THE BORROWER'S GUIDE TO

FINANCING SOLAR ENERGY SYSTEMS

A FEDERAL OVERVIEW

SECOND EDITION

PREPARED BY THE
U.S. DEPARTMENT OF ENERGY

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Acknowledgments

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INTRODUCTION

Using solar energy systems to provide heat and electricity for the nation's buildings helps to conserve our fossil fuel resources and reduce our reliance on imported fuels. Because solar energy systems do not emit harmful pollutants, they also help protect the environment.

The Borrower's Guide to Financing Solar Energy Systems: A Federal Overview provides information that can assist both lenders and consumers in financing solar energy systems, which include both solar electric (photovoltaic) and solar thermal systems. This guide also includes information about other ways to make solar energy systems more affordable, as well as descriptions of special mortgage programs for energy-efficient homes.

Although the sun's energy is free, special equipment is needed to convert it to electricity or heat for a building. The up-front costs of this equipment can be daunting to consumers and a barrier to new purchases. Therefore, this guide was prepared to show how today's solar energy systems can be affordably financed.

Financing resources for solar energy systems include Fannie Mae, the Federal Home Mortgage Loan Corporation ("Freddie Mac"), and the U.S. Departments of Agriculture, Energy, Housing & Urban Development, and Veterans Affairs. U.S. Environmental Protection Agency and U.S. Small Business Administration programs are also included.

See the quick-reference chart that follows for summaries of the programs administered by these organizations. Following the chart are brief descriptions of today's solar systems and more detailed descriptions of the financing programs. The glossary at the end of this guide contains definitions of some of the special solar energy and financing terms used here.

The second edition of this guide includes updates on several of the financing resources summarized here, such as Fannie Mae and Freddie Mac. It also includes some additional sources of information.

Agency	Program	Loan Amount
Fannie Mae Corp. www.fanniemae.com	(a) Conventional mortgages; (b) Residential Energy Efficiency Improvement Loans	(a) Up to $240,000; (b) up to $15,000
Federal Home Mortgage Loan Corp. (Freddie Mac) www.freddiemac.com	Conventional mortgages	Up to $240,000
U.S. Dept. of Agriculture (USDA) www.usda.gov	Rural Housing Service, Rural Business-Cooperative Service, Rural Utility Service	$300,000 (average)
U.S. Dept. of Energy (DOE) www.doe.gov	Energy Savings Performance Contracts, State Energy Conservation and Weatherization Assistance	Varies
U.S. Dept. of Housing and Urban Development (HUD) www.hud.gov	Energy efficiency mortgages for FHA 203(b) and (k) insurance programs, etc.; special HOME, HOPE VI, and Title I programs for energy efficiency and solar systems (with limits)	HUD area limit
U.S. Dept. of Veterans Affairs (VA) www.va.gov/vas/loan/lenders.htm	VA Home Mortgage Loan Program	Up to $203,000
U.S. Environmental Protection Agency (EPA) www.epa.gov	Energy Star-Rated Home, Energy Star-Rated Building	Guided by Fannie Mae and Freddie Mac limits
U.S. Small Business Administration (SBA) www.sba.gov	7(a) Std Small Bus. Loan, 7(a)-12 Energy Loan Program, 7(m), etc.	Up to $750,000 guarantee (7(a))

RAMS FOR SOLAR ENERGY SYSTEMS

Collateral & Term	Interest Rate	Energy Features and Systems Covered
(a) Secured; 1 to 30 years (adjustable, fixed, or balloon); (b) unsecured; up to 10 years	(a) Market rates; (b) usually below-market rates	(a) Energy efficient mortgages; (b) energy efficiency upgrades; solar water & space heating systems; photovoltaic systems
First mortgage to 95% loan-to-value; 15, 20, & 30 years (including balloons)	Fixed at market rates; variable at prime + 2%	Energy-efficient mortgages that meet Freddie Mac's criteria
As negotiated with RUS borrower; 10 years	0%; conventional mortgages at market rates	Solar thermal systems; photovoltaic systems
Unsecured; varies	Rate varies	Energy-efficient features and equipment; solar thermal systems; photo-voltaic systems
First mortgage: to 120% loan-to-value; second mortgage: no maximum loan-to-value; 15 and 30 years	Fixed or variable rates	Energy-efficient features; solar water and space heating; photovoltaic systems; EEMs to 10% above base loan amount
First mortgage: 100% loan-to-value plus costs; 15 and 30 years	Fixed rates	Energy-efficient features and appliances; solar water and space heating; photovoltaic systems; EEMs to 10% above base loan amount
First mortgage: to 120%; 30 years	Market rates, but discounts are available on some loans	Energy-efficient features making home up to 30% more efficient than code; solar thermal water and space heating; photo-voltaic systems (10-year payback or less required)
Guarantees 80% to $100,000; 75% if more than $100,000; varies	Market rates	Energy-efficient features; photovoltaic, solar thermal, and other renewable energy systems

What Are Photovoltaic Power Systems?

Photovoltaic (PV) power systems are one of today's fastest growing renewable energy technologies. Solar cells, which are the foundation of PV systems, convert the energy in sunlight directly into electricity. Consequently, the "fuel" is free. The term "photo" comes from the Greek "phos," which means "light." "Volt" is named for Alessandro Volta (1745-1827), a pioneer in the field of electricity. Electricity is produced when sunlight strikes the semiconductor material in a photovoltaic (solar) cell, creating an electric current.

PIX04473/COURTESY OF TIM ELLISON, ECD

An example of a photovoltaic power system: The townhouse on the right, located in Bowie, Maryland, has a building-integrated photovoltaic (PV) standing-seam roof; the PV modules look and perform like the standard metal roofing on the other units, and they produce clean electric power.

Photovoltaic energy systems can be as small as a few solar cells or as big as a large array of PV modules, which are made up of interconnected groups of solar cells. Most modules are about the size of a coffee table top, though they can be manufactured in many different sizes and shapes.

The simplest and smallest PV systems are those that provide power for small consumer items like solar calculators and wrist watches. Larger PV systems were

originally developed for use in space. They now power nearly every satellite circling the Earth, because they operate reliably for long periods of time and require little maintenance.

"Stand-alone" PV systems have been installed in many remote locations, often because they cost less than power line extensions to the nearest utility. These remote PV systems provide electricity for communication stations, emergency call boxes, lights, and refrigerators in remote cabins, ranger stations, and similar outposts.

In partnership with their local utility company, a number of U.S. homeowners use PV systems connected to the utility grid. A PV system generates power and thus reduces the amount of electricity homeowners must purchase from the utility each month. Because its fuel is sunlight, a PV system consumes no fossil fuels and generates no air pollutants.

A PV system can be built in almost any size. Its final size will correspond to the energy requirements of a building or utility and the amount of sunlight available to the system. Because most PV systems are modular, homeowners can add to them as their energy use and financial resources increase.

The state-of-the art PV technology is known as Building-Integrated Photovoltaics, or BIPV. This is a construction material, such as a roof shingle or a sheet of glazing, with PV cells directly laminated onto it. The material is multifunctional because it is part of the building and it generates electricity, as well. BIPV is an environmentally friendly building element emerging in the commercial marketplace.

What Are Solar Thermal Systems?

The sun gives us energy in two forms: light and heat. For countless centuries, people have been using the sun's energy to make their homes brighter and warmer. Today, we use special equipment and specially designed homes to capture solar energy for lighting and heating.

PIX00655/WARREN GRETZ, NREL

An example of a solar thermal system: The collectors for a flat-plate, solar thermal water heating system have been installed on the roof of this house in Golden, Colorado.

Solar thermal energy systems heat indoor air or water, and they are also used for air-conditioning. Solar collectors trap the sun's rays to produce heat. Most collectors are built in the shape of a box, frame, or wall, and some are a whole room. Most contain these parts: (1) clear covers that let in solar energy; (2) dark interior surfaces (absorbers) that soak up heat; (3) insulation materials that prevent heat from escaping; and (4) vents or pipes that carry heated air or liquid from inside the collector to the place where it is used.

The solar collector itself is one part of an entire active or passive solar system. Active systems use pumps or fans to move heated air or water through a home or other building. Passive systems make use of design features and natural ventilation, not pumps or fans, to transport heat. In many passive solar homes and buildings, a special room or other part of the building (such as a sunspace) is itself the solar collector. These buildings also incorporate natural daylighting to replace or supplement electric lighting.

Environmentally friendly solar systems are already cost-effective ways to heat water for swimming pools, showers, and laundry areas in residential, commercial, and institutional buildings.

FannieMae

FINANCING AT A GLANCE

Eligible borrowers:
For energy efficiency improvements: eligible borrowers (natural persons), certain utility customers, and purchasers of off-grid systems

Eligible systems:
Energy efficiency upgrades; solar water and space heating systems; photovoltaic systems

Loan amount:
Energy loans typically up to $15,000

Term:
Up to 10 years

Collateral:
Unsecured

For more information:
Phone: 1 (800) 732-6643;
Internet: http://www.fanniemae.com

Citation: Loan authority 12 USCS ' 1717 (p. 430) A (3) The Corporation is authorized, with the approval of the Secretary of Housing and Urban Development, to purchase, service, sell, lend on the security of, and otherwise deal in loans or advances of credit for the purchase and installation of home improvements, or energy conserving improvements or solar energy systems described in the last paragraph of section 2(a) of the National Housing Act (12 USCS ' 1703 (a).

Fannie Mae

Fannie Mae, formerly known as the Federal National Mortgage Association or FNMA, is a congressionally chartered, shareholder-owned company and the nation's largest source of home mortgage funds. Fannie Mae is willing to buy, bundle, and sell certain energy efficient as well as traditional mortgages on the secondary market. The corporation also provides financing for certain consumer loans involving energy efficiency improvements.

In March 1994, Fannie Mae launched "Showing America a New Way Home" by pledging to earmark $1 trillion to finance more than 10 million homes for low-income families, minorities, immigrants in cities, and people with special housing needs. As part of this initiative, Fannie Mae is working with utility companies to assist customers by providing a low-cost source of funds that allow homeowners to finance energy efficiency improvements.

Fannie Mae is partnering with utility companies to provide low-interest, unsecured consumer loans to utility customers for the purpose of installing residential energy efficiency improvements. Compared with other unsecured consumer loans, the Residential Energy Efficiency Improvement Loan program provides a below-market interest rate and promotes a bundled approach to efficiency upgrades. Solar water and space heaters as well as photovoltaic power systems (including grid-independent PV systems) are eligible technologies for this loan program.

Under the "Opening Doors for Every American" campaign, the Fannie Mae Corporation is conducting a national education effort using multilingual media to provide all potential homebuyers with the information they need to become homeowners. The corporation also hosts consumer-housing fairs in cities nationwide.

FannieMae

Freddie Mac

FINANCING AT A GLANCE

Eligible borrowers:

Natural person (not a business); there are some restrictions on resident aliens

Eligible systems:

Photovoltaic (including grid-independent systems) and solar thermal, to 10% above base loan with an energy-efficient mortgage

Loan amount:

Mortgages up to $240,000

Terms:

15, 20, and 30 years (30-year "balloon" due in 7 years or 30-year "balloon" due in 5 years)

Interest rates:

Fixed at market rates/variable at prime rate + 2%

Collateral:

First mortgage to 95% loan-to-value

For more information:

Phone: 1 (800) FREDDIE

Internet: http://www.freddiemac.com

Citation: The Federal Housing Enterprises Financial Safety and Soundness Act of 1992 created a regulatory oversight structure for Freddie Mac divided to address two functions—its housing mission and its safety and soundness. The U.S. Department of Housing and Urban Development (HUD) has oversight responsibilities for the housing mission. In addition, HUD has set permanent affordable housing goals based on income and population diversity for Freddie Mac that went into effect January 1, 1996. These goals require that a certain percentage of the mortgages we purchase support financing for housing low- and moderate-income families. Safety and soundness regulation is vested in the Office of Federal Housing Enterprise Oversight (OFHEO). Organizationally, OFHEO is located within HUD but operates independently of the Secretary of HUD as it implements, monitors, and enforces capital standards for Freddie Mac. This arrangement is similar to the way the Office of Comptroller of the Currency (OCC) operates within the U.S. Department of the Treasury.

Federal Home Loan Mortgage Corporation

The Federal Home Loan Mortgage Corporation (FHLMC), also known as "Freddie Mac," is a secondary mortgage lender that purchases mortgages from lenders, packages the mortgages as securities, and sells the securities (guaranteed by Freddie Mac) to investors such as insurance companies and pension funds. Freddie Mac, a congressionally chartered institution, is privately owned by its shareholders and is accountable to them as well as to an 18-member board of directors.

Mortgage lenders use the proceeds from selling loans to Freddie Mac to fund new mortgages, constantly replenishing the pool of funds available for loans to homebuyers and apartment owners. Just as stock and bond markets have put investor capital to work for corporations, the secondary mortgage market puts private investor capital to work for homebuyers and apartment owners, providing a continuous flow of affordable funds for home financing.

Freddie Mac's programs are similar to Fannie Mae's. Freddie Mac encourages energy efficiency by providing specific criteria for energy efficient mortgages (EEMs) that Freddie Mac is willing to buy on the secondary mortgage market.

Freddie Mac

FINANCING AT A GLANCE

Eligible borrowers:
Rural development borrowers,
Rural Utility Service utilities

Eligible systems:
Solar thermal, PV

Loan amount:
$300,000 (avg.)

Term:
10 years

Interest rates:
0%; market rates for conventional mortgages

Collateral:
As negotiated with the Rural Utility Service borrower administering the funds

For more information:
Contact the Rural Development Field Offices and USDA Service Centers, or the National Office of USDA Rural Development,
Stop 0705, 1400 Independence Ave., S.W.,
Washington, D.C. 20250-0705;
Phone: (202) 720-4323
Fax: (202) 690-0311
Internet: http://www.usda.gov

Citations: A. FMHA: 7 USCS ' 1942 Section 1942 (a) Assisting farmers and ranchers in reducing their dependence on nonrenewable energy resources through the development and construction of solar energy systems, including modifications of existing systems. B. Rural Utility Service: 7 USCS ' 901 Section 902: Loan by Administrator A for the purpose of assisting electric borrowers to implement demand side management, energy conservation, and on-grid and off-grid renewable energy systems and ' 1710.106 which exempts prohibitions on inside wiring in regard to above. USDA Farm Bill 1996C, Federal Agricultural Improvement and Reform Act of 1996, Rural Development, Title VII.

U.S. Department of Agriculture

The U.S. Department of Agriculture (USDA) Rural Development Mission Area is committed to helping improve the economy and the quality of life in all of rural America. Its financial programs support such essential public facilities and services as water and sewer systems, housing, health clinics, emergency service facilities, and electric and telephone service.

The USDA promotes economic development by supporting loans to businesses through banks and community-managed lending pools. The department offers technical assistance and information to help agricultural and other cooperatives get started, improve the effectiveness of their member services, and help communities undertake community empowerment programs.

The USDA Rural Development Mission Area offers these three services: Rural Housing Service (RHS), Rural Business-Cooperative Service, and Rural Utilities Service (RUS). Through RHS, Farmer Mac (formerly the Farmers Home Administration or FmHA) guarantees and insures loans in rural areas. Farmer Mac provides a secondary market for agricultural real estate and rural housing mortgage loans. The RHS offers the following programs: Community Facilities Loans, Resource Conservation and Development Loans, Home Ownership Loans, Rural Rental Housing Loans, Home Improvement and Repair Loans and Grants, Self-Help Housing Loans, Rural Housing Site Loans, and Farm Labor Housing Loans and Grants.

The Rural Business-Cooperative Service offers Business and Industry Guaranteed and Direct Loans, Intermediary Relending Program Loans, Rural Business Enterprise Grants, Rural Economic Development Loans and Grants, and Rural Cooperative Development Grants. Rural Business Cooperative Service programs are designed to facilitate the development of small business enterprises and other economic opportunities in rural areas. Public bodies, nonprofit corporations, and Indian Tribal groups are eligible for all programs; other legally organized entities (cooperatives, partnerships, trust, or profit entities) are also eligible under Business and Industry Guaranteed and Direct Loan Programs.

The Rural Business-Cooperative Service offers a "Rural Economic Development Loan Program" that provides zero-interest loans to RUS borrowers to promote rural economic development and create jobs. The maximum loan amount depends on the amount of funds available each fiscal year. Recently, the average loan has been $300,000. The Rural Economic Development Grant Program provides grants to RUS borrowers to promote economic development. Grants are used to establish revolving loan funds to provide infrastructure or community facilities in rural areas that will lead to economic stability.

PIX04474/LYLE RAWLINGS

This home in Hopewell, New Jersey, demonstrates the effectiveness of off-grid photovoltaics, solar thermal water heating systems, and passive solar building design.

PIX05982/COURTESY OF SUN SYSTEMS

Solar thermal water heating systems can be attractively integrated into a home's exterior design.

RUS also administers two electric loan programs: the Guaranteed Program and the Direct Loan Program. The Guaranteed Program is used primarily by power supply cooperatives or borrowers and is a 100% loan-guarantee program. The interest rate is based on the Treasury yield curve (20-30 years). There is $300 million available in this program. The Direct Loan Program is based on appropriations from Congress. The interest rate is based on the municipal bond rate for AA utilities. Photovoltaics is an eligible technology (including grid-independent systems) for RUS loan programs. The 60 electricity generation & transmission companies and 800 cooperatives are eligible for this loan program; RUS applies only to existing rural electric cooperatives.

The USDA also has a leveraged loan program for rural borrowers that could provide rural homebuyers with an opportunity to borrow money for energy-efficient equipment. There are also programs for conventional mortgages at market rates.

FINANCING AT A GLANCE

Eligible contractors:

Federal agencies; utilities; energy service companies; state governments

Eligible systems:

Solar thermal, photovoltaic systems, energy efficiency measures

Amounts:

Varies

Term:

Up to 25 years using ESPCs

Interest rate:

Varies

For more information:

Phone: (800)-363-3732 (FEMP Help Desk)
Internet: http://www.doe.gov/
http://www.eren.doe.gov/femp/

Citations: A. State Energy Conservation Plans: 42 USCS ' 6322. Section 6322 (d) (5) programs for financing energy efficiency and renewable energy capital investments, projects, and programs (A) which may include loan program ... and programs which allow rebates, grants, and other incentives for the purchase and installation of energy efficiency and renewable energy measures.
B. Energy Efficiency Grants (Section 112:EPACT) Subtitle E; State and Local Assistance. Sec 141 State Buildings Energy Incentive Fund (amending 42 USCS 6323) financing improvements in state and local government buildings to finance energy efficiency improvement in state and local governmental facilities and buildings.
C. Energy Policy Act of 1992; Executive Order 12902.

U.S. Department of Energy

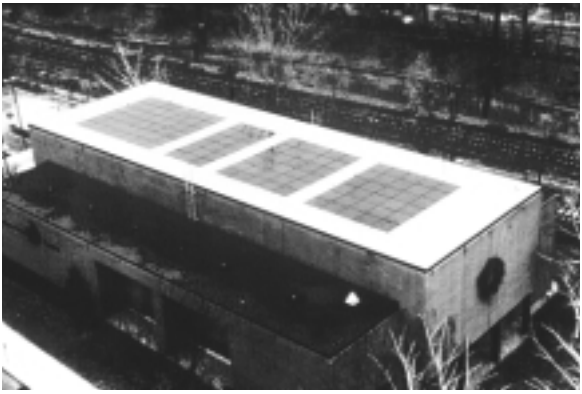
Federal Buildings—The Federal government spends more than $3 billion a year on its electric bill for more than 500,000 Federal facilities. Therefore, the President has directed Federal agencies to reduce their energy use by 30% from 1985 levels by the year 2005.

Achieving this goal will save taxpayers more than $1 billion a year. But it will also require initial investments of about $5 billion in energy projects for Federal facilities. As Federal budgets shrink, agencies such as the Department of Defense (one of the largest consumers of renewable energy in the nation) will have to turn to the private sector for these investments.

Energy Savings Performance Contracts (ESPCs) are a congressionally approved mechanism for funding capital improvements using private-sector funds rather than appropriations. Congress explicitly authorizes and encourages agencies to use this purchasing and financing vehicle to retrofit aging facilities with energy-saving, environmentally beneficial improvements and to acquire related maintenance services.

Utilities can also provide financing for solar projects under Basic Ordering Agreements. The Utility PhotoVoltaic Group includes some of the most active utilities; it can provide technical support to rural utilities that have appropriate applications, such as Forest Service cabins, at the end of utility lines that are expensive to maintain.

A number of Federal PV and solar thermal projects are already under way using ESPCs. In this process, an energy service company (ESCO) pays the up-front cost of purchasing and installing energy-efficient equipment that will reduce a facility's operations and maintenance (O&M) bills. The government then repays the ESCO a share of the utility and related O&M cost savings over the life of the contract, which can be up to 25 years.



PIX04471/COURTESY OF POWERLIGHT CORP.

The New York Power Authority partnered with the village of Tuckahoe, N.Y., to install an 1800-square-foot rooftop photovoltaic system on the Tuckahoe Library and Community Center. Utilities are also partnering with Federal agencies in solar projects.

Super ESPCs can be used by any Federal agency, and there are two types: regional and technology-specific. DOE's Federal Energy Management Program (FEMP) is releasing six regional Super ESPCs, each designated for a particular area of the nation. Technology-specific Super ESPCs typically focus on a particular technology, such as solar collectors, and they apply to the entire nation.

FEMP is currently emphasizing technology-specific Super ESPCs because these contracts enable the Federal government to use its substantial buying power to stimulate growth in environmentally friendly emerging technologies. The technologies covered under these contracts can be bundled with energy-efficient measures to make the results even more economical. The cost of the solar energy system installed under such a contract must meet 33% of the total dollar value of all the energy retrofits.

Technology-specific ESPCs are a streamlined process for acquiring PV and solar thermal systems using a simple delivery order. For more information on ESPC contracting, see the DOE FEMP Web site, http://www.eren.doe.gov/femp/

For more information about renewable energy in Federal buildings, you can subscribe to *Save With Solar: A Quarterly Technical Bulletin for Federal Solar Energy Champions.* To add your name to the mailing list, send an e-mail request to Patrina_Eiffert@nrel.gov.

DOE Contacts

Hugh Saussy, Jr., Director
DOE Boston Regional Support Office
(Northeast Region), (617) 565-9710

Charles F. Baxter, Director
DOE Philadelphia Regional Support Office
(Mid-Atlantic Region), (215) 656-6954

James R. Powell, Director
DOE Atlanta Regional Support Office
(Southeast Region), (404) 347-2837

Val Jensen, Regional Director
DOE Chicago Regional Support Office
(Midwest Region), (708) 252-2001

William S. Becker, Director
DOE Denver Regional Support Office
(Central Region), (303) 275-4826

Kathy M. Vega, Director
DOE Seattle Regional Support Office
(Western Region), (206) 553-1004

State Weatherization Assistance Program—Nationally, the DOE Weatherization Assistance Program makes grants to states to increase energy efficiency and reduce the burden of energy costs for low-income Americans. Of special concern are households with elderly residents, people with disabilities, and families with children. States, in turn, award grants to local agencies, usually community action agencies or other nonprofit or government organizations, to perform the actual weatherization services.

An energy audit is conducted on each home to determine the most cost-effective actions to take. A solar hot water system is allowed under the program. For more information, call the FEMP Help Desk, (800) DOE-EREC (363-3732).

The National Database of State Incentives for Renewable Energy—In late 1995, the U.S. Department of Energy established the National Database of State Incentives for Renewable Energy (DSIRE).

Created through the Interstate Renewable Energy Council (IREC), DSIRE surveys each of the 50 states for information on financial, regulatory, and utility incentives designed to promote the application of renewable energy technologies. Information on these programs, policies, and incentives is available as a database application. Reports are printed that detail incentives on a state-by-state basis, and access is provided to much of the database via the Internet. Providing this information to a wide audience will enable consumers to take advantage of incentives and assist states in analyzing and replicating successful programs.

The North Carolina Solar Center is the principal subcontractor to IREC in charge of collecting and preparing the information. Each financial and regulatory incentive is identified by type, state, end-use sector, and technology. Each financing and regulatory tool is available in the form of documents pertaining to statutes, legislation, fact sheets, brochures, reports, and other information describing the incentive programs, along with data on the volume of users and the amount or value of the funds dispensed or allocated. The database is updated at least monthly.

IREC is a nonprofit consortium of renewable energy officials in state and local governments and is uniquely situated to lead this effort to compile information on state incentives. The North Carolina Solar Center is a state clearinghouse for solar energy programs and information.

DSIRE Contacts

Interstate Renewable Energy Council
P.O. Box 1156 , Latham, NY 12110-1156
Phone: (518) 459-2601
Fax: (518) 459-2601
E-mail: IREC1@aol.com
Internet: http://www.eren.doe.gov/irec

North Carolina Solar Center
Box 7401, North Carolina State University
Raleigh, North Carolina 27695-7401
Phone: (800) 33-NC SUN
(toll-free in North Carolina) or (919) 515-3480
Fax: (919) 515-5778
E-mail: ncsun@ncsu.edu
Internet: http://www.ncsc.ncsu.edu

For more information from DOE about home energy rating systems and energy-efficient mortgages, see "Green Buildings Rating Systems" on the Web, http://www.sustainable.doe.gov/buildings/hers.htm.

FINANCING AT A GLANCE

Eligible borrowers:
Anyone qualifying for certain FHA, EEM, and Title I loans

Eligible systems:
Solar thermal space and water heating; photovoltaic systems

Amounts:
HUD area limits

Terms:
15 and 30 years

Collateral:
To 120% loan-to-value, depending on loan type

Interest rate:
Fixed or variable

For more information:
Check local phone listings for HUD office near you

Citations: *Energy Efficient Mortgages:* See HUD's Web site for a summary description of the HUD Energy Efficient Mortgage Program: http://www.hud.gov.fha.sfh/desc/sfhdesc.html#k Note: Though this source indicates that eligible properties contain just one or two units, HUD is now authorized for up to four, but with the same cost limits, i.e., $8,000. See identical provisions in EPAct (PL 102-486) Sec 105, and Housing and Community Development Act of 1992 (PL 102-550) Title V, Sec 513. For information on Mortgagee Letters 95-46 and 93-13 on EEMS, see: http://www.hud.gov:880/fha/comp/ltrs/mltrmenu.html. HUD Handbook 4150.1, "Valuation Analysis for Home Mortgage Insurance," Section 12-14, "Solar Energy."
Community Development Block Grant Program: Title I of the Housing and Community Development Act of 1974, as amended (P.L. 93-383) Community Development Block Grants. Findings and Purposes: Sections 101(a)(3), (b)(4), (c)(9) "provision of alternative and renewable energy sources of supply." Eligible Activities: Sec. 105(a)(4) "...rehabilitation which promotes energy efficiency... ."
Public Housing HOPE VI: See these Web sites:
http://www.hud.gov/pih/pih
http://www.hud.gov/pih/programs/ph/hope6

U.S. Department of Housing and Urban Development

The broad mission of HUD is "to help create communities of opportunity." HUD's principal community building goals are to develop affordable housing and increase home ownership opportunities for low- and moderate-income families.

Community Development Block Grant Program—HUD's primary neighborhood support program provides more than $4.5 billion a year to local governments. More than one-third goes for property rehabilitation, often financed in cooperation with private interest and capital buy-downs. Programs that promote energy efficiency and renewable energy are encouraged.

HOME Investment Partnership Program—This program can be used for housing rehabilitation that includes energy conservation. HOME also supports new construction that meets the Council of American Building Officials (CABO) Model Energy Code standards. More than $1 billion a year is provided to applicant state and local governments for investment in long-term affordable housing for lower income families. Joint ventures by state and local governments, public utility companies, and nonprofit providers are encouraged.

HOPE VI—Hope VI is a special public housing program providing $2 billion over several years to permit local housing authorities to demolish high-ris[illegible] housing buildings and replace [illegible]m with [illegible] apartments for occupants o[illegible] incor[illegible] This new construction, h[illegible] M[illegible] Code standards, shoul[illegible] demonstrate solar ene[illegible]

FHA-Insured Lending Programs—Lenders can obtain the HUD/Federal Housing Administration (FHA) Use of Materials (UM) 300 Bulletin from HUD. It explains the technical requirements that a solar water heating system must meet to qualify for an FHA-insured loan. A UM 200 Bulletin for PV systems should be available in early 1999.

Several HUD programs can help with financing solar energy systems. For example, FHA mortgage insurance is available for solar energy systems in the following three ways:

1. The Energy Efficient Mortgage Program—In 1995, following a two-year demonstration, FHA announced its version of the energy-efficient mortgage (EEM) program. An EEM recognizes that the improved energy efficiency of a house can increase its affordability by reducing operating costs.

Eligible properties include new and existing 1- to 4-unit properties. Energy improvements must be identified with a home energy rating. The resulting cost-effective improvements may not be valued at more than 5% of the property value, up to $8,000, to qualify the borrower for a higher mortgage. The FHA maximum mortgage limit for an area may be exceeded by the amount of the improvements. An EEM can be used in conjunction with FHA Section 203(b), 203(k), 221(d)(2), 234(c), and 203(h) loans for both purchases and refinances. (See Mortgagee Letters citation in this section.)

2. Mortgage Increase for Solar Systems—In 1978 Congress authorized FHA to exceed by 20% the maximum loan limit under Section 203(b) home ownership and 203(k) property rehabilitation, and other mortgage insurance sections to allow for the installation of solar heating and domestic hot water systems. There also must be 100% operational conventional backup systems. Initially provided for passive and active solar hot water systems, this authorization is being adjusted to cover photovoltaic systems. (See Section 12-14, Handbook 4150.1, cited in this section.)

3. Title I Property Improvement Mortgage Insurance — Title I insurance enables lenders to make property improvement loans to creditworthy borrowers with little or no equity in their homes. For single family-homes, the maximum loan is $25,000. These second mortgages do not require energy efficiency calculations. Borrowers can piggyback Title I on Title II loans to help finance solar improvements that otherwise would not be eligible under the first mortgage.

PIX05584/VINCENT DELGUERCIO

Ten flat-plate solar collectors heat water for this home in Elm, New Jersey; its many south-facing windows reduce heating bills in winter.

FINANCING AT A GLANCE

Eligible borrowers:
Veterans and servicepersons

Eligible systems:
Solar thermal, photovoltaic systems, energy-efficiency measures

Loan amount
Typically, up to $203,000

Terms:
15 and 30 years

Interest rate:
Fixed

Collateral:
First mortgage to 100% loan-to-value plus costs

For more information:
Phone: (800) 848-4904
Internet:
http://www.va.gov/vas/loan/lenders.htm

Citations: A. Subchapter II. Loans. (38 USCS ' 3710) Purchase or Construction of Homes. (7) A To improve a dwelling or farm residence owned by the veteran or occupied by the veteran as the veteran's home through energy efficiency, as provided by subsection (d)(1) "the Secretary shall carry out a program to demonstrate the feasibility of guaranteeing loans for the acquisition of an existing dwelling and the cost of making energy efficiency improvements to a dwelling ...." Note certain limits, $3,000 and $6,000, respectively, apply in following sections.
B. Subchapter II. Loans (continues) (6) For the purposes of this subsection: (A) The term "energy efficiency improvement" includes solar heating and cooling system or a combined solar heating and cooling system and the application of a residential energy conservation measure ... (E) the term "residential energy conservation measure" means: (viii) such other energy conservation measures the Secretary may identify for the propose of the subparagraph.

U.S. Department of Veterans Affairs

The U.S. Department of Veterans Affairs (VA) guarantees mortgage loans for veterans and servicepersons. The guaranty allows veterans to obtain home loans with favorable loan terms, usually without a down payment. A lender, such as a mortgage company, savings and loan, or bank, makes these loans. The VA mortgage loan guaranty program offers a guarantee on loans made to eligible veterans.

Veterans are able to negotiate the interest rate and terms of a VA loan. The loan amount depends on the borrower's income and the value of the property. Although VA has no maximum loan, lenders typically will not exceed $203,000 because of secondary market considerations. The local VA office can provide details on guaranty and entitlement amounts.

A VA loan may be used to buy a home, which includes a townhouse or condominium unit in a VA-approved project; to build a home; to simultaneously purchase and improve a home; and to buy a manufactured home, or lot, or both. A VA loan may also be used to improve a home by installing energy-related features such as solar heating and cooling systems, water heaters, insulation, weather-stripping and caulking, storm windows, storm doors, or other energy-efficient improvements approved by the lender and VA.

These features may be added with the purchase of an existing dwelling or by refinancing a home owned and occupied by the veteran. A loan can be increased up to $3,000 based on documented costs or up to $6,000 if the increase in the mortgage payment is offset by the expected reduction in utility costs. A refinancing loan may not exceed 90% of the appraised value plus the costs of the improvements. VA allows an increase in the veteran's mortgage amount for energy-related improvements, within certain limits and with appropriate documentation. A veteran may refinance an existing VA loan to retrofit a home with energy-efficient measures. In new construction, a photovoltaic or solar thermal system can be included in the sale price of the home. Check with a lender or VA for details.

FINANCING AT A GLANCE

Eligible borrowers:

People and businesses

Eligible systems:

Solar thermal, photovoltaic systems (utility-grid-tied, with 10-year payback limit); measures increasing energy efficiency by 30% over code

Loan amount:

No limit

Interest rates:

Market rates with discounts available on some Energy Star® home loans

Collateral:

First mortgage to 120%

For more information:

Phone: (888) STAR-YES

Internet: http://www.epa.gov

Citations: A. Energy Efficient Environmental Program (Section 2108 of EPAct) Solicitation for Proposals (d) opportunities for the demonstration of energy efficient pollution prevention technologies.

B. Technology Innovation Strategy (released by EPA in January 1994, EPA-543-K-93-002, page 28: accelerate diffusion in domestic market).

U.S. Environmental Protection Agency

The Environmental Protection Agency (EPA) moves into the 21st century with a blueprint for achieving vital public health and environmental protections for U.S. citizens over the next five years. This includes continuing EPA's mission to protect human health and safeguard the natural environment (air, water, and land) upon which life depends.

Environmental protection contributes to making our communities and ecosystems diverse, sustainable, and economically productive. The Environmental Financing Program seeks to increase environmental investments by creating partnerships with states, local governments, and the private sector to fund environmental programs and projects.

The Energy Star® Financing Program works with lenders to provide special financing for buyers of Energy Star®-rated homes. The Energy Star® Homes Program encourages builders to construct homes that are 30% more energy efficient than homes built to the model energy code. Some Energy Star®-rated builders are including solar thermal and photovoltaic systems.

Currently, three national lenders and several regional lenders are offering Energy Star® mortgages. These involve special underwriting guidelines that allow home buyers to purchase homes with mortgages 10% to 24% higher than they would have qualified for if the home were not Energy Star®-rated.

In addition, several Energy Star® lenders offer cash discounts at closing that cut closing costs almost in half. All offer competitive interest rates. Even without these special mortgages, an Energy Star®-rated home provides energy savings that benefit home buyers financially. The monthly energy savings on an Energy Star®-rated home translate into ¼ to ½ point off the interest rate on a 30-year mortgage. EPA/DOE studies indicate that the value of a home increases from $11 to $25 for every $1 reduction in annual utility bills.

FINANCING AT A GLANCE

Eligible borrowers:
Small businesses

Eligible systems:
Photovoltaic (including grid-independent) and solar thermal systems, plus many other renewable energy systems and efficiency measures; payback not specified; systems and measures must have a positive effect on business cash flow

Loan amount:
Up to $750,000 guaranty for 7(a) loan

Guaranty:
Can be 80% up to $100,000; 75% if greater than $100,000

For more information:
Phone: (800) 8-ASK-SBA
Internet: http://www.sba.gov

Citations: A. Loans to small business concerns for solar energy & energy conservation measures (15 USCS ‘ 636) Section (1) the Administration also is empowered to make loans, either directly or in cooperation with banks or other lending institutions through agreements to participate on an immediate or deferred basis as the Administrator may deem to be necessary or appropriate to assist any small business ... to manufacture, distribute, market, install, or service any of the following energy measures: Solar thermal energy equipment ... Photovoltaic cells related equipment. No loan shall be made under this section ... would exceed $500,000 ... or in cooperation with banks ... shall exceed $350,000.
B. ‘ 122.53-1 Energy Conservation and ‘122.53 (b) Photovoltaic cells and related equipment. These are related, explicit, allowable loan descriptions.

U.S. Small Business Administration

The U. S. Small Business Administration (SBA), an independent agency of the Executive Branch of the Federal government, is charged with providing advocacy, management, procurement, and financial assistance to American small businesses.

SBA provides business loans to eligible and credit-worthy small businesses by guaranteeing loans made by participating lenders. The guaranty transfers the risk of borrower nonpayment, up to the amount of the guaranty, from the lender to the SBA. Therefore, businesses applying for an SBA loan are actually applying for a commercial loan having an SBA guaranty.

Under this concept, when a business applies to a lender for financing, the lender first decides whether it can make the loan itself or if certain aspects of the application require an SBA guaranty. The SBA guaranty is available only to the lender. The Government will reimburse the lender for any loss, up to the percentage of SBA's guaranty. Under this program, however, the borrower remains obligated for the full amount due.

Lenders generally seek an SBA guaranty after they have evaluated the credit merits of the application and determined that an SBA guaranty is needed. Through its guaranty, SBA can help tens of thousands of businesses each year obtain financing that would otherwise not be available. -

A key concept of the 7(a) guaranty loan program is that the loan actually comes from a commercial lender, not the government. The lender may be unwilling to provide the loan even with an SBA guaranty, and this is permissible. The agency does not make loans by itself. It is important that applicants know the criteria and requirements of lenders as well as those of the SBA.

PIX04470/COURTESY OF SOLAR DESIGN ASSOCIATES, INC.

A house on the coast of Maine beautifully integrates a utility-grid-tied photovoltaic power system into the roof.

Eligibility Criteria—Eligibility requirements for a 7(a) loan are as broad as possible so the program can accommodate a variety of small business financing needs. Eligibility factors include the size and type of business, use of the proceeds, and the availability of funds from other sources.

There is no maximum dollar amount for an SBA 7(a) loan, but the SBA's share may not exceed $750,000 to any business and its affiliates. SBA could therefore provide a 50% guaranty to a loan for $1.5 million. The maximum amount of SBA's guaranty usually may not exceed 75%, regardless of the total dollar amount of the loan, to any one business and its affiliates, but SBA may also guarantee up to 80% of any loan for $100,000 or less.

SBA has a variety of specialized 7(a) loan programs designed to meet the particular credit needs of a small business. One is the Energy Loan Program, which is designed to help finance the production of energy or energy efficiency measures.

Energy Loans—SBA may make or guarantee loans to assist a small business in designing, engineering, manufacturing, distributing, marketing, installing, or servicing energy devices or techniques designed to conserve U.S. energy resources. Note that this program is not designed for the end user (the business that wants to acquire and use the energy measure itself) but only for those who build, install, or service energy measures. End users can finance energy measures by obtaining a basic 7(a) loan.

Eligible energy conservation devices, measures, or techniques include solar thermal equipment; photovoltaic cells and related equipment; a product or service that increases the energy efficiency of existing equipment, methods of operation, or systems that use fossil fuels, and that is on the Energy Conservation Measures list of the Secretary of Energy; equipment producing energy from wood, biological waste, grain, or other biomass energy sources; equipment for cogeneration of energy, direct heating, or production of energy from industrial waste; hydroelectric power equipment; wind energy conversion equipment; and engineering, architectural, consulting, or other professional services necessary or appropriate to accomplish other conservation measures.

Loan proceeds may be used to acquire land for imminent plant construction, buildings, machinery, equipment, furniture, fixtures, facilities, supplies, and material needed to accomplish any of the program purposes, and for research and development of an existing or new product or service, as well as for working capital. In addition to regular credit evaluation criteria, SBA weighs the greater risk associated with energy projects. SBA considers such factors as quality of the product or service, technical qualifications of the applicant's management, sales projections, and financial status.

GLOSSARY

SOLAR ENERGY TERMS

British thermal unit:
A Btu is a measure of energy equal to the energy needed to raise the temperature of one pound of water by one degree Fahrenheit; the equivalent of 252 calories, or the energy in a single burning match. *(See also kilowatt-hours.)*

Electric utility restructuring:
This refers to the way in which electric utilities are moving from monopoly franchises to a more competitive environment. In the former, one electric company provides power to customers that are usually determined geographically; in the latter, different power providers are allowed to compete for customers in the same area. Across the nation, electric utilities are being restructured, deregulated, or both. In most states where restructuring has taken place, incentives to use renewable energy are also being established. In California, for example, $540 million has been set aside for renewable energy financing incentives. The effect of deregulation on some rural communities has been an increase in the cost of grid extensions of as much as 400%-500%, which makes renewable electric power systems cost-competitive.

Kilowatt-hour:
A kWh is a unit or measure of electricity supply or consumption of 1,000 watts over a period of one hour; equivalent to 3,412 Btu.

Net metering:
This refers to the way in which the owner of a grid-connected PV system, for example, can sell surplus electricity; the practice is being allowed in a number of states across the nation. Electricity generated by a PV system can be used on site or fed through a meter into the utility grid. When a home or business requires more electricity than the PV system is generating (e.g., in the evening), the need is automatically met by power from the utility grid. When less electricity is required, the excess generated by the PV system is fed (or sold) back to the utility. A utility thus backs up a grid-connected PV system as batteries do in stand-alone systems. At the end of the month, a credit for electricity sold is deducted from charges for electricity purchased.

Utility-grid-independent homes:
These are homes not hooked up to the local utility grid, often because they are a considerable distance from power lines. When this is the case (for example, in a remote cabin), renewable energy systems such as PV become cost-competitive with other sources and can be used for most common electrical needs. *(But see also net metering.)* Because PV systems are usually

installed close to the point of use, they require shorter power lines than those connected to a utility grid. Using PV also eliminates the need for a step-down transformer from the utility line. Less wiring means lower costs, shorter construction time, and reduced permitting paperwork, particularly in rural areas. Homes not connected to an electric grid will be eligible for loan programs when comparable sales in an area support the market value.

FINANCING TERMS

Balloon loan:
A long-term loan in which a large payment is due on maturity; a balloon payment is the final payment and is much larger than the regular payments.

Consumer credit:
This is a growing potential source of funds for solar system installations. Most conventional lenders (see below) make personal loans available to creditworthy businesses and individuals on an unsecured or a secured basis. This should have a positive effect on energy efficiency and renewable energy projects, especially projects that have short payback periods and those in which time is of the essence.

Conventional lenders:
These include banks, savings and loan companies, and credit unions. These lenders use their depositor's funds to lend to local customers for a variety of purposes, such as first and second mortgages, home improvement loans, home equity loans, and personal loans. These may be secured by real estate, equipment, and other collateral, or they may be unsecured. Often a conventional lender will keep these loans in its portfolio rather than selling them on the secondary market. Programs can be designed for local needs and thus can be more flexible than those of the marketplace.

Energy efficient mortgages:
EEMs are loans that provide special underwriting considerations so the borrower can purchase or refinance homes that are energy efficient or that will be energy efficient after energy-saving equipment is installed. The reason for this special consideration is that homeowners with lower utility bills can afford to devote a larger portion of their income to housing expenses. The two general categories of EEMs are (1) the new home mortgage (the regular EEM), and (2) the energy improvement mortgage (the EIM), which is used to purchase an existing home or to refinance energy improvements. An energy rating must be obtained to determine the cost-effectiveness of these improvements. Fannie Mae, Freddie Mac, HUD/FHA, and the VA have all instituted EEM programs.

Energy Savings Performance Contracts:
In an ESPC, an energy service company (ESCO) incurs the cost of financing, designing, installing, operating, and maintaining an energy system for the system's user. The ESCO is compensated by receiving a share of the user's energy cost savings during the term of the contract.

Equipment financing/leasing:
This is product financing commonly offered by original equipment manufacturers (OEMs). Conventional lenders offer a line of credit secured by the equipment as well as unsecured loans for creditworthy businesses. Private finance and leasing companies structure business equipment leases as well as public sector project financing for municipalities, school districts, and government agencies. Loan rates and terms are usually higher than those of conventional lenders, but leasing companies often offer financing on projects that conventional lenders are not willing to finance.

Financing for energy conservation improvements:
This financing can be part of a home mortgage covering energy-saving measures that are deemed cost effective. This is usually subject to some limitations. A Home Energy Rating System (HERS) report is required to help determine which improvements will be approved for additional funding. The lender establishes a holdback account to fund the installation of energy-saving improvements after the home purchase or refinancing closes.

Home energy rating system:
This system is the basis for a HERS report, which is prepared by an auditor trained in examining a home's energy efficiency. Factors such as insulation levels, solar orientation, appliance efficiency, and window types are considered to give the home a rating between 1 and 100. The higher the rating, the more efficient the home. A HERS report also recommends improvements based on cost effectiveness and estimates the energy costs for a particular house. Improvements must have a net life-cycle savings that exceeds their cost in order to be recommended. For greater flexibility, some lenders allow an Energy Addendum to the HERS report. The addendum evaluates the cost savings and payback associated with a specific improvement (e.g., a new energy-efficient furnace). In some instances, an improvement that would not be deemed cost effective may be financed if the sum of all the improvements is shown to be cost effective.

Increased debt-to-income ratios:
An increase (up to 2%) on debt-to-income ratios is allowed in loans for homes that are or will be energy efficient. A qualifying ratio compares a borrower's expenses and income to determine

the borrower's ability to meet monthly financial obligations. If a home meets a minimum energy-rating score, the increased ratios can help the loan applicant qualify for a larger loan amount. The Fannie Mae and Freddie Mac loan programs consider homes built after November 1992 to be energy efficient by virtue of the building codes in place at that time. HUD/FHA considers homes built after October 1993 to be energy efficient. A HERS report is necessary for homes built before these dates to establish a home's energy efficiency.

Loan guaranty programs:
These programs are offered by agencies such as HUD/FHA, the VA, the SBA, the Rural Economic Community Development Services (RECDS, via the USDA), and EPA. These agencies offer a guaranty to a conventional lender to cover potential losses resulting from a default on the loan. The lender uses its own funds for these loans but can offer expanded programs for projects that may be beyond its guidelines. Most agencies offer significant incentives such as lower loan costs, below-market interest rates, and higher income-to-debt ratios. Programs include the energy efficient mortgage, EPA's Energy Star®-rated homes and buildings, and HUD's Title I home improvement loan and subsidies for low- and moderate-income homeowners.

Revolving loan funds:
RLFs are offered by state, county, and municipal governments, economic development corporations, and minority business development centers. Typical sources of funds are Community Development Block Grants, Rural Business Enterprise Grants, and Intermediary Relending Programs (HUD). Local agencies usually fund the expansion or creation of small businesses to provide jobs and spur economic development. As the loans are repaid, funds go back into the loan pool to be used again. These programs may be applied to energy efficiency projects or used to facilitate the growth of solar energy businesses. Local chambers of commerce often have information on RLFs.

Secondary market lenders:
Secondary market lenders make loans that are sold to large loan pools such as Fannie Mae and Freddie Mac. These loans are typically for residential purposes and must meet specific guidelines to be marketable. A homeowner's primary residence, a second home, or a non-owner-occupied investment property may secure the loans. The secondary market offers the widest variety of programs, competitive interest rates, and long loan terms. First-time homebuyer programs, energy efficient mortgages, and 125% home improvement loans are a few examples of the innovative loan programs available.

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