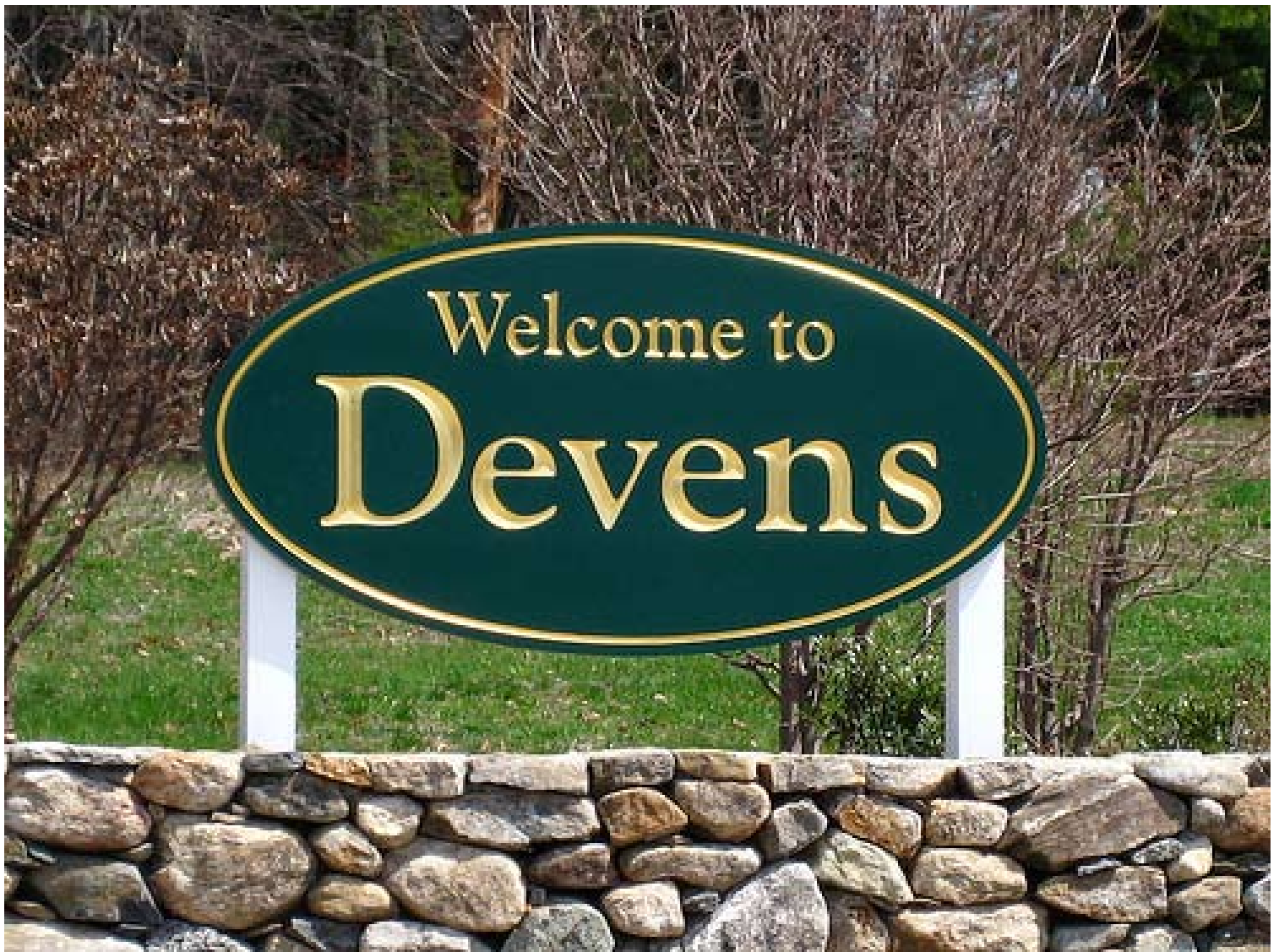


# Power Down Devens: Revolving Loans





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Power Down Devens: Revolving Loans

Field Projects, Spring 2008  
Urban and Environmental Policy & Planning  
Graduate School of Arts & Sciences  
Tufts University  
Medford, Massachusetts



Produced For  
EcoStar Devens  
Dona Neely, Director,  
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Devens, Massachusetts

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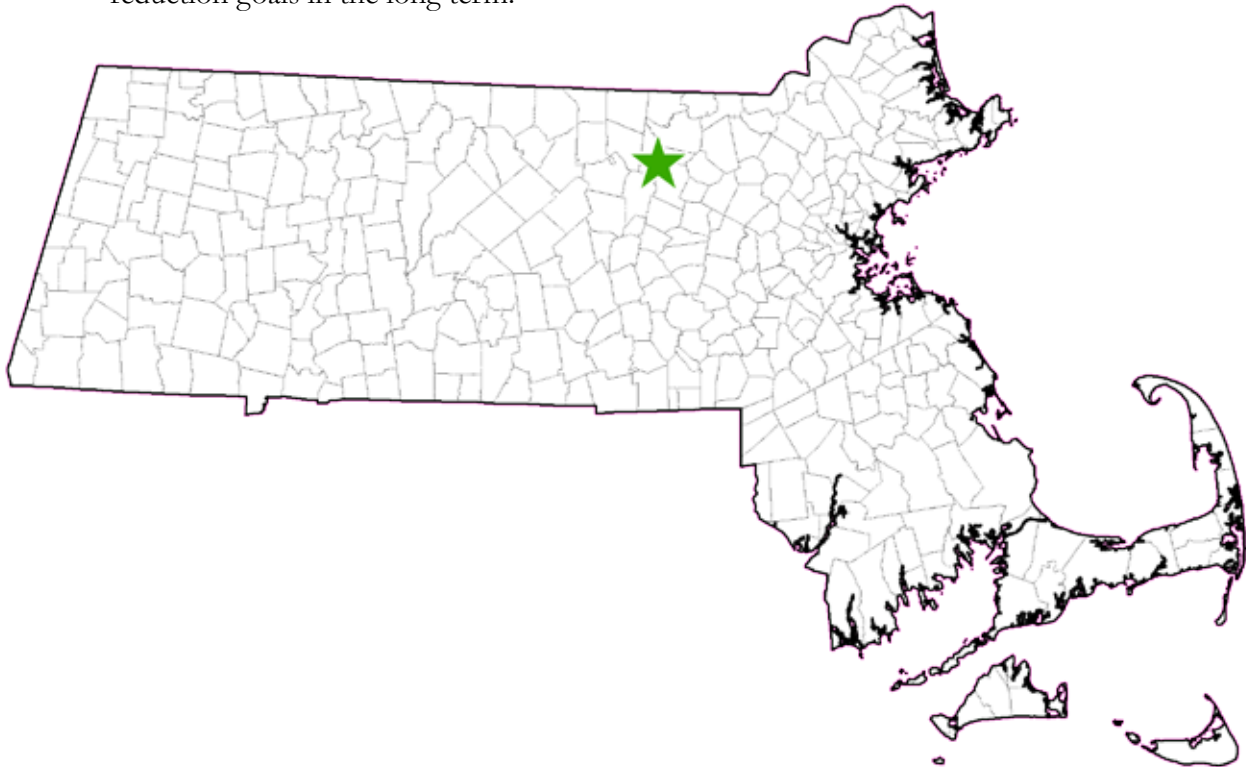
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# Abstract

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This report will lead the reader through the RLF process, potential scenarios, best management practices, parameters, and implications of an RLF program at Devens. Social marketing, tax exemptions, and other green incentives are developed as tools necessary for its effective implementation. Next, a set of recommendations to the RLF administrator are presented, including design and implementation of the RLF; inclusiveness of residents; tools to encourage and award applicants that meet and surpass energy reduction goals; environmental legislation that may facilitate the RLF; and the development of additional partnerships that could provide individual consultation or auditing services. Finally, we offer next steps how Devens can serve as a model of a green community and expand their energy reduction goals in the long term.



# Executive Summary

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Devens Massachusetts is a 4,400 acre former Army base in Central Massachusetts, the only one in New England. The U.S. Army closed the base in 1996 and repurposed as an eco-industrial park, and sustainable community. Power Down Devens! is an initiative proposed by the EcoStar program that is designed to promote the reduction of energy consumption in the companies by at least ten percent. Our team has been asked to research various financial mechanisms and incentives, weighing the efficacy of each in achieving Power Down goals.

There are a number of incentives available, including energy savings performance contracts. EPSC are particularly appealing because they generally require no initial outlay, and the resulting savings are used to pay for improvements. Therefore the focus of this report is on another widely used financial incentive package, the Revolving Loan Fund RLF.

In the following pages we explore how to set up an RLF including how one might determine the interest rate, maximum loan amount, payback period, and grace period for payments. We include different scenarios, which show how different values for these parameters will affect the attractiveness of loans and vitality of the fund. We also include an operational guide to RLF's, which offers some guidelines for implementing in Devens. We discuss the challenges that will be faced, and recommend that the loans be offered to residents as well as businesses. We also recommend the use of social marketing which can be used to effectively market the program to the residents and businesses in Devens.



# Introduction

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In recent years, there has been growing national and international attention to the perils of climate change. Energy conservation is viewed by many as a central strategy in reducing the human impact on the environment and minimizing global warming. Ours is a society dependent on the use of fossil fuels that are by nature finite energy resources. The rising cost associated with fossil energy is a major concern, as current supply simply will not be able to match demand. Thus, energy conservation captures two separate but complementary strategies: energy efficiency and curbing consumption and emissions. The first strategy promotes the creation and implementation of a system that uses energy with as little waste loss as technologically possible. The second strategy looks at changing people's patterns of behavior, reducing energy use in everyday activities.

The benefits of reducing energy consumption are numerous. First, reducing energy consumption will reduce emissions from fossil fuels thereby helping states meet their Renewable Portfolio Standard goals, and moving the U.S. closer to critical reductions in overall emissions that are accelerating climate change. Second, when consumers reduce their use of fossil fuel energy, they reduce their energy bills, saving money. Third, upgrading to energy efficient technologies will pay for itself over time through the money saved on energy costs. Even with these benefits in mind, there are challenges the consumer may still face. Many efficient technologies available today are capital-intensive and that may pose a problem for residents and business that would like to adopt them, but do not have the money or access to the money necessary to pay for the necessary upgrades.

The underlying goal of an energy conservation initiative is to promote energy efficient technology and change patterns of consumer behavior. The objective of this report is to explore a financial mechanism, a revolving loan fund, that can provide access to the vital funding necessary for effective adoption of energy efficient technology by the residents and businesses of Devens, Massachusetts. We begin with the background of Devens, and relating the history, from former Army base to the current state of self-determination, as well as the conservation measures put in place during the formative stages of transition. In Chapter 2, the report discusses the purpose of a revolving loan scheme in Devens, Massachusetts. This chapter describes what a revolving loan fund is and how the fund revolves, as well as explains how a revolving loan fund could finance sustainability projects.

Chapter 3 describes recommended upgrades and suggested improvements based on criteria such as average cost and energy savings. The process from loan application to fund disbursement, including details on billing mechanisms, is outlined in Chapter 4. Chapter 5 examines questions about the optimal parameters for a revolving loan fund, in Devens, with inferences from the literature and applicable regulations. This chapter also includes several scenarios that look at the different ways a loan can be designed in order to help Devens determine the best way to assemble their own loan program. Chapter 6 describes the function of social marketing in establishing a successful revolving loan fund. This chapter explains how marketing principles are applied to sell the idea of a revolving loan to potential borrowers.

The final chapters, 7 and 8 respectively, discuss implications and incentives, and recommendations. Based on a review of current best practices, these chapters synthesize the lessons learned throughout the research process. These suggestions should direct the loan administrator away from known as well as perceived challenges associated with implementing a revolving loan program.

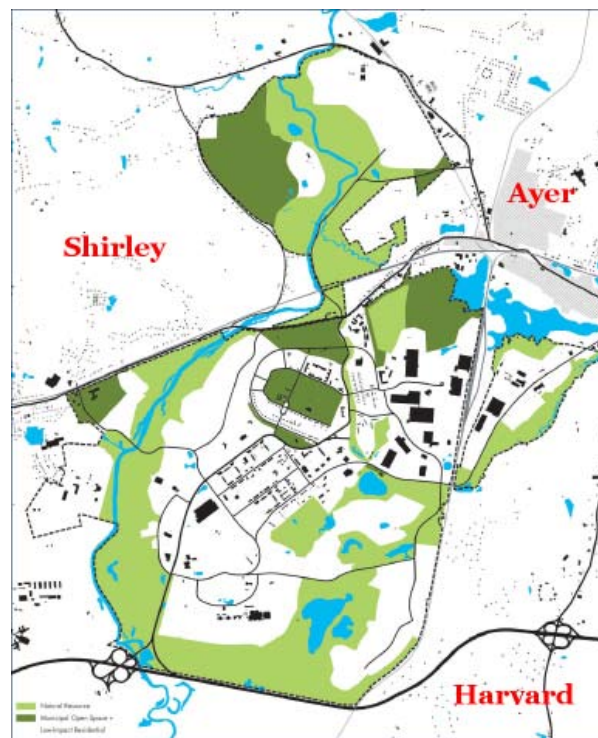
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# Chapter 1: Background

## The Devens Story: Fort Devens

Devens, Massachusetts is a census-designated place encompassing a total area of 6.8 square miles, or roughly 4400 acres. Situated in Central Massachusetts, Devens is approximately 35 miles west of downtown Boston and is comprised of parts of the towns of Ayer, Harvard and Shirley.

A census designated place is used to compile data for population centers that are identifiable by name but are not legally incorporated under the laws of the state in which they are located. These communities lack a separate municipal government, but otherwise resemble incorporated places (“Cartographic Boundary Files”, 2001).



Adapted from the DEC Reuse Plan

The area known as Devens today was originally named Camp Devens, established in 1917 as temporary quarters for training soldiers during World War I. By 1918 the camp, named after General Charles Devens of Massachusetts, was home to nearly 60,000 troops. The camp became a permanent installation in 1932, and dubbed Fort Devens. Decommissioned and closed in 1996, 79 years after its inception,

under the national Base Realignment and Closing Act (BRAC).

An unfortunate consequence of the

The National Priorities List (“NPL”) is the list of hazardous waste sites in the United States eligible for long-term remedial action financed under the federal Superfund program. EPA regulations outline a formal process for assessing hazardous waste sites and placing them on the NPL. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation. (Wikipedia, 2007)

decommissioning was the resulting loss of approximately 7000 jobs, almost half of which belonged to neighboring civilians (devenscommunity.com, 2006). Additionally, Fort Devens was listed on the National Priorities List (NPL) in November 1989, designating it a Superfund site. According to the Environmental Protection Agency (“EPA”) Waste Site Cleanup & Reuse in New England web site, “the closure of Fort Devens accelerated the investigations and cleanup to protect human health and the environment in a timely fashion and facilitate economic redevelopment” (EPA, 2007).



Former Devens Military Housing

## Chapter 498

When a military base is decommissioned, the remaining land must be dispersed. The process for land dispersal is described by the Devens Information Alliance, detailed below ([www.devensinfoalliance.org](http://www.devensinfoalliance.org)):

1. First choice of the land goes to other branches of the military;
2. Second choice goes to other federal agencies;
3. Third choice goes to the state;
4. Then to host or neighboring municipalities;
5. And finally, if any land remains it will be offered on the open market.

Representatives from the towns of Ayer, Harvard and Shirley met to discuss just how the land would be dispersed. But, before the towns were able to come to a consensus, Governor William Weld issued an Executive Order declaring the Massachusetts Government Land Bank (since renamed MassDevelopment) proprietors of all the land the military had opted not to take.

The residents of Harvard, Shirley and Ayer were not satisfied with the Governor's decision, particularly in light of the fact that the state had already compiled a list of potential uses for the land: airport, nuclear waste site, solid waste disposal, recycling center for hazardous materials, and other dubious uses without public input. Rather than allow MassDevelopment to develop sensitive land, the communities came together and with the help of local experts, formulated a framework for a compromise with the state. "That compromise is Chapter 498 of the General Laws of Massachusetts, and it spells out how the state must develop the land. It is the current law, and no committee or entity, including MassDevelopment, may change it without coming to the towns for approval" ([devensinfoalliance.org](http://devensinfoalliance.org), n.d.). The Devens Enterprise Commission (DEC) is a by-product of Chapter 498, and the DEC acts as the expedited permitting authority in Devens.

MassDevelopment is a semi-private development authority that is redeveloping Devens by creating a sustainable and diverse residential and business community. Their key goals are stimulating economic activity and creating new jobs. MassDevelopment currently provides municipal services, education, environmental protection and the infrastructure improvements to convert the former military installation into a planned community (Devens Community: History of Devens, n.d.).

## The Path to Sustainable Reuse

The 4,400-acre site was subsequently sold to MassDevelopment for approximately \$17 million. At the same time, a series of open charrettes and town meetings, facilitated by the Boston Society of Architects and the Boards of Selectmen from the communities of Ayer, Shirley, Harvard and Lancaster, or the Joint Boards of Selectmen (JBOS), were held to help refine the strategy for sustainable reuse of

the Fort Devens' land. Thus, the reuse plan of 1994 was born, which has been used to guide the redevelopment efforts in Devens for more than a decade. The guiding principles, last updated in 2006, aim to:

1. Continue job creation;
2. Support the continued growth of a sustainable business community;
3. Promote workforce training that corresponds with regional business needs;
4. Create a framework of neighborhoods and a town center that provides a mix of uses;
5. Protect open spaces to support community use and ecological systems;
6. Create neighborhoods and districts that respond to their cultural and natural context.

Today, Devens has 106 homes with approximately 350 residents and as of 2006, over 80 companies that employ more than 4,200 people, and growing. This includes 10 large corporations that employ at least 100 people,

including several large manufacturing and distribution companies like Kraft/VeryFine, Budweiser, and Dunkin Donuts, engineering firms like Parker Hannifin and PolyCarbon Industries, Inc., as well as cutting-edge firms like Bristol-Myers Squibb and Evergreen Solar.

In order to facilitate the continued growth of a sustainable business community, several initiatives have recently been undertaken to promote energy conservation and waste management. A formal low-cost commercial recycling program has been instituted, and EcoStar, a voluntary stewardship program, was started as a resource for companies as they begin to integrate ecologically efficient strategies. “EcoStar hosts educational forums

and technical assistance to enable organizations to adopt conservation and pollution prevention practices” (DEC Reuse, 2006, p. 34).

The next step is EcoStar’s Power Down Devens! (PDD) initiative, which will encourage the small-to-medium sized businesses to reduce their energy use by at least ten percent. Our team has been researching various options to help fund the necessary energy efficiency improvements, and have devised a few options. Our client has expressed particular interest in a Revolving Loan Program (RLF), and so we have paid particular attention on this financial tool. In the following chapters we will discuss the various benefits and drawbacks to RLFs and other financial programs and make a case for our recommendations.



In addition to the attractive location of Devens for our expansion, we found the overall environment of the park desirable. The combined elements of campus-like surroundings and conservation land provided the right setting for us to build our first-rate facility.” – Jack Lyons, Operations Manager, Parker Hannifin Source: MassDevelopment’s Devens web site.



# Chapter 2: Purpose of an RLF in Devens

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## EcoStar, Devens and Sustainability

The 2006 Devens Reuse Plan states that, “As Devens becomes its own town, it will continue to explore opportunities to regionalize services with Ayer, Harvard, Shirley and other communities to increase efficiency and economy, especially with regards to utilities and town services. These efforts can build on the collaborative programs developed with the business community, such as the EcoStar environmental branding and recognition program” (Devens Enterprise Commission, 2006). The EcoStar program was launched in 2005 to help businesses gain eco-efficiencies and improve environmental and economic performances. EcoStar Devens was built on the redevelopment successes at Devens. It evolved from the Devens Industrial Ecology Project, “a project that connects and improves relationships among companies in Devens, improves economic development for the region, and helps preserves existing

natural resources for generations to come” (EcoStar Devens, 2008 ).

EcoStar launched their yearlong Power Down Devens! campaign in January 2008, the goal of which is to reduce energy consumption of the community by at least ten percent. In order to meet this goal, EcoStar is hosting a series of workshops aimed at educating and empowering businesses to reduce energy consumption. The DEC maintains a Workshops and Roundtables web site that archives information from these prior workshops, which are led by a field of experts, where the idea is that participants will “gain knowledge, tools, and reference resources that they can apply in their organization to help meet its economic and environmental performance goals.”

The Devens Utilities Division provides electricity, natural gas, water and sewer services to the residents, businesses and other institutions in Devens. The Utilities Division continues to

## EcoStar at a Glance

- Recognizes businesses for outstanding environmental performance;
- Program is pro-business and pro-environment;
- Program is a conduit for education, information exchange and technical assistance;
- Voluntary – non-regulatory and non-prescriptive;
- Program tailored to each business, allowing members to identify and set relevant goals for sustainability;
- Businesses meet 15 of 25 environmental standards to reach EcoStar Achiever status;
- EcoStar Action Guide – manual detailing the program and how members can achieve each of the 25 environmental standards;
- Members assist in actualizing the vision of sustainable development for Devens.

### Goals of the Program:

- Advance sustainable development through long term partnerships;
- Strive for continuous improvement and innovation;
- Improve efficiency and cost savings;
- Achieve environmental stewardship;
- Strengthen accountability;
- Serve the local community;
- Assist one another;
- Become a model.

Source: EcoStar Devens Program Overview

pursue programs aimed at increasing energy supply, reliability and efficiency all while maintaining competitive energy costs. In light of deregulation, utilities at Devens have a unique structure; the Massachusetts Restructuring Act of 1997 does not apply to municipal utilities or Devens Utilities. Rather, Devens relies upon competitive bids from energy suppliers and maintenance contractors and because residents and businesses purchase utilities from the Utilities Division, customers cannot participate in the energy efficiency programs and rebates that are typically offered in Massachusetts

by the major private utility companies like NSTAR and National Grid. Therefore, a simple financial mechanism that can make capital funds available to businesses and residents looking to retrofit their buildings to meet energy efficiency goals seems like a natural fit for Devens.

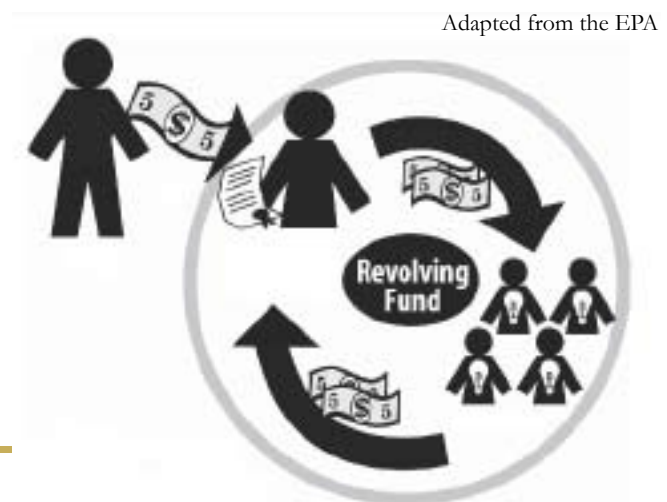
Normally, residents and businesses in Massachusetts would be able to take advantage of programs and grants available through the Massachusetts Technology Collaborative and other state programs that are funded by the surcharges paid in investor-owned utility bills. The Massachusetts Technology Collaborative's Renewable Energy Trust has the following goal:

The Trust provides financial assistance to individuals and businesses for solar panels and wind turbines at their homes and facilities, works with communities to incorporate green design into schools, helps emerging clean energy businesses flourish in the Commonwealth, and much more. The Trust works through a variety of programs geared towards these different groups to provide many avenues for the Commonwealth to become greener.

Due to the fact that Devens does not pay the surcharges that fund the MTC and state efficiency programs, they are at a disadvantage for funding their green community mission. Currently, there is a bill on the horizon that could give municipal utilities the option to pay these surcharges. This would allow the businesses and residents in Devens to opt-in to paying the additional surcharges while remaining customers of the Wellesley Municipal Light Plant, and be eligible to take advantage of the energy efficiency programs and grants offered by the MTC and other state grants and programs. This has been proposed as part of the Massachusetts Senate Bill, No. 2457: An Act to Generate Renewable Energy and Efficiency Now.

## What is a Revolving Loan Fund?

An RLF is a simple, private loaning mechanism used to fund capital improvements that recycles money as loans are repaid (Mikesell and Wallace, 1996 ). Most often employed in an institutional context as an alternative



to bonds, RLFs may also be offered by a third party as a means of serving private parties or small businesses. In the latter case, RLFs are established to advance the goals of the lending party's program through the provision of financing for small to medium, local, expanding, or start-up businesses within the community which may not otherwise be met by the existing financial service providers or products.

This particular cohort, loosely defined as those who require a modest amount of up-front capital, are often considered a high-risk group, because they tend to lack the collateral or moneymaking capacity to convince banks and other lending institutions that they are able to repay loans. The cost of processing small loans and the risks involved in lending make financial institutions hesitant to develop services aimed at these businesses or projects, thus creating a barrier to accessible credit.

Although loan pools serve a different purpose than revolving loans, to stimulate economic development, an understanding of loan pools is instructive since they have been utilized for decades. "Beginning in the early 1950s, banks permitted to invest in corporations that issued stock were active in establishing business development corporations [BDC]" (Davis, 2005, p. 3). A BDC is a corporation legally

"Revolving Loan Funds have become an increasingly popular business financing tool to help reverse decline in available funding because of their ability to leverage public and private dollars and recycle funds as well as their flexible design and simple operation" (Davis, 1995, p. 3).

organized to encourage economic development. "While individuals and businesses usually purchased stock, banks made unsecured loans to these state-chartered private BDCs, which in turn made loans to individual firms. Today more than half the states have BDCs that provide loans to firms seeking capital for plant acquisition and expansion, working capital, inventory, leveraged buyouts, machinery and equipment purchases and

related investments” (Davis, 2005, p. 3). From an operational standpoint, the organizational structure of a BDC may help inform potential RLF managers by providing proven models for developing, implementing and operating a successful RLF program.

As previously mentioned, a revolving loan fund is a simple and flexible financial mechanism that can be adapted to suit any number of capital investment needs. For example, microfinance, an adaptation of a traditional revolving loan, services entrepreneurial ventures in developing countries. Another adaptation of an RLF services Brownfield revitalization efforts across the country. Regardless of the RLF’s particular mission, they all operate based upon the same basic premise. The Association for the Advancement of Sustainability in Higher Education published a guide for students entitled, *Creating a Campus Sustainability Revolving Loan Fund* (2007). According to them, the basic premise is:

An initial sum of money is set aside for the fund. The fund then finances sustainability projects that have quantifiable monetary savings or return - such projects abound in the realms of renewable energy, energy efficiency, and energy conservation. A portion of the returns from these projects is reinvested into the fund until the project has been paid off. The money is then reused for more projects. Some loan funds are designed to grow over time, so they can provide ever-greater benefits. These funds require that projects return slightly more money to the fund than the inflation-adjusted project cost. This does not deter projects because even with this requirement, loan fund money is easier to get and less expensive than borrowing from traditional sources, such as banks (p.5).

Some of the key benefits of an RLF program according to Davis (2007) are:

- Reduce the overall negative environmental impact.
- Improve quality of life for residents and businesses.
- Save residents and business owners money by lowering their energy costs.
- Provide an opportunity to those who lack knowledge about available resources.
- Provide technical assistance to businesses and residents in order to improve infrastructure.

Regardless of the benefits an RLF affords the PDD initiative, there are still impediments that will likely be encountered. Though the eco-friendly, sustainable mission of Devens has always been

expressed clearly and pursued in practice, financial constraints have burdened the process. Based on the original goals of the Reuse Plan of 1994, the existing buildings on the Devens site were to be updated to be more energy efficient, however the funds were not available at that time, and while the sustainable industry park moved ahead in earnest, the existing buildings were left



Recycling Facility at Devens

untouched. The DEC should be commended for the foresight and extensive scope of conservation included in the land use plan adopted during the decommissioning process. Unfortunately, for perfectly respectable reasons i.e.; lack of funds, less attention was paid to infrastructure modernization, increasing the burden on any new energy efficiency program such as the RLF.

Currently, MassDevelopment has pledged \$25,000 to capitalize the seed fund for an RLF in Devens (D. Neely, personal communication, January 16, 2008). This is a small sum given the number of businesses and residences that could be involved in these efficiency upgrades, even though the larger industrial presences are being excluded. This could limit the size and number of loans that can be dispersed at a given time.

Another anticipated issue is the historic preservation restrictions that apply to the residential areas in Devens. On June 10, 1993, 118 building sites in Devens were listed on the National Register of Historic Places, and the 308-acre Fort Devens Historic District was born (RE Dinneen, 2000). The formation of the Devens Housing Redevelopment Historic Preservation Plan, six and a half years hence (Devens, 2000), created a cohesive mechanism for managing the architectural resources of three neighborhoods:

Auman Street – Approximately 25 Bungalow, single-family housing units constructed between 1931-1934.

Bates Street – Tudor Revival, multi-family housing built in 1940. Four two-and-a-half story buildings containing five units each.

Elm & Walnut Street – Georgian Revival and Tudor Revival, single-family and multi-family houses originally constructed as officer's homes, dating to the 1930s.

The design standards and guidelines that were implemented are meant to serve two main purposes:

- Coordinate planning and rehabilitation throughout all the historic neighborhoods
- Set guidelines to help MassDevelopment determine which architectural changes are appropriate within the regulated districts.

In order to gain approval for a renovation project a homeowner or lessee must proceed through an intricate process of reviews by various parties, although ultimately MassDevelopment and the DEC reserve the right to decide what renovations can take place. In fact, they have already laid out specific guidelines that explain which renovations are allowed and which are forbidden. It should be noted that due to S106 of Massachusetts General Laws, governing renovations in or near designated historic districts, the Massachusetts Historical Commission (MHC) can review or comment on the renovation plans due to the Massachusetts Section 106 process.

The Historic District Residential Design Standards and Guidelines for Devens, Massachusetts encompass 47 pages, and many of the rules could potentially interfere with efforts to retrofit the homes with energy saving infrastructure, such as external insulation or solar collection units. However, there is a degree of flexibility within the rules that appear allow for case-by-case approval. Only the exterior of the homes is governed by these rules, so improvements such as internal insulation and efficient water heaters are permissible. In the Developer Informational Guide it is stated that: "All proposed changes or alterations to elements of a proposed exterior modification will be reviewed unless specifically exempted; preference will be given to alterations that maintain, preserve, or restore according to the standards and guidelines for elements identified" (RE Dinneen, 2000, p. 1).

Of particular concern for green renovations is the requirement that existing window designs and positions must be retained along with the façade. The window openings and designs vary among the homes in the three historic residential areas, and according to Peter Lowitt, the land-use administrator for the DEC, the windows must be sized to fit the openings exactly. He noted that Devens has two different providers who have been approved by the MHC, Anderson Renewal and Champion Windows. In order to be approved, the building inspector requires shop drawings that he inspects to make sure the replacement window meets the well opening requirements. Lowitt also added that they seek to avoid one-size-fits-all windows that which require unsightly shimming around the window to ensure a secure fit. In addition to these guidelines, even a uniform style and color of roofing shingles for the neighborhoods is prescribed (Lowitt, personal communication, April 3, 2008).

While the DEC currently reviews the regulations on a regular basis, the historic district poses some insurmountable issues. He stated with relative certainty that the exteriors of existing homes will not be changed, since doing so would not allow them to meet the requirements for remaining a National Register District. He agreed that the best option would have been to renovate the building interiors during the initial redevelopment, but as previously mentioned, the lack of money at the time prevented them from doing so.

Despite the fact that the MHC prevents the DEC from making some of the more sizable improvements to the exteriors of the residences, like solar electric or solar thermal, regular review of the regulations should help to initiate an update of out-of-date regulations. For example, there is a current regulation which states that free-standing exterior lighting apparatus and exterior lighting fixtures affixed to a building must have incandescent bulbs. Given the inefficiency of these lamps and the current national trend in phasing them out, this regulation should be updated.



# Chapter 3: Improvement Recommendations

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It is important to choose words wisely when publicizing an energy conservation program and discussing energy savings with the public in order to establish appropriate expectations of results. For instance, efficiency advocates often focus on the benefits of reduced cost to encourage adoption. This strategy is imperfect for several reasons. Firstly, it overlooks an important benefit of many energy efficiency upgrades: increased comfort. Whether through more effective and better controlled heating and lighting, or reduced drafts, noise, glare, etc. modern equipment often offers many advantages over existing installations. A second fault with the emphasis on monetary savings is the mismatch between energy and dollar savings. The lowest hanging fruit in many buildings are generally related to climate control however, due to differences in utility prices and use patterns, the surest way to reduce utility bills in an outdated facility are lighting upgrades. This discrepancy between dollars and kilowatt-hours or therms is especially important to the PDD program, whose goal is to reduce energy use.

Another problem related to the overemphasis of fiscal factors in promoting conservation is the impact of this focus on project selection. Although it is common to discuss the benefits of improvements in terms of “payback period,” or the amount of time it will take for the savings to pay for the initial project investment, this is a mistake that can blind one to many worthy projects.

$$\text{Payback period} = \text{Cost of project} / \text{Savings per year}$$



Alan Whitson and many others in the field of green building point out that the use of payback periods causes individuals to overemphasize the importance of quick turnaround ((Friend, 2006; Whitson, n.d.). In economics this phenomenon is known as a high implicit discount, and it rears its head when a homeowner opts for an inefficient refrigerator that is \$200 cheaper than a more efficient model that uses 10% less energy. Even with the prominently displayed EnergyGuide sticker on new appliances, most consumers will either skip the math altogether, or determine that the 4 years<sup>1</sup> is too long and that they can put the money to better use now. Instead of simple payback period, efficiency advocates recommend/ the use of one of the many standard alternative metrics used in accounting: return on investment (ROI). Although the term ROI may sound complicated, and the province of high-finance, it is in fact simply the reciprocal of the simple payback period.

$$\text{ROI} = \text{Savings per year} / \text{Cost of project}$$

Indeed, businesses are capable of making the misstep as our homeowner. Businesses often impose artificial minimally acceptable payback periods as low as 18 months on capital improvement projects such as energy efficiency upgrades. At first glance this may seem perfectly reasonable however, if this constraint is expressed in terms of return on investment, the minimum acceptable ROI is set at an extraordinarily high 66%! A company with an 18 month policy would not pursue an upgrade with a 2 year payback, despite the fact that the corresponding 50% ROI would almost certainly exceed any returns they might be receiving in their core business units. Wouldn't you invest in a business with a 66, 50 or even 20% return on investment? Ignoring inflation, it makes economic sense to invest in any project with an ROI that meets or exceeds the prevailing interest rate. In economic analyses it is common to assume an interest rate of 10%, yielding a seemingly drawn-out 10 year payback period.



From the Fort Devens Museum

Table 1: Equivalency

6 mo.	12 mo.	18 mo.	24 mo.	48 mo.	120 mo.
ROI	200%	100%	66%	50%	10%

ROI is one divided by the payback measured in years.

The disagreement over payback versus ROI can be considered a struggle of whether the emphasis should be placed on cost or value, and (Corps, 2005; Seattle City Light, n.d.; Whitson, 2005). A similar tension can be discerned in the kind of improvements evaluated. There a wide range of technologies and practices one may adopt to decrease energy consumption. Some of them, such as solar panels, are snazzy while others, such as commissioning<sup>2</sup>, aren't nearly as glamorous. It is important to keep an old adage in mind when considering possible improvements: don't judge a book by its cover. Often it is the more obscure and banal upgrades that have the most significant impact. For instance, the importance of commissioning cannot be overstated, as the anecdote at right relates.

Although many green products offer claims of payback in 6 months or savings of \$50 over the device lifetime, return on investment calculations are highly sensitive to context. Among other things, the cost of energy and use patterns both greatly affect real ROI. For instance, discussions of the ROI for the much vaunted compact fluorescent lamp (CFL) vary greatly, often ranging from 6 months to 2 years.

In reality, the best one can say is that a typical bulb costing between \$2 and \$3.33<sup>3</sup> uses 8% less energy than the bulb it replaces, and requiring 1,440–2,400 hours of home-owner operation to reach payback (1000bulbs.com, n.d.; Devens Utilities, 2007). With 6 hours of use per day this equates to 150% ROI for the cheaper bulbs, and a respectable 66% for their costlier cousins. On the other hand, if the CFL is installed in a hall closet instead of a living room, the ROI clearly plummets dramatically; particularly since CFL life is shortened by repeated brief illuminations.

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## Burlington's Market

The progressive food retailer Onion River Co-op, owner/operator of City Market, did not commission their new downtown storefront in 2002 as originally intended. As a consequence, it is estimated the cooperative wasted at least 60 MWhr each year, or a total of \$32,000 since opening, on poorly set thermostats and drive motors (Onion River Co-op [ORC], 2008). An exceedingly narrow thermostat setting (dead-band) is quite common (Anderson, 2008), and was responsible for 84% of the quantifiable waste at City Market (ORC, 2008).

A year-long commissioning contract with CX Associates has cost Onion River between \$15,000 and \$20,000; some minor system updates included (Lyon, 2008). The original, value-engineered commissioning therefore had an ROI of at least 27%! Although more difficult to quantify, the recent commissioning uncovered other sources of waste including a reversed air damper, and the probable futility of a post-occupancy HVAC upgrade to include pressure controls that may have increased system loads and operating costs (ORC, 2008). Had City Market been commissioned from the outset, it is probable the co-op would have avoided such common pitfalls as the backwards installation of equipment (Anderson, 2008), saved even more money on energy, and received a higher return on investment.

These numbers were arrived at with the relatively simple calculation below:

$$\text{Hours of operation until payback} = \text{Device cost} / (\text{price of energy} \cdot \% \text{ energy savings}) \cdot 1000 / \text{energy rating of device}$$

OR

$$\text{Hours} = \$2 / (13.63\text{¢/kWhr} \cdot 78\%) \cdot 1,000 \text{ W/kW} / 13 \text{ Watts}$$

Many other lighting upgrades (Super T8s, skylights) have similarly impressive ROIs and should provide attractive enough dividends to be tackled without any external financial incentives, thusly freeing up Power Down Devens! resources for other efforts. However, it may be helpful to clearly make this case to members of the Devens community. On the other hand, many are averse to adopting solar upgrades because large, unattractive and expensive photovoltaics come to mind. Although PV are a special case where use patterns do not significantly affect payback, since unused power may be sold back to the grid, they continue to offer a rather low ROI. Also, as previously discussed, various zoning considerations in Devens also limit the applicability of PV or even solar hot water.

Luckily, there are a number of other solar efficiency measures that can be employed in Devens. While it is prohibitively expensive to change the orientation of existing buildings to take advantage of our forefathers' knowledge, plenty of windows on the south wall, minimal openings on the north, it is possible to achieve similar effects with landscape screening. Planting large trees and shrubs on the north and windward sides of a building will help insulate it. If a major landscaping project is out of the question, it is important to recognize that other options remain. The choice of paint and especially roof color can have a significant impact since darker colors absorb more sunlight and increase the load on HVAC equipment (Environmental Protection Agency, 2007); one might then expect that a dark roof would be beneficial for the winter months however, the gain is negligible due to the weaker sun and frequent snow covering. There are also attractive window-like panels which serve as solar-powered space heaters with an estimated ROI of 17%.<sup>4</sup>

- 1 \$200 cost divided by \$50 per year average energy savings.
- 2 Commissioning, or measurement and verification, can be thought of as post-upgrade auditing to insure that systems are operating as intended.
- 3 The more expensive bulbs are low-mercury, lead-free options that also yield more light.
- 4 Based on a total cost of \$2000: \$1029 per panel; \$309 mounting kit; \$250 for an optional solar cell, although comparable units are available for as little \$60; and an estimate of \$150 for installation, which can also be done by the homeowner (Environmental Solar Systems [ESS], n.d.a; ESS, n.d.b; ESS, personal communication, April 28, 2008; Affordable Solar Group, n.d.), As compared to the gas usage of 205 therms—based on the author's older, approximately 700 square foot apartment with an EnergyStar thermostat set to 60° from November 2007 through March 2008—at \$1.7184 per therm (Devens Utilities, 2007).



To promote sustainable development by integrating economic, social, and environmental needs while maintaining and enhancing the natural resource base in the Devens area.

- EcoStar Mission Statement

# Chapter 4: Application Process and Billing

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## On the Ground

The following section will walk the reader through a step-by-step description of the revolving loan process. The eight step process includes verification of eligibility and approval of the funds, later utilization of the funds, returns, and gradual pay-off of the loan. The accumulation of savings for energy efficiency needs is discussed, as well as the eventual monitoring of energy use reduction.

### 1. Verification of Eligibility

The applicant must certify that they are unable to finance the proposal through other sources at reasonable rates and terms. The applicant can either be a start-up business or existing business located in Devens. The fund is intended for small - to- large scale projects, where the fund is approximately one third of the overall financing plan.

### 2. Approval of New Loan

The applicant must demonstrate the ability to repay the loan and provide adequate collateral for securing the loan. This may include a building mortgage, security interest on machinery and equipment, or other guarantees.

### 3. Funds are Dispersed

Priority will be given to proposals that are in accordance with EcoStar's strategic plan for redevelopment, energy efficiency, and conservation. Loans are non-assumable. The loan will be considered in default if the borrower relocates its Devens operations outside the city limits of Devens. However, the Devens Utility Department may choose to negotiate with the borrower as deemed appropriate.

### 4. Funds are Used for Energy Efficient Equipment

Revolving loan proceeds can be used towards the purchase of fixed assets such as energy efficient machinery and equipment or other

energy conservation needs. Funds can also be used for the renovation or rehabilitation of fixed assets.

#### 5. Returns Invested in the Fund

Revenues from energy efficiency savings are returned to the fund, providing additional revenue to reinvest in energy efficient equipment. Essentially, this is the first step to understanding how the fund revolves.

#### 6. Loan is Paid Off

New loans are made as existing ones are paid.

#### 7. Savings are used for Other Efficiency Needs

An applicant for the revolving loan fund must be a for-profit or non-profit corporation, partnership, or sole proprietorship that has established a financing need that cannot be met through conventional and alternative funding sources. If a residence or business has applied and finished paying off a loan, it has the option to reapply for another loan in order to achieve additional energy reductions.

#### 8. Monitoring of Decreased Energy Use

The Devens Utility Department's agent for management of the Revolving Loan Fund Accounts (EcoStar) will refer delinquent accounts for action when they have tried all routine methods for solving the delinquency. EcoStar will then provide a recommendation to the Devens Utility Department concerning the account.

### Billing

With regard to billing, Jim Moore of the Devens Utilities Division expressed a strong desire to keep things as simple as possible (J. Moore, personal communication, February, 6, 2008). However, without fully understanding the capacity of the newly integrated billing system used by the Devens Utility Department, the most effective (for RLF maintenance) and convenient (for customers) billing may be somewhat complicated to administer. It is logical to assume that customers would prefer the simplicity of having their loan payments rolled into their utility bill, and there is some



evidence to support that line of reasoning (American Council for an Energy-Efficient Economy, 2008, p. 20-6). However gas and electric utilities are usually billed separately (Devens Utilities, 2005), meaning that it may be preferable to manage separate loans for gas- or electric-related improvements in order to track cases. Alternatively, while unorthodox, a single loan and combined bill would simplify matters greatly.

A potential advantage of RLF-utilities integration is the access it would provide to historic utility bills, thereby allowing for the calculation of some rough, post-improvement energy savings calculations for report on the utility bill e.g; “therms less consumption than this period last year,” and “estimated utility bill without improvements.” This report would provide the end-user with valuable feedback on their endeavor, and could also serve as a proxy mechanism for verifying that loan disbursements have been appropriately and effectively employed. If no savings are achieved then something is wrong, and the situation warrants further attention. Furthermore, the

Devens Utility Department has a larger staff than EcoStar Devens, and existing accounting/ billing personnel, so they are better positioned to handle this aspect of the loan program.

Of course, the RLF billing mechanism needs to be integrated with the Utility Department’s billing software in order for it to agree to take on this additional activity. Unfortunately, this raises a dependency on the new accounts system currently in testing, and could delay the roll-out of the loan program (Moore, 2008).

## Cambridge Energy Alliance

We would be remiss in not discussing the Cambridge Energy Alliance (CEA), which has received so much attention in recent months, in large part due to the size and scope of this momentous undertaking. While it is unlikely that Devens would be able to replicate the CEA program in the near future, it offers an interesting model for contrast that many already covet. Below is a brief description of how this unique partnership of city government, foundations, utilities and private contractors project. While it is unlikely that Devens would be able to replicate the CEA program in the near future, it offers an interesting model that many already covet. Below is a brief description of how this unique partnership of city government, foundations, utilities and private contractors will work.

A homeowner or businessman becomes interested in learning more about the program, and contacts CEA who will then arrange a free field visit by staff from one of several local ESCOs that were awarded contracts with CEA. In the mean time, with your permission, CEA will examine your recent utility bills to obtain some preliminary information about how your building operates. During the visit, the contractor will conduct a summary energy and water audit of the facility. A report outlining a wide variety of potential upgrades will be furnished to the owner who may then elect to follow-up with the CEA. The CEA will generally recommend/ a package of upgrades with a cumulative ROI of 10%. If the owner decides to move forward by signing a memorandum of understanding a more extensive audit is undertaken, and a discussion of which improvements to pursue takes place including the options of "less economical" upgrades e.g.; photovoltaics; at the owner's discretion. Auditors are kept informed of any pertinent grants and rebates, and will share this information with homeowners to assist them with the costs of the improvements. In addition, CEA has made arrangements with several local banks for loans with favorable terms and conditions, such as a low interest rate, to be available to program participants. The initial recommendations from the CEA are chosen such that the energy savings they generate will be sufficient to make the loan payments. After financing is secure, installation begins and savings ensue. The CEA will also conduct varying levels of project verification to ensure job quality and end-user satisfaction, depending on the type of project, a more extensive audit is undertaken, and a discussion of which improvements to pursue takes place including the options of "less economical" upgrades e.g.; photovoltaics; at the owners discretion. Auditors are kept informed of any pertinent grants and rebates, and will share this information with homeowners to assist them with the costs of the improvements. In addition, CEA has made arrangements with several local banks for loans with favorable terms and conditions, such as a low interest rate, to be available to program participants. The initial recommendations from the CEA are chosen such that the energy savings they generate will be sufficient to make the loan payments. After financing is secure, installation begins and savings ensue. The CEA will conduct varying levels of project verification to ensure job quality and user satisfaction (CEA, 2008).

## Chapter 5: RLF Parameters and Scenarios

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Because many of the questions our client has regarding the design of a revolving loan fund are subjective or arbitrary, a sensitivity analysis of sorts will be conducted on several of these values to determine their effect on the throughput of the loan. The results will be presented in an array of scenarios, with details in an appendix. The variables we intend to examine are:

The mix of businesses and residents applying for loans, if different loan conditions are offered to each.

Maximum percentage of a projects costs covered by a loan

Maximum dollar value of a loan

Loan interest rate

Amortization schedule including a grace period and payment amount calculation method.

The initial fund size

We will refer to the literature where possible for well-substantiated or commonly used values of these variables, and in the remainder of cases shall make an educated guess e.g; state regulations allows contracts of up to \$5,000 to be awarded without competitive bidding. Given the probable size of our RLF, and the complicated involvement of (quasi-)state agencies, this is a convenient and reasonable upper limit for maximum loan amount. the Many of these factors have been previously discussed, and explanations of the remainder shall follow.

For simplicity it is assumed that if a significant balance is retained in the RLF account, or that some nominal interest rate is assessed on loans, that the real value of the fund will not depreciate with inflation.

## Scenarios

In this chapter we take a closer look at the different ways a loan can be designed in order to help Devens determine the best way to assemble their own loan program. In Appendix B you will find in-depth calculations of sample loan amounts with variations in the following parameters, and their effect on loan payments and the recharge rate of the RLF balance:

- Maximum loan amount;
- Annual percent interest;
- Grace period;
- Payback period.

The size of a loan is determined by the combination of two limits: maximum percentage of the project cost, and a maximum dollar amount. One takes the percentage of the project cost, and the loan is made for this amount unless it exceeds the maximum amount, in which case the loan is awarded for this lesser value. Two examples, in which the maximum percentage is 33% and the maximum loan is \$5,000, may help illustrate how this works. For an \$18,000 project the maximum percentage would equal \$6,000, which exceeds the maximum recommended amount, and the borrower could only receive \$5,000. One third of a \$12,000 project is less than the maximum size of a loan and the full \$4,000 would be available.

Although we considered several maximum loan amounts, we chose \$5,000 as the absolute maximum because of the limited funds available, and also due to Massachusetts General Law Chapter 30B. In Massachusetts, \$5,000 is the maximum contract that can be awarded by state agencies without a competitive bidding process. The Office of the Inspector General, Procurement Assistance and Enforcement guidelines dictate that the regulation “applies to the procurement of supplies and

services, dispositions of surplus supplies, and the acquisition and disposition of real property” (Mass, 2008). Since we advocate for the involvement of Devens Utilities in the PDD RLF process, and the initial funds are also to be received from a state authority, we believe it is best to err on the side of caution. Likewise, technically the maximum amount that is not subject to a bidding process is a penny shy of \$5,000, the math is cleaner with the round number.

We calculated the loan parameters based on annual interest rates of 0%, 2% and 4%. Ideally, Devens would like to make this RLF as user friendly as possible, and a 0% interest rate would certainly be a nice incentive. Unfortunately, the small size of the fund complicates matters. Very little money will remain in the loan account when loans are dispersed, and at a 0% interest rate, inflation will eat away at the value of the fund since no fund balance will remain to accrue interest.

We included grace periods of six months, twelve-months, and eighteen months. Grace periods make the RLF loans more attractive, and also help offset the burden of financing the remainder of the project cost oneself or by other , more expensive means. In our calculations interest accrues during the grace period, and is then capitalized.

Payback periods of five, ten, and fifteen years in order to explore the effects on monthly payment size and loan recharge periods. Overall, these calculations show that interest must be charged if it is to remain viable, maintain or increase value of the loan fund, since the fund isn't large enough to keep a sizable portion in the account at any time. The fund will be battling inflation, and a small fund like this will depreciate quickly. Increasing the interest rate helps, as does lowering the loan amounts, but both of these actions decrease the utility of the program. Additional calculations demonstrate that changing the size of the fund, much like changing the maximum size of the loan, has a predictable multiplying effect. Doubling the fund doubles the number of loans which can be made, and halves the time until the next loan can be made.

## Chapter 6: Social Marketing

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Social marketing is the application of ideas, processes, and practices whose purpose is to improve societal and environmental health and welfare. There are several key elements to social marketing applicable to the Devens community. These include perception of the existence of a problem, costs and benefits, as well as ensuring adequate accessibility and effective promotion.

The first element is perception of the problem, wherein people must first understand that they have a genuine problem. Among advocates for environmental change, and other causes, there is a perception that the public is ignorant of the problem and that if they could only be made aware of the impacts of inaction to make the problem more tangible, we would be that much closer to solving the problem. After all, energy efficiency and conservation have only apparently garnered significant interest of late due to heightened oil and gas costs, climate change and foreign policy issues. Often, to

convey the information necessary to educate the masses, factoids are tossed out such as, “The average American family produces enough trash to fill the Grand Canyon every three years.” Besides their incongruence with most readers’ experience and perceptions or priorities, this style of “marketing” (dubbed shaming) often fails to have the intended effect, and eventually results in desensitization, resentment or “paralysis.” Furthermore, it is rarely the case that the public is as ill-informed as they seem, they simply have not altered their behavior accordingly. This common phenomenon is known as the “KAP-gap,” or the deficit in practice despite knowledge of and a positive attitude about an issue.

Equally important to identifying the problem are the possible barriers to the perception that an adequate solution is possible. Hence the second element to consider in social marketing is perception of costs and benefits. If the costs of energy efficient upgrades outweigh the

benefits for the businesses and residents of Devens, the RLF will be under-utilized. The third element of social marketing - accessibility, involves deciding how to ensure accessibility of the revolving loan fund and quality of its service. Determining the activities and habits of its businesses and residents, as well as their experience and satisfaction with the existing system can lead one to the most effective means of service distribution the fourth element. This would be the role of media events and news stories regarding energy efficiency and conservation, which could play a significant role in the implementation of the revolving loan program.

A sometimes effective means of solving the KAP-gap is to ease subjects into the desired behavior by offering the necessary equipment for free. For example, if EcoStar were to give home owners a few free CFL bulbs, or low-flow shower heads to try out at home, the homeowners would hopefully see that the quality and effectiveness of these mature products is comparable to those of conventional alternatives and that the energy

savings are real. It is then possible to increase program participation among individuals whom have experienced this free sample. While not all individuals will do so, research shows that once these people have made this initial step, they are more likely to commit to a larger program such as taking out a loan for energy efficiency upgrades. Moreover, petition signatures and opportunities for vocal announcements at town meetings or workshops make program participators proud that they are partaking in the important cause of energy reduction, and thus are more likely to make consistent contributions, spread the word, and make involvement in the RLF a top priority.

Hence, social marketing comes into play in initiating involvement as well as maintaining involvement, which in the case of Devens, would mean the renewal of loans after they are paid off in order to meet further energy reduction goals. This aspect of social marketing develops the social and political satisfaction for businesses and residents involved the RLF via rewards. Businesses and residents making considerable energy reductions up to and

beyond the goal of 10 percent should be rewarded through announcements in the Devens community and other award programs.

For an example of a reward program, it is valuable to look at the case study of the National Business Initiative's South Africa Energy Efficiency Accord from the World Business Council on Sustainable Development. SASOL, the petrochemical giant, has committed to including all possible energy efficiency measures in all new build projects. These projects are focusing on recovering waste heat, upgrading equipment, and working towards flaring. In 2007, this initiative earned a national award for Greening the Future in the energy and climate category. Public announcements from Greening the Future judges included that the initiative is "great on engaging businesses to become more energy efficient [and is] playing a wonderful role in making businesses more responsible" (National Business Initiatives, 2008). This award has not only further induced businesses to achieve specific goals, but has spurred competition to pursue energy efficiency faster, more cost effectively, and with improved results.



EcoStar Headquarters, Devens Enterprise  
Commission Office



The following table summarizes additional factors that can be tapped into and could influence RLF applicant behavior:

External factors	
Cultural Beliefs and Values	Development at Devens must be sustainable - “achieving a balance of economic, social, and environmental needs, while maintaining and enhancing the natural resource base.”
Available Resources	Several services have been put in place to enable businesses to minimize their environmental footprint, including extensive on-site recycling services and EcoStar, a voluntary stewardship program.
Access	Local utility customers do not have access to the energy efficiency programs and rebates that are typically offered in Massachusetts by the major private utility companies such as NSTAR and National Grid.
Consequences of the RLF	Protection of the community’s resources and the health of its residents and resources, as well as the economic viability of the businesses themselves.

## Chapter 7: Incentives, Implications & Further Research

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Given the likely inability of a small RLF to fully satisfy the demand for aid in increasing energy efficiency, we sought out additional incentives outlined below.

### Renewable Sales & Capital Tax Exemptions

Businesses may deduct costs from the installation of any solar or wind powered units including water heating via the Excise Tax Exemption for Solar or Wind Powered Systems. Deductions may be taken from net income or state tax for installations used in trade or the business of a corporation located in Massachusetts. The excise tax exemption for solar or wind powered systems is applicable only for the industrial and commercial sectors. The exemption is in effect for the length of the system's depreciation period.

The Massachusetts Renewable Energy Equipment Sales Tax Exemption exempts the purchase of solar, wind, and heat pump systems from sales tax. This exemption is limited to

residential systems and is not for commercial users. Massachusetts Tax Form ST-12 must be presented to the vendor from which the energy efficiency equipment will be purchased. On the residential side, Massachusetts also allows a 15 percent credit against state income tax for the cost of renewable energy systems. If the credit amount is greater than a resident's income, the excess credit amount can be accepted for the succeeding year. Eligible technologies include solar water and space heating, photovoltaics, and wind energy.

### Green Mortgages

Energy Action resources are available for energy efficient multi-family housing through [energyactionresources.org](http://energyactionresources.org). A range of services are provided for property owners and managers. Financial resources include a financial resource guide and contractor referrals, while educational resources include a peer network, tenant education, property manager training. On-call technical support is also available in addition to

diagnostics. An accredited state home energy rating report (HERS) can help a home owner to qualify for additional energy-efficient financing. The report is used to demonstrate that the home is energy-efficient or that cost-effective recommended improvements will save more money than is borrowed for their installation. When a borrower applies for a mortgage, the mortgage lender can recognize these savings and take the installation costs of the energy efficiency improvements into account. If the home is already energy-efficient, the lender can stretch the debt-to-income qualifying ratio, or in other words the borrower's monthly payment obligation divided by the borrower's gross monthly income in order to reduce the debt.

### Green Insurance

The Fireman's Fund Insurance Company is a member of the United States Green Building Council (USGBC). This firm offers Green Upgrade Coverage that allows business owners to replace standard systems and materials with green ones. The insurance covers the cost to rebuild or replace the standard systems with specified green alternatives. These can include non-toxic paints and carpeting, roof and insulation materials, and energy-efficient lighting systems. Green-powered generating equipment, alternative water systems, and water efficient interior plumbing are also covered. In the event of total loss, green insurance covers the cost to rebuild an entire business as a green certified building. In doing so, the insurance includes the cost to hire a LEED-accredited professional to oversee the repairs.

### Environmental Reform Bill

A prospective benefit that Devens residents will likely want to take advantage of in the future is Governor Patrick's Environmental Reform Bill, which House Speaker Salvatore F. DiMasi sponsored last year. The ultimate goal of the bill is a ten percent statewide energy reduction by the year 2017 by providing power company rebates to consumers who install energy efficient appliances and light bulbs as well as other efficiency improvements to homes and buildings. Ratepayers can receive rebates up to

the value of the energy saved. If passed, the bill will also provide low-interest loans to homeowners for green improvements, gives hybrid vehicle owners a \$2,000 tax credit, and requires utilities to get 11% of their power from renewable sources by 2016. (BostonNow, 2008)

### Green Building Income Tax Credit

An act establishing a Green Building Income Tax Credit was filed by Mayor Menino recently in the Massachusetts General Court. Qualifiers for the tax credit include developers, owners, and tenants of commercial and multi-family residential buildings. Moreover, the Regional Greenhouse Gas Initiative, a voluntary inter-state legislation that Governor Deval Patrick signed in January 2007, will limit GHG emissions from electrical generating units in Massachusetts and other states spanning Maine to Maryland beginning in 2009.

The Massachusetts Renewable Energy Equipment Sales Tax Exemption is exempts the purchase of solar, wind, and heat pump systems from sales tax. This exemption is limited to residential systems and is not for commercial users. The Massachusetts Tax Form ST-12 must be presented to the vendor from whom the energy efficiency equipment will be purchased.

## Implications and Further Research

While this report provides a comprehensive overview of the options for Devens and the hurdles they may face while implementing the necessary financial incentive program for the Power Down Devens! campaign, there are some areas of research that were out of reach, and could not be implemented in the report. These areas could have implications in the implementation of the program or the outcome.

First, there are no comparable 3rd party revolving loan funds in existence that serves a community like Devens. Their unique status as neither town nor municipality, small \$25,000 seed fund, and lack

of access to larger state funded efficiency programs, makes it impossible to retrofit an existing RLF program design to Devens. Second, the lack of contact with the business and residential community makes it difficult or impossible to gauge these group's opinions about the most effective form of support EcoStar Devens could provide to aid the energy consumption reductions. An appropriately designed survey could yield valuable information about how individual companies or residents can be best served. Third, it is hard to determine whether an RLF can be run with a small staff and limited financial resources for professional expansion. This could be a significant factor in whether or not an RLF could succeed in Devens.

Devens is likely to experience challenges finding the workers to complete the energy audits and upgrades, as the demand for energy efficiency related services exceeds the supply of providers (CEA, 2008; Chiodo, 2008). Currently, jobs in the clean energy sector are growing at about 20% per year, and the technical nature of many of these jobs has historically made them difficult to fill (Department of Energy, 2007). While Massachusetts stands to increase their job count in the clean energy sector from 14,400 to well above that, the resulting growing pains may create problems that would be especially noticeable to a large area of potential work like Devens.

A prospective benefit that Devens residents will likely want to take advantage of in the future is Governor Patrick's Environmental Reform Bill, which House Speaker Salvatore F. DiMasi proposed last year. The ultimate goal of the bill is a ten percent statewide energy reduction by the year 2017 by providing power company rebates to consumers who install energy efficient appliances and light bulbs as well as other efficiency improvements to homes and buildings. Ratepayers can receive rebates up to the value of the energy saved. If passed, the bill will also provide low-interest loans to homeowners for green improvements, gives hybrid vehicle owners a \$2,000 tax credit, and requires utilities to get 11% of their power from renewable sources by 2016 (BostonNow, 2008).

Another potential benefit could be the statewide low-income residential incentives that are provided through Boston Community Capital in partnership with Massachusetts Housing Partnership to promote the overall effectiveness and cost-efficiency of green housing. The incentives are being offered to several developments across the state over a two year period. Sizes of projects will range from 50 to about 250 existing housing units across the state. The target savings are a 33 percent reduction of electrical usage through conservation and efficiency. Building improvements may include on-site generation, reduction in water usage, heating reduction through conservation, high efficiency boilers, and building envelope improvements.

## Chapter 8: Recommendations

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**B**ased on a synthesis of the information covered thus far, the following is a set of policy recommendations that the RLF administrator should take into consideration in designing and implementing the loan.

- Get a lawyer – There are a number of possible complications in setting up an RLF including usury laws, should interest be charged. These are likely to vary depending on which organization holds the money in trust; if the billing is performed by Devens Utilities it is probably best if they also disburse funds and EcoStar Devens serves an advisory role in loan approval and marketing.
- Particular Values related to the design and implementation of the RLF, which includes defining the grace period, recommended loan amounts, low-or-no interest, etc. More to come on this section.
- Be inclusive – The PDD campaign was originally intended to target to businesses in the Devens area, and we recommend that the scope of the program be widened to include residents as well. Many people that live in Devens also work in Devens, and an effective energy efficiency upgrade at home may inform how they approach energy efficiency at work.
- Consider other vendors – While Energy New England is a recommended vendor for both energy audits and purchase of efficiency equipment due to their existing relationship with Wellesley Municipal Light, we believe there are other companies that could be a better choice. Unlike other local ESCOs, Conservation Services Group (CSG) is well suited to deal with the scope envisaged for PDD. CSG has extensive experience with appliance recycling, quality control, marketing and other aspects of implementing energy efficiency programs for commercial and residential buildings (CSG, 2008). In addition, their own long-standing relationship with

Energy Federation Incorporated (EFI) can help accomplish another aspect of EcoStar's PDD program, bulk-purchasing of efficient accessories (Neely, personal communication, February 6, 2008) since EFI is a wholesale supplier of water and energy-conservation materials. Greendustry Park is a commercial, eco-industrial park/incubator venture based out of an old mill in Holyoke, MA. Part of the "green" in Greendustry, are the variety of design and auditing services offered to tenants. Greendustry Park has also offered its services on a consultation basis to local businesses, and has expressed interest in working with Devens (E. Fogg, personal communication, March 31, 2008). Either one of these companies could be a great partner for Devens.

- Big, Hairy, Audacious Goal (BHAG) – Pronounced 'bee-hag' is a concept that was proposed and popularized by Jim Collins and Jerry Porras, in their 1996 article, Building Your Company's Vision (BHAG Wikipedia, 2008). "A true BHAG is clear and compelling, serves as unifying focal point of effort, and acts as a clear catalyst for team spirit. It has a clear finish line, so the organization can know when it has achieved the goal; people like to shoot for finish lines." (Collins and Porras, 1996). The goal of the Power Down Devens! campaign is to reduce energy consumption by ten percent. While a goal of ten percent seems tenable, why not increase the goal to say that Devens aims to be climate neutral by 2030 or promises a 50% energy reduction by 2020? After all, as mentioned earlier, the Environmental Reform Bill would set a comparable 10% goal for all of Massachusetts. There are a number of programs and organizations available which could help Devens meet a grander goal including EPA Region 1's New England Community Energy Challenge, and ICLEI. Alternatively, perhaps residents and businesses should be provided with incentives to declare their own personal energy BHAG, with a detailed plan for achieving it. Devens can serve as a model for other towns by surpassing that goal and truly living up to their billing as a green community.



Finally, it is worth mentioning that the difficulties we discovered related to founding an RLF are significant enough that it may be worth exploring other approaches. Specifically, the \$25,000 seed fund could be used to offer energy audits to interested businesses and residents. Based on the social marketing concepts discussed earlier, this could be an appropriate initiation that entices the company or resident to take the next step and improve their efficiency by investing in the upgrades. Available funds would be used to rebate the costs of audits if the owner carries through with an adequate level of upgrades. This would avoid spending money without some return on the investment and entice the business owner or resident to invest in the upgrades in order to receive their rebate. This plan may provide the most effective and efficient use of the limited funds available since it also allows a greater deal of flexibility in the extent and types of upgrades that could be supported. Rather than attempting to fund the upgrades, which could vary widely in cost between a small residential project and a project at a large company, the money goes to an audit that informs how the individual or company should invest their own money to save energy and money over the long term.

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# Additional Resources

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Green Depot – A local green construction materials vendor

<http://greendepot.com>

Rate it Green – A green product catalog and review resource

<http://rateitgreen.com/>

EPA Community Energy Challenge

<http://www.epa.gov/region1/eco/energy/energy-challenge.html>

ICLEI

<http://www.iclei.org/>

Energy Efficiency in California Laboratory-Type Facilities

<http://eetd.lbl.gov/emills/PUBS/LabEnergy/LabEnergy.html>

Industrial Steam Efficiency: Checklist for Getting Management Approval

[http://www.ase.org/files/1088\\_file\\_checklist\\_industrial.pdf](http://www.ase.org/files/1088_file_checklist_industrial.pdf)

PA Governor's Green Government Council – Making the case for green building

<ftp://ftp.state.pa.us/pub/dep/WEB/GGGC/makingTheCase.wmv>

Winning the Oil Endgame

<http://www.oilendgame.com/>

Natural Capitalism

<http://www.natcap.org/>



Appendices

# Appendix A: Operational Guide

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## Getting Started

Some 70% of the businesses located in Devens are characterized as small- to medium-sized, employing fewer than 100 employees, in addition to 106 homes with approximately 350 residents. The primary purpose of the revolving loan program is to engage these particular businesses and residents by providing them access to a no- or low-risk loan program in an attempt to get them interested in investing in energy savings measures to ultimately meet the goal of reducing energy consumption by ten percent or more.

### Establishing the Need

A program formulated in response to the presumed need for capital funding must first be deemed necessary, particularly if the program designer is soliciting support from other key constituents. “Before considering the feasibility of establishing a RLF, it is necessary to determine if there is a clearly defined and defensible need.” (Davis 1995, 4) If in fact coming up with capital funding to make energy efficiency upgrades is the primary concern for residents and businesses at Devens, then an RLF may be the most suitable solution to the financial problems they face in meeting the EcoStar Power Down Devens! challenge (PDD).

In designing the appropriate revolving loan fund scheme, it is important to address several key variables related to the specific needs of the businesses and residents of the area. At Devens, some of these concerns include the need for:

- A streamlined application process;
- Low- or no-interest financing; and
- Repayment based on expected energy bill savings.



If the loaning mechanism is able to address those concerns, the residents and businesses would likely find it difficult to opt out, since the mechanism would provide them with access to the capital they need, along with confidence that they would be able to make monthly payments on the loan with little or no interruption from business as usual.

#### Positioning and Shaping of Expectations

The emphasis of EcoStar's PDD campaign is energy savings, which does not necessarily correspond to the potential savings of efficiency. Moreover, energy savings are tantamount to the myriad non-monetary benefits, such as a sustainability factor and comfort, achieved by the program. In designing a loaning mechanism to support the PDD initiative, it is important to balance the message of energy savings and energy conservation. After all, an eco-industrial park should strive for both, creating a symbiotic relationship balancing economic and environmental concerns.

## Formulate the Concept

#### The Business Plan

An important objective of a formal business plan is to create value and highlight opportunity for growth in an innovative and attractive manner. The purpose of a business plan is twofold; first, it should act to ignite enthusiasm about a particular venture, and secondly, it should be used to enlist financial support. In the case of Devens, there lies an opportunity to solicit public and private funding to help grow the initial seed fund, and a well-informed business plan will persuade those interested in capitalizing the fund to do so with less hesitation.

According to William A. Sahlman, Dimitri V. d'Arbeloff Professor of Business Administration at the Harvard Business School, a successful business plan systematically assesses four interdependent factors: (Sahlman, 1997, p. 99)

The People – Who will operate the RLF.

The Opportunity – A profile of the RLF, including what the overall objectives are for the program.

The Context – What are the parameters, including the regulatory environment, interest rates, demographics (who the fund benefits), etc.

Risk and Reward – An assessment of everything that can go wrong and right, and more importantly, how the RLF manager and administrative team can respond.

One might think of the business plan as an executive summary or synthesis of the revolving loan fund administrative manual, which is described in detail below. Whereas the RLF manual details some of the administrative duties, the business plan provides the blueprint for investors and others interested in participating to some degree.

## What's Next: Creating an RLF Manual

The RLF manual is the administrative guide to the program. This manual should contain the RLF policies and procedures that have been adopted to govern the use of revolving loan funds. Much like the business plan, the manual also acts as a repository for all relevant information regarding the goals and objectives of the program, details about eligible applicants and eligible activities, performance monitoring practices, loan processing information, and policies regarding the structure of the loans. Based on a review of the current RLF manuals available for public consumption, the following are recommended topics that should be incorporated in the creation of an RLF manual.

### 1. Goals and Objectives:

The revolving loan administrator should, “develop a clear set of goals and objectives, which articulate in quantifiable terms, the purpose of, and reason for the revolving loan program.” (Montana, 2005, p. 9) This particular section, which can be culled from different aspects of

the well-defined business plan, can take the form of a preface or forward. It should succinctly articulate the objectives that the revolving loan fund program intends to address. It should also include details regarding who will be administering the RLF, a list of those who have helped capitalize the seed fund, and the overall need for such a program. The concept is that this section, “should serve as a basis for an organizational strategy and operating plan for the reuse of program income.” (Montana, 2005, p. 9)

## 2. Eligible Applicants:

This section of the RLF manual should articulate the specific criteria for who is eligible for RLF funding as well as those who are not. This section is particularly important to target loans according to specific criteria, especially for loans funds capitalized with a small seed. Examples of specific criteria may include funding for those who are affected by “discrimination in lending; targeting existing businesses versus start-up businesses; addressing specific industries affected by lending patterns; addressing discrimination against women and minorities in lending.” (Montana, 2005, p. 10)

An Ohio State University Extension community development fact sheet entitled, “Establishing a Revolving Loan Fund,” articulates some key concerns that should be address in the RLF administrative manual:

### 1. Size and type of business.

Should the RLF only service the residents and of small-to-medium sized businesses, or should funds be made available to all members of the Devens community, including large companies and organizations? Because of the limited amount of money capitalizing the fund, it is our recommendation that the funds be made available only to those who are unable to fund their own energy efficiency upgrades, without regard to the type of business.

## 2. Well established or newly incorporated.

The primary concern here is that newly incorporated businesses are considered a liability. With the proper loan servicing and loan security measures intact, it is our recommendation that loans be made available to both new and matured businesses.

The aforementioned loan measures are discussed in detail below.

## 3. Ineligible Applicants

The loan review committee (discussed below) should be charged with defining the parameters of ineligibility. For example, ineligibility may be determined by the size of the organization in terms of the number of employees or assets and/or types of ownership. This section is relatively subjective and should be customized to meet the needs of the particular goals and objectives outlined above.

## 3. Eligible and Ineligible Activities:

Program funds should be made available to those who have demonstrated a clearly defined need for assistance, all in accordance with the program's objectives. The goal of the PDD initiative is to reduce energy consumption by ten percent or more, and each loan application should articulate how the particular infrastructure upgrade relates to the needs, goals and objectives of the revolving loan program.

Key Concerns:

1. Recommended projects;
2. Expected ROI.

#### 4. Eligible Type of Loans:

Determine which types of loans are to be funded.

#### 5. Financing Policies:

Establish the minimum and maximum dollar amount of loans; include their terms and rates of interest for repayment. Include policies for restructuring loans or modifying terms, along with any other financing policies required. Quantify acceptable levels of risk. Matching sources and uses of funds is key to the ability to “revolve” funds.

Again, the Ohio State University community development fact sheet outlines some issues to consider when developing this section of the RLF manual: (Ohio State)

- Loan amounts- set loan maximums in terms of either a cap in the amount of dollars or a percentage of the project. Special exceptions can be made in instances where the borrower, “can demonstrate that the increased level of assistance can be justified based on the need for the assistance and the increased public benefit to be received.” (Hermitage, 7)
- Job/cost ratio;
- Percent of project;
- Equity requirements.
- Interest rate – define the annual interest rate. Will the RLF loan be low-or-no interest? Variable or fixed? If fixed, be sure to note the date to which the interest rate is fixed. (e.g. “The interest rate will be fixed on the date of first approval or the date three (3) business closing, whichever is lower.” (Hermitage, p. 7)

## 6. Loan Review Committee:

“Establish a loan review committee whose purpose is to make recommendations to the governing body. The committee’s membership, role and responsibilities should be specified.”

(Montana, 10)

## 7. Loan Review, Selection and Approval:

Create a process for advertising the revolving loan program, including elements of social marketing discussed later in this report. The RLF administrative manual must establish criteria and procedures for review and approval of loan applications. The Program Income Manual for Revolving Loan Funds developed by the Montana Department of Commerce suggests that this section of the RLF manual include the following: (Montana, 2005, p. 10)

1. Provide justification of applicant’s need.
2. Define beneficiaries.
3. Describe what will be used for necessary or appropriate documentation (certifications, etc.)
4. Describe the type of credit and financial analyses that will be performed on loan requests.
5. Describe the manner and time frame for disbursement of loan proceeds
6. Indicate which loan review and/or approval functions will be delegated to staff and/or the Loan Review Committee; describe which functions will be retained by the governing body.

## 8. Loan Security:

1. Are personal guarantees required?

## 9. Loan Servicing:

Loan servicing parameters should outline terms and conditions, “for loan repayments, loan delinquencies, loan defaults and loan monitoring, and designate who will be responsible for carrying out each of these vital functions” (Montana, 2005, p. 11).

- Default and delinquency terms;

The RLF manual must outline default and delinquency terms. Based upon existing revolving loan funds, defaulted loans fail to meet the terms and conditions of the loan agreement, and when loans are in default, the recommended course of action is to demand that, “all sums due and owing, including penalties, shall, at the Community’s option, become immediately due and payable,” according to a Sample Revolving Loan Fund Manual created by the Wisconsin Department of Commerce. Upon exercise the aforementioned option, the Community, in this instance, Devens, must seek legal council to prepare a written notice to the business. According to the Wisconsin City of Brillion Revolving Loan Fund Manual, the notice should include the following information: (Brillion, p. 19)

a. The default.

b. The action required to remedy the default.

c. A date, not less than thirty (30) days from the date of the notice, by which the default must be cured to avoid foreclosure or other collective action.

d. Any penalties incurred as a result of the default.

- Will there be a grace period for loan payments?

Again, in light of monetary restraints related to a relatively small seed fund, a long grace period for loan repayment will only impede the loaning process by putting unnecessary

strain on lending potential. However, if a grace period is to be incorporated into the loaning structure, remember that interest does accrue during the time the loan repayment is postponed, and this interest will ultimately help recapitalize the seed fund. We recommend a grace period of six months to a year, based on a review of current best practices.

#### 10. Performance Monitoring Practices

Throughout the life of the loan and beyond, it is important to maintain a comprehensive record of all documents and transactions, in an attempt to ensure compliance with the loan terms and conditions. “This may also include monitoring for the timely submission of financial reports from the business. This loan servicing will ensure that all loan covenant requirements are met to ensure the community’s interest and funds in the project are protected.” (Administrator’s Guide, p. 7)

1. Monitoring the use of funds – In accordance with the terms and conditions of the loan, the RLF administrator should keep a file that includes the loan amortization schedule, status of payments, and the outstanding balance of the loan.

#### 11. Loan Loss Reserve Strategy

Define the loan loss reserve strategy that shall be maintained in the portfolio to cover situations of default. One recommended course of action would be to create what is called a buffer fund. “A buffer fund is money saved to cover late payments or defaulted loans. Issues regarding this fund could include its size, how much is contributed by each member, under what circumstances the fund is used. The interest through the loan repayment could be used to create this fund.” (Rotary, p. 19)



## 12. Loan Closing Procedure

At closing, it is important to have the appropriate documents in place before one can execute the loan document and disperse the funds. We recommend a documentation checklist, which is a guide that helps ensure that all of the documents are in place prior to the actual closing. The checklist is a listing of appropriate documents used in closing the loan. “Safe practices may suggest the need for additional documentation not included on this checklist. Be sure to consult legal counsel to be certain that the forms and procedures noted on the checklist are appropriate” (Administrator’s Guide, p. 10).

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Loan Seed Fund	Loan Period (Yr)	Initial Loan Amount	Grace Period (mo)	Annual Interest Rate	Capitalized amount	Monthly payment	Number of payments	Total interest	Total cost of loan	Months until next loan
\$25,000.00	5	\$5,000.00	0	0%	\$5,000.00	\$83.33	60	\$0.00	\$5,000.00	12.00
\$25,000.00	5	\$5,000.00	0	2%	\$5,000.00	\$87.64	60	\$258.33	\$5,258.33	11.41
\$25,000.00	5	\$5,000.00	0	4%	\$5,000.00	\$92.08	60	\$524.96	\$5,524.96	10.86
\$25,000.00	5	\$5,000.00	6	0%	\$5,000.00	\$83.33	60	\$0.00	\$5,000.00	12.00
\$25,000.00	5	\$5,000.00	6	2%	\$5,050.00	\$88.52	60	\$260.91	\$5,310.91	11.30
\$25,000.00	5	\$5,000.00	6	4%	\$5,100.00	\$93.92	60	\$535.46	\$5,635.46	10.65
\$25,000.00	5	\$5,000.00	12	0%	\$5,000.00	\$83.33	60	\$0.00	\$5,000.00	12.00
\$25,000.00	5	\$5,000.00	12	2%	\$5,100.00	\$89.39	60	\$263.49	\$5,363.49	11.19
\$25,000.00	5	\$5,000.00	12	4%	\$5,200.00	\$95.77	60	\$545.95	\$5,745.95	10.44
\$25,000.00	5	\$5,000.00	18	0%	\$5,000.00	\$83.33	60	\$0.00	\$5,000.00	12.00
\$25,000.00	5	\$5,000.00	18	2%	\$5,150.00	\$90.27	60	\$266.08	\$5,416.08	11.08
\$25,000.00	5	\$5,000.00	18	4%	\$5,300.00	\$97.61	60	\$556.45	\$5,856.45	10.24
\$25,000.00	10	\$5,000.00	0	0%	\$5,000.00	\$41.67	120	\$0.00	\$5,000.00	24.00
\$25,000.00	10	\$5,000.00	0	2%	\$5,000.00	\$46.01	120	\$520.81	\$5,520.81	21.73
\$25,000.00	10	\$5,000.00	0	4%	\$5,000.00	\$50.62	120	\$1,074.71	\$6,074.71	19.76
\$25,000.00	10	\$5,000.00	6	0%	\$5,000.00	\$41.67	120	\$0.00	\$5,000.00	24.00
\$25,000.00	10	\$5,000.00	6	2%	\$5,050.00	\$46.47	120	\$526.02	\$5,576.02	21.52
\$25,000.00	10	\$5,000.00	6	4%	\$5,100.00	\$51.64	120	\$1,096.20	\$6,196.20	19.36
\$25,000.00	10	\$5,000.00	12	0%	\$5,000.00	\$41.67	120	\$0.00	\$5,000.00	24.00
\$25,000.00	10	\$5,000.00	12	2%	\$5,100.00	\$46.93	120	\$531.22	\$5,631.22	21.31
\$25,000.00	10	\$5,000.00	12	4%	\$5,200.00	\$52.65	120	\$1,117.70	\$6,317.70	18.99
\$25,000.00	10	\$5,000.00	18	0%	\$5,000.00	\$41.67	120	\$0.00	\$5,000.00	24.00
\$25,000.00	10	\$5,000.00	18	2%	\$5,150.00	\$47.39	120	\$536.43	\$5,686.43	21.10
\$25,000.00	10	\$5,000.00	18	4%	\$5,300.00	\$53.66	120	\$1,139.19	\$6,439.19	18.64
\$25,000.00	15	\$5,000.00	0	0%	\$5,000.00	\$27.78	180	\$0.00	\$5,000.00	36.00
\$25,000.00	15	\$5,000.00	0	2%	\$5,000.00	\$32.18	180	\$791.58	\$5,791.58	31.08
\$25,000.00	15	\$5,000.00	0	4%	\$5,000.00	\$36.98	180	\$1,657.19	\$6,657.19	27.04
\$25,000.00	15	\$5,000.00	6	0%	\$5,000.00	\$27.78	180	\$0.00	\$5,000.00	36.00
\$25,000.00	15	\$5,000.00	6	2%	\$5,050.00	\$32.50	180	\$799.49	\$5,849.49	30.77
\$25,000.00	15	\$5,000.00	6	4%	\$5,100.00	\$37.72	180	\$1,690.34	\$6,790.34	26.51
\$25,000.00	15	\$5,000.00	12	0%	\$5,000.00	\$27.78	180	\$0.00	\$5,000.00	36.00
\$25,000.00	15	\$5,000.00	12	2%	\$5,100.00	\$32.82	180	\$807.41	\$5,907.41	30.47
\$25,000.00	15	\$5,000.00	12	4%	\$5,200.00	\$38.46	180	\$1,723.48	\$6,923.48	26.00
\$25,000.00	15	\$5,000.00	18	0%	\$5,000.00	\$27.78	180	\$0.00	\$5,000.00	36.00
\$25,000.00	15	\$5,000.00	18	2%	\$5,150.00	\$33.14	180	\$815.33	\$5,965.33	30.18
\$25,000.00	15	\$5,000.00	18	4%	\$5,300.00	\$39.20	180	\$1,756.62	\$7,056.62	25.51

Loan Seed Fund	Loan Period (Yr)	Initial Loan Amount	Grace Period (mo)	Annual Interest Rate	Capitalized amount	Monthly payment	Number of payments	Total interest	Total cost of loan	Months until next loan
\$25,000.00	5	\$3,300.00	0	0%	\$3,300.00	\$55.00	60	\$0.00	\$3,300.00	7.92
\$25,000.00	5	\$3,300.00	0	2%	\$3,300.00	\$57.84	60	\$170.50	\$3,470.50	7.53
\$25,000.00	5	\$3,300.00	0	4%	\$3,300.00	\$60.77	60	\$346.47	\$3,646.47	7.17
\$25,000.00	5	\$3,300.00	6	0%	\$3,300.00	\$55.00	60	\$0.00	\$3,300.00	7.92
\$25,000.00	5	\$3,300.00	6	2%	\$3,333.00	\$58.42	60	\$172.20	\$3,505.20	7.46
\$25,000.00	5	\$3,300.00	6	4%	\$3,366.00	\$61.99	60	\$353.40	\$3,719.40	7.03
\$25,000.00	5	\$3,300.00	12	0%	\$3,300.00	\$55.00	60	\$0.00	\$3,300.00	7.92
\$25,000.00	5	\$3,300.00	12	2%	\$3,366.00	\$59.00	60	\$173.91	\$3,539.91	7.38
\$25,000.00	5	\$3,300.00	12	4%	\$3,432.00	\$63.21	60	\$36.33	\$3,468.33	6.89
\$25,000.00	5	\$3,300.00	18	0%	\$3,300.00	\$55.00	60	\$0.00	\$3,300.00	7.92
\$25,000.00	5	\$3,300.00	18	2%	\$3,399.00	\$59.58	60	\$175.61	\$3,574.61	7.31
\$25,000.00	5	\$3,300.00	18	4%	\$3,498.00	\$64.42	60	\$367.26	\$3,865.26	6.76
\$25,000.00	10	\$3,300.00	0	0%	\$3,300.00	\$27.50	120	\$0.00	\$3,300.00	15.84
\$25,000.00	10	\$3,300.00	0	2%	\$3,300.00	\$30.36	120	\$343.73	\$3,643.73	14.35
\$25,000.00	10	\$3,300.00	0	4%	\$3,300.00	\$33.41	120	\$709.31	\$4,009.31	13.04
\$25,000.00	10	\$3,300.00	6	0%	\$3,300.00	\$27.50	120	\$0.00	\$3,300.00	15.84
\$25,000.00	10	\$3,300.00	6	2%	\$3,333.00	\$30.67	120	\$347.17	\$3,680.17	14.20
\$25,000.00	10	\$3,300.00	6	4%	\$3,366.00	\$34.08	120	\$723.49	\$4,089.49	12.78
\$25,000.00	10	\$3,300.00	12	0%	\$3,300.00	\$27.50	120	\$0.00	\$3,300.00	15.84
\$25,000.00	10	\$3,300.00	12	2%	\$3,366.00	\$30.97	120	\$350.61	\$3,716.61	14.07
\$25,000.00	10	\$3,300.00	12	4%	\$3,432.00	\$34.75	120	\$737.68	\$4,169.68	12.54
\$25,000.00	10	\$3,300.00	18	0%	\$3,300.00	\$27.50	120	\$0.00	\$3,300.00	15.84
\$25,000.00	10	\$3,300.00	18	2%	\$3,399.00	\$31.28	120	\$354.04	\$3,753.04	13.93
\$25,000.00	10	\$3,300.00	18	4%	\$3,498.00	\$35.42	120	\$751.87	\$4,249.87	12.30
\$25,000.00	15	\$3,300.00	0	0%	\$3,300.00	\$18.33	180	\$0.00	\$3,300.00	23.76
\$25,000.00	15	\$3,300.00	0	2%	\$3,300.00	\$21.24	180	\$522.44	\$3,822.44	20.51
\$25,000.00	15	\$3,300.00	0	4%	\$3,300.00	\$24.41	180	\$1,093.75	\$4,393.75	17.85
\$25,000.00	15	\$3,300.00	6	0%	\$3,300.00	\$18.33	180	\$0.00	\$3,300.00	23.76
\$25,000.00	15	\$3,300.00	6	2%	\$3,333.00	\$21.45	180	\$527.67	\$3,860.67	20.31
\$25,000.00	15	\$3,300.00	6	4%	\$3,366.00	\$29.40	180	\$1,115.62	\$4,481.62	14.82
\$25,000.00	15	\$3,300.00	12	0%	\$3,300.00	\$18.33	180	\$0.00	\$3,300.00	23.76
\$25,000.00	15	\$3,300.00	12	2%	\$3,366.00	\$21.66	180	\$532.89	\$3,898.89	20.11
\$25,000.00	15	\$3,300.00	12	4%	\$3,432.00	\$25.39	180	\$1,137.50	\$4,569.50	17.16
\$25,000.00	15	\$3,300.00	18	0%	\$3,300.00	\$18.33	180	\$0.00	\$3,300.00	23.76
\$25,000.00	15	\$3,300.00	18	2%	\$3,399.00	\$21.87	180	\$538.11	\$3,937.11	19.92
\$25,000.00	15	\$3,300.00	18	4%	\$3,498.00	\$25.87	180	\$1,159.37	\$4,657.37	16.84

Loan Seed Fund	Loan Period (Yr)	Initial Loan Amount	Grace Period (mo)	Annual Interest Rate	Capitalized amount	Monthly payment	Number of payments	Total interest	Total cost of loan	Months until next loan
\$25,000.00	5	\$1,650.00	0	0%	\$1,650.00	\$27.50	60	\$0.00	\$1,650.00	3.96
\$25,000.00	5	\$1,650.00	0	2%	\$1,650.00	\$28.92	60	\$85.25	\$1,735.25	3.77
\$25,000.00	5	\$1,650.00	0	4%	\$1,650.00	\$30.39	60	\$173.24	\$1,823.24	3.58
\$25,000.00	5	\$1,650.00	6	0%	\$1,650.00	\$27.50	60	\$0.00	\$1,650.00	3.96
\$25,000.00	5	\$1,650.00	6	2%	\$1,666.50	\$29.21	60	\$86.10	\$1,752.60	3.73
\$25,000.00	5	\$1,650.00	6	4%	\$1,683.00	\$31.00	60	\$176.70	\$1,859.70	3.51
\$25,000.00	5	\$1,650.00	12	0%	\$1,650.00	\$27.50	60	\$0.00	\$1,650.00	3.96
\$25,000.00	5	\$1,650.00	12	2%	\$1,683.00	\$29.50	60	\$1,683.00	\$3,366.00	3.69
\$25,000.00	5	\$1,650.00	12	4%	\$1,716.00	\$31.60	60	\$180.17	\$1,896.17	3.45
\$25,000.00	5	\$1,650.00	18	0%	\$1,650.00	\$27.50	60	\$0.00	\$1,650.00	3.96
\$25,000.00	5	\$1,650.00	18	2%	\$1,699.50	\$29.79	60	\$87.81	\$1,787.31	3.66
\$25,000.00	5	\$1,650.00	18	4%	\$1,749.00	\$32.21	60	\$183.63	\$1,932.63	3.38
\$25,000.00	10	\$1,650.00	0	0%	\$1,650.00	\$13.75	120	\$0.00	\$1,650.00	7.92
\$25,000.00	10	\$1,650.00	0	2%	\$1,650.00	\$15.18	120	\$171.87	\$1,821.87	7.17
\$25,000.00	10	\$1,650.00	0	4%	\$1,650.00	\$16.71	120	\$354.65	\$2,004.65	6.52
\$25,000.00	10	\$1,650.00	6	0%	\$1,650.00	\$13.75	120	\$0.00	\$1,650.00	7.92
\$25,000.00	10	\$1,650.00	6	2%	\$1,666.50	\$15.33	120	\$173.59	\$1,840.09	7.10
\$25,000.00	10	\$1,650.00	6	4%	\$1,683.00	\$17.04	120	\$361.75	\$2,044.75	6.39
\$25,000.00	10	\$1,650.00	12	0%	\$1,650.00	\$13.75	120	\$0.00	\$1,650.00	7.92
\$25,000.00	10	\$1,650.00	12	2%	\$1,683.00	\$15.49	120	\$175.30	\$1,858.30	7.03
\$25,000.00	10	\$1,650.00	12	4%	\$1,716.00	\$17.37	120	\$368.84	\$2,084.84	6.27
\$25,000.00	10	\$1,650.00	18	0%	\$1,650.00	\$13.75	120	\$0.00	\$1,650.00	7.92
\$25,000.00	10	\$1,650.00	18	2%	\$1,699.50	\$15.64	120	\$177.02	\$1,876.52	6.96
\$25,000.00	10	\$1,650.00	18	4%	\$1,749.00	\$17.71	120	\$375.93	\$2,124.93	6.15
\$25,000.00	15	\$1,650.00	0	0%	\$1,650.00	\$9.17	180	\$0.00	\$1,650.00	11.88
\$25,000.00	15	\$1,650.00	0	2%	\$1,650.00	\$10.62	180	\$261.22	\$1,911.22	10.25
\$25,000.00	15	\$1,650.00	0	4%	\$1,650.00	\$12.20	180	\$546.87	\$2,196.87	8.93
\$25,000.00	15	\$1,650.00	6	0%	\$1,650.00	\$9.17	180	\$0.00	\$1,650.00	11.88
\$25,000.00	15	\$1,650.00	6	2%	\$1,666.50	\$10.72	180	\$263.83	\$1,930.33	10.16
\$25,000.00	15	\$1,650.00	6	4%	\$1,683.00	\$12.45	180	\$557.81	\$2,240.81	8.75
\$25,000.00	15	\$1,650.00	12	0%	\$1,650.00	\$9.17	180	\$0.00	\$1,650.00	11.88
\$25,000.00	15	\$1,650.00	12	2%	\$1,683.00	\$10.83	180	\$266.45	\$1,949.45	10.06
\$25,000.00	15	\$1,650.00	12	4%	\$1,716.00	\$12.69	180	\$568.75	\$2,284.75	8.58
\$25,000.00	15	\$1,650.00	18	0%	\$1,650.00	\$9.17	180	\$0.00	\$1,650.00	11.88
\$25,000.00	15	\$1,650.00	18	2%	\$1,699.50	\$10.94	180	\$269.06	\$1,968.56	9.95
\$25,000.00	15	\$1,650.00	18	4%	\$1,749.00	\$12.94	180	\$579.69	\$2,328.69	8.42

These brief calculations demonstrate that changing the size of the RLF, much like changing the maximum size of a loan, has a predictable multiplying effect. Doubling the fund doubles the number of loans which can be made, and halves the time until the next loan can be made.

\$50,000.00	5	\$5,000.00	0	2%	\$5,000.00	\$87.64	60	\$258.33	\$5,258.33	5.71
\$50,000.00	5	\$5,000.00	0	4%	\$5,000.00	\$92.08	60	\$524.96	\$5,524.96	5.43