

FINANCING SOLAR ENERGY SYSTEMS: A FEDERAL OVERVIEW

Patrina Eiffert, Ph.D.

National Renewable Energy Laboratory, Deployment Facilitation, 1617 Cole Blvd.,
Golden, Colorado 80401, USA (303) 384-7411, patrina_eiffert@nrel.gov

Abstract – This workshop paper provides a brief overview of financing mechanisms in the United States for solar energy systems. The discussion is taken from a guide, written by the author, to inform prospective lenders and consumers about US nationwide financing programs. The work was funded by programs from the US Department of Energy (DOE's) Office of Energy Efficiency and Renewable Energy.

1. INTRODUCTION

The objective of the *Borrowers Guide to Financing Solar energy systems: a federal overview* is to provide 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.

The guide is applicable to financial programs that encourage energy efficiency practice and investment in solar power (PV) and thermal systems.

2. OVERVIEW OF FINANCING PROGRAMS

2.1 *Fannie Mae Corporation* (<http://www.fanniemae.com>)

Originally known as the Federal National Mortgage Association or FNMA, Fannie Mae is America's largest home mortgage fund provider and a congressionally chartered, shareholder-owned company. Fannie Mae uses bulk purchasing power and energy utility partnerships to sustain low interest loans offered to home owners, particularly low-income earners, to finance residential energy efficiency improvements. Fannie Mae runs a Residential Energy Efficiency Improvement Loan program offering unsecured consumer loans which includes photovoltaic and solar thermal applications eligible for investment funding. This builds on a 1994 initiative 'Showing America a New Way Home' where US\$1 trillion was earmarked to finance more than 10 million homes for the underprivileged. The loan schemes are complemented by Fannie Mae's national educational campaign called 'Opening Doors for Every American' to stimulate homeownership and help householders avoid fuel poverty.

2.2 Freddie Mac Corporation (<http://www.freddiemac.com>)

Freddie Mac, also known as the Federal Home Loan Mortgage Corporation (FHLMC), is a secondary mortgage lender. Original mortgage lenders sell their liability to FreddieMac and use the proceeds to fund new mortgages for homebuyers and apartment owners. Freddie Mac uses the mortgage purchases, packages the mortgages as securities and sell the securities by guarantee to investors such as insurance companies and pension funds. What is significant from a renewable energy perspective is that Freddie Mac offers an incentive by purchasing properties on the secondary mortgage market that meet specific criteria for energy efficient mortgages (EEMs).

2.3 U.S. Department of Agriculture (USDA) (<http://www.usda.gov>)

USDA's Rural Development Mission Area manage financial support programs to stimulate economic development and improve the quality of life in rural America. Three major initiatives include:

- **Rural Housing Service (RHS)** - through RHS, Farmer Mac (formally known as the Farmers Home Administration or FmHA) provides a secondary mortgage market for agriculture real estate and rural housing mortgages by guaranteeing and insuring loans in rural areas.
- **Rural Business-Cooperative Service** – offers business and industry guaranteed and direct loans, relending finance, enterprise grants and a number of rural financing schemes to facilitate the development of small business enterprises and other economic opportunities in rural areas.
- **Rural Utilities Service (RUS)** – borrowers under this category are eligible for financing support if there are direct economic and employment spin-offs. Loans vary from year to year but recently average around US\$300,000. The Rural Economic Development Grant Program establishes revolving loan funds to support infrastructure or community facilities This may include purchase and installation of solar power and heating appliances in rural communities. RUS also manages two electric loan programs, the 100% loan Guaranteed Program for power supply cooperatives with a budget of US\$300 million; and the Direct Loan Program based on appropriations from Congress providing an interest rate in line with the municipal bond rate for utilities.

2.4 U.S. Department of Energy (<http://www.doe.gov>)

With more than a US\$3 billion a year electricity bill for 500,000 federal government facilities, agencies have been required to cut their energy use by 30% from 1985 levels by 2005. This is estimated to save taxpayers more than US\$1 billion a year but require an up-front investment of approximately US\$5 billion in energy projects. Rather than using congress appropriations, agencies are urged to negotiate energy savings performance contracts (ESPCs) to finance retrofits and environmentally beneficial improvements. Basic Ordering Agreements are used by utilities to fund solar projects in this instance. An example, includes the PhotoVoltaic Group who will provide technical support especially in remote areas without end of utility line access.

ESPCs have been used to implement a range of solar thermal and PV projects. It works by an energy service company (ESCO) paying the up-front purchase and installment costs. The government then repays the ESCO a share of the utility and related operation and maintenance cost savings over the life of the contract, typically, up to 25 years.

DOE's Federal Energy Management Program (FEMP) (<http://www.doe.gov/femp/>) distributes six regional ESPCs that are either Technology specific and allow federal government to bulk buy solar products to stimulate environmental goods and services. These are paralleled with energy efficient improvements where the solar energy installation cost component must meet 33% of the total dollar value of all the energy retrofits.

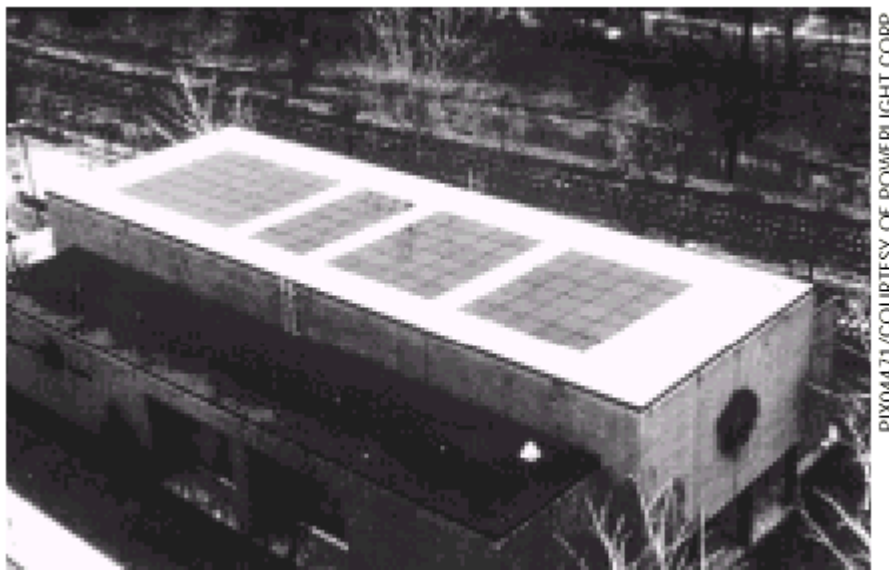


Fig. 1: 1800 m² PV system at Tuckahoe Library and Community Centre supported by the federal government and New York Power Authority.

In 1995 DOE established a National Database of State Incentives for Renewable Energy (DSIRE) (<http://www.eren.doe.gov/irec>) created through the Interstate Renewable Energy Council (IREC), a non-profit consortium of renewable energy officials. This is a state by state inventory of renewable energy financial, regulatory and utility incentives collected and updated monthly on behalf of IREC by the North Carolina Solar Centre (<http://www.ncsc.ncsu.edu>).

2.5 U.S. Department of Housing and Urban Development (HUD) (<http://www.hud.gov>)

Targeted at creating community opportunities for low to moderate income families, HUD provides more than US\$4.5 billion a year to local government through Community Development Block Grants, of which, more than a third adds to private investments in rehabilitating properties. A US\$1 billion HOME Investment Partnership Program is available to state and local governments for investment in long-term affordable housing. HOPE VI provides US\$2 billion over several years to allow for

demolition of highrise public housing and replacement with new garden apartments. All of these major urban improvement programs have scope for integrating solar systems.

A joint HUD and Federal Housing Administration (FHA) information bulletin specifies criteria for an FHA insured loan to finance solar thermal and PV capacity. FHA insurance is available through an energy-efficiency mortgage (EEM) program where energy savings permit owners to extend their borrowing facility and a commensurate interest rate and use the extra loan to invest in further energy savings. Specific Mortgage increase programs have been authorised by congress for FHA to extend the maximum loan limit for solar systems by 20%. Also Title I Property Improvement Mortgage Insurance enables lenders to approve improvement loans to creditworthy borrowers with little or no equity in their homes. These provide second mortgage facilities to meet the financial demands of purchasing and installing a solar energy system.

2.6 U.S. Department of Veterans Affairs (VA) (<http://www.va.gov>)

Veterans and those in the services are offered special loan terms without down payment by mortgage companies and the VA provides the guarantee on the loan. This may include refinancing an existing dwelling. This credit support helps fund renewable systems and energy efficiency improvements.

2.7 Environmental Protection Agency (EPA)

As part of its role of safeguarding America's natural environment the EPA has Energy Star rating systems and inducements to encourage builders to construct homes that are 30% more efficient than homes built to the model energy code. Out of this incentive have followed solar PV and thermal building integrated systems. An Energy Star mortgage mechanism is available, where home buyers become entitled to a 10% to 25% higher home loan bracket if their house is Energy Star Rated. Even so, Energy Star products are to be encouraged, in that EPA/DOE studies found that the value of a home increase from around US\$11 to US\$25 for every US\$1 reduction in annual utility bills.

2.8 U.S. Small Business Administration (SBA) (<http://www.sba.gov>)

As an independent agency of the Federal Government's Executive Branch, the SBA provides small business support by guaranteeing loans and takes on the loan repayment liability from the lender. This adds a cushion for small businesses that otherwise would be unable to secure loan approval. SBA's underwriting of risk still means the money comes from the lender and not from the government. SBA will only guarantee 75% of the loan to any one business above US\$100,000 and up to 80% below this. SBA's Energy Loan Program is a specialised arrangement to help meet credit needs of those wanting to finance energy production or energy efficiency measures. SBA will assess the risk associated with energy projects.

3. CONCLUSIONS

This paper summarises funding programs and incentives for stimulating solar energy and energy saving projects. The work aims to provide a guide for borrowers and prospective investors in the United States and describes various fiscal mechanisms for financing renewable energy projects. It is perhaps a reflection on investment interest and government policy support that there has been a need to update the borrower's guide information every six months.

REFERENCES

This workshop paper is taken from the following publication

The Borrower's Guide to Financing Solar Energy Systems: A Federal Overview, 2nd Edition, DOE/GO-10099-742, March 1999

This publication is a revision of DOE/GO-10098-660, September 1998