting Improvement, Space Conditioning Improvement, Envelope Improvement, Central System Improvement, or O&M Improvement (see Figure A.6). After selecting an investment type, the user enters the investment amount (Inv.), the lag time for savings (time it takes to realize energy savings) (Lag), the expected ROI, and the EPER for each year (see Figure A.7). This option allows the user to model a revolving fund using fixed-investment amounts but vary the ROI and lag time based on the type of improvement funded for up to five investment types. After entering the investment stream, the user returns to the multiple-investment input screen by clicking on the "OK" button. The user can then specify inputs for another investment type. Once all investment streams have been entered, the user returns to the main input screen by clicking on the "OK" button in the multiple-investment input screen. To cancel the inputs, the user clicks on the "Cancel" button, which will retrieve the original values and return the user to the main input screen.

Input Screen - Multiple Investments by Year

Enter information for up to 5 investment types:

1	2	3	4	5	OK
					Cancel

Figure A.5. Multiple Investments by Year Input Screen

Input Screen - Investment Type 1

Enter Investment Type: Lighting Improvement ▼

Enter Investment Amount (\$ T Investment (.2 = 20%), and En

Space Conditioning Improvement
 Envelope Improvement
 Central System Improvement
 O&M Improvement

OK
Cancel

	Inv.	Lag	ROI	EPER		Inv.	Lag	ROI	EPER
Year 1	100	12	0.2	0	Year 11				
Year 2	100	12	0.2	0	Year 12				
Year 3	100	12	0.2	0	Year 13				
Year 4	100	12	0.2	0	Year 14				
Year 5	100	12	0.2	0	Year 15				
Year 6	100	12	0.2	0	Year 16				
Year 7	100	12	0.2	0	Year 17				
Year 8	100	12	0.2	0	Year 18				
Year 9	100	12	0.2	0	Year 19				
Year 10	100	12	0.2	0	Year 20				

Figure A.6. Multiple Investments by Year – Investment Type 1 Input Screen (Choosing Investment Type)

Input Screen - Investment Type 1

Enter Investment Type: Lighting Improvement OK

Enter Investment Amount (\$ Thousand), Lag Time (months), Return on Investment (.2 = 20%), and Energy Price Escalation Rate (.05 = 5%) Cancel

	Inv.	Lag	ROI	EPER		Inv.	Lag	ROI	EPER
Year 1	100	12	0.2	0	Year 11				
Year 2	100	12	0.2	0	Year 12				
Year 3	100	12	0.2	0	Year 13				
Year 4	100	12	0.2	0	Year 14				
Year 5	100	12	0.2	0	Year 15				
Year 6	100	12	0.2	0	Year 16				
Year 7	100	12	0.2	0	Year 17				
Year 8	100	12	0.2	0	Year 18				
Year 9	100	12	0.2	0	Year 19				
Year 10	100	12	0.2	0	Year 20				

Figure A.7. Multiple Investments by Year – Investment Type 1 Input Screen (Entering Inv., Lag, ROI, EPER)

A.2.3.4 Multiple Investments as Percentage of Fund Balance

The user can enter information for up to five investment types (see Figure A.8): Lighting Improvement, Space Conditioning Improvement, Envelope Improvement, Central System Improvement, or O&M Improvement (see Figure A.9). The user then enters the investment as a percentage of the total fund balance (Inv.), the lag time for savings (time it takes to realize energy savings) (Lag), the expected ROI, and the EPER for each year (see Figure A.10). This option allows the user to model a revolving fund that distributes the investment amount as a percentage of the total funds available but vary the ROI and lag time based on the type of improvement funded for up to five investment types. After entering the investment stream, the user returns to the multiple-investment input screen by clicking on the “OK” button. The user can then specify inputs for another investment type. Once all investment streams have been entered, the user returns to the main input screen by clicking on the “OK” button in the multiple-investment input screen. To cancel the inputs, the user clicks on the “Cancel” button, which will retrieve the original values and return the user to the main input screen.

Input Screen - Multiple Investments by Fund Balance

Enter information for up to 5 investment types: OK

1	2	3	4	5	Cancel
---	---	---	---	---	--------

Figure A.8. Multiple Investments by Fund Balance Input Screen

Input Screen - Investment as % of Fund Balance Type 2

Enter Investment Type: Space Conditioning Improvement OK

Enter Investment as a % of Initial Fund Balance (months), Cancel

Return on Investment (.2 = 20%) (.05 = 5%)

	Inv.	Lag	ROI	EPER		Inv.	Lag	ROI	EPER
Year 1	0.2	15	0.1	0	Year 11				
Year 2	0.2	15	0.1	0	Year 12				
Year 3	0.2	15	0.1	0	Year 13				
Year 4	0.2	15	0.1	0	Year 14				
Year 5	0.2	15	0.1	0	Year 15				
Year 6	0.2	15	0.1	0	Year 16				
Year 7	0.2	15	0.1	0	Year 17				
Year 8	0.2	15	0.1	0	Year 18				
Year 9	0.2	15	0.1	0	Year 19				
Year 10	0.2	15	0.1	0	Year 20				

Figure A.9. Multiple Investments by Fund Balance – Investment as Percentage of Fund Balance Type 2 Input Screen (Choose Investment Type)

Input Screen - Investment as % of Fund Balance Type 2

Enter Investment Type: Space Conditioning Improvement OK

Enter Investment as a % of Initial Fund Balance (.3 = 30%), Lag Time (months), Cancel

Return on Investment (.2 = 20%), and Energy Price Escalation Rate (.05 = 5%)

	Inv.	Lag	ROI	EPER		Inv.	Lag	ROI	EPER
Year 1	0.2	15	0.1	0	Year 11				
Year 2	0.2	15	0.1	0	Year 12				
Year 3	0.2	15	0.1	0	Year 13				
Year 4	0.2	15	0.1	0	Year 14				
Year 5	0.2	15	0.1	0	Year 15				
Year 6	0.2	15	0.1	0	Year 16				
Year 7	0.2	15	0.1	0	Year 17				
Year 8	0.2	15	0.1	0	Year 18				
Year 9	0.2	15	0.1	0	Year 19				
Year 10	0.2	15	0.1	0	Year 20				

Figure A.10. Multiple Investments by Fund Balance – Investment as Percentage of Fund Balance Type 2 Input Screen (Entering Inv., Lag, ROI, EPER)

A.2.4 Entering Fraction of Savings Retained by Site

Finally, the user enters the fraction of savings retained by the site by clicking on the “Go To Fraction of Retained Savings Inputs” button. The user is then presented with the Fraction of Savings Retained by Site Input Screen (see Figure A.11).

Fraction of Savings Retained by Site

Enter Fraction of Savings Retained by Site (0.2 = 20%)

Year 1	0.20	Year 11	
Year 2	0.20	Year 12	
Year 3	0.20	Year 13	
Year 4	0.20	Year 14	
Year 5	0.20	Year 15	
Year 6	0.00	Year 16	
Year 7	0.00	Year 17	
Year 8	0.00	Year 18	
Year 9	0.00	Year 19	
Year 10	0.00	Year 20	

Figure A.11. Fraction of Savings Retained by Site Input Screen

The user is asked to enter the amount of the energy cost savings the sites will be allowed to retain by year (the remaining savings are paid back into the revolving fund balance). After entering the retained savings fraction stream, the user returns to the main input screen by clicking on the “OK” button. To cancel the inputs, the user clicks on the “Cancel” button, which will retrieve the original values and return the user to the main input screen.

A.3 Saving and Running the Scenario

The scenario inputs can be saved by clicking on the “Save Scenario As” button. The scenario will be saved using the scenario name provided in the main input screen.

To generate the outputs, the user clicks on the “Run Scenario” button.

A.4 Outputs

Once the scenario has been run, three graphs are generated illustrating the revolving fund balance, the cash flow, and the distribution of savings. Additionally, the user can view the inputs to the model. To view the outputs, the user clicks on the “View Output” button (see Figure A.12).

View Revolving Efficiency Fund	View Savings Distribution	Return to Input Screen
View Cash Flow	View Input Summary	
Output for Scenario: Default		

Figure A.12. Output Viewing Options

Figures A.13 through A.16 illustrate the outputs generated by the FORCAST model. To return to the main input screen, the user clicks on the “Return to Input Screen” button.

Figure A.13. Revolving Efficiency Fund Graph

Figure A.14. Cash Flow Graph

Figure A.15. Savings Distribution Graph

Year	FAA Contribution	Total Investments	Energy Savings	Fund Repayments	Savings Retained by Installations	Initial Fund Balance	Year End Fund Balance	
1	\$1,000	\$1,000	\$0	\$0	\$0	\$1,000	\$0	View Revolving Efficiency Fund
2	\$1,000	\$1,000	\$200	\$160	\$40	\$1,000	\$160	
3	\$1,000	\$1,000	\$400	\$320	\$80	\$1,160	\$480	
4	\$1,000	\$1,000	\$600	\$480	\$120	\$1,480	\$960	
5	\$1,000	\$1,000	\$800	\$640	\$160	\$1,960	\$1,600	
6	\$0	\$1,000	\$1,000	\$1,000	\$0	\$1,600	\$1,600	View Cash Flow
7	\$0	\$1,000	\$1,200	\$1,200	\$0	\$1,600	\$1,800	
8	\$0	\$800	\$1,400	\$1,400	\$0	\$1,800	\$2,400	View Savings Distribution
9	\$0	\$800	\$1,560	\$1,560	\$0	\$2,400	\$3,160	
10	\$0	\$1,000	\$1,720	\$1,720	\$0	\$3,160	\$3,880	

Year	Cumulative FAA Contribution	Cumulative Investment	Cumulative Energy Savings	Cumulative Fund Repayments	Cumulative Retained Savings		Return to Input Screen
1	\$1,000	\$1,000	\$0	\$0	\$0		
2	\$2,000	\$2,000	\$200	\$160	\$40		
3	\$3,000	\$3,000	\$600	\$480	\$120		
4	\$4,000	\$4,000	\$1,200	\$960	\$240		
5	\$5,000	\$5,000	\$2,000	\$1,600	\$400		
6	\$5,000	\$6,000	\$3,000	\$2,600	\$400		
7	\$5,000	\$7,000	\$4,200	\$3,800	\$400		
8	\$5,000	\$7,800	\$5,600	\$5,200	\$400		
9	\$5,000	\$8,600	\$7,160	\$6,760	\$400		
10	\$5,000	\$9,600	\$8,880	\$8,480	\$400		

Figure A.16. Summary of Inputs

A.5 Printing the Scenario

The scenario input summary and output graphs can be printed by clicking on the “Print Scenario” button.

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