MASTER

DOE/CS/20059--T6

TASK VI

ANALYSIS OF OPTIONS FOR A SOLAR
DEVELOPMENT BANK

Submitted To:

Department of Energy

Contract No: EM-78-C-01-4249

Prepared By:

Donovan, Hamester & Rattien, Inc.
1055 Thomas Jefferson Street, NW
Suite 414
Washington, D.C. 20007

September 30, 1979

DOE/CS/20059--T6

DE02 013218

dhr donovan, hamester & rattien, inc.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

BACKGROUND PAPER:

Solar Financing

The Solar Domestic Policy Review identified three generic classes of financial barriers which hinder the use and acceptance of solar technology in residential commercial and industrial markets. The three categories are

- Risk: According to results developed by the DPR, purchasers of solar equipment are denied adequate credit on favorable terms for solar equipment because of the risks associated with the technology. This risk impairs the credit-worthiness of potential solar loans. Additionally, there is a market risk borne by the user due to the newness of the technology.
- Liquidity: Purchasers of solar equipment do not have access to adequate capital to meet needs.
- Subsidy: In order to overcome the high initial capital cost of solar equipment, subsidies may be necessary to stimulate the demand for solar equipment.

Specific financial barriers such as credit terms for new solar homes, public and private appraisal policies, and loan capital cost ceilings fall within these generic classes of financial barriers.

NOTICE
PORTIONS OF THIS REPORT ARE ILLEGIBLE.
It has been reproduced from the best
available copy to permit the broadest
possible availability.

DISCLAIMER

This book was prepared in an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

EAB

A number of government programs and institutions have been designed to overcome the same set of barriers (i.e. risk, subsidy, liquidity) in the housing market. These program^(s) and institutions are described briefly in Attachment I. An important part of the policy debate on how to overcome financing barriers for solar is whether or not the existing financial institutions serving the housing market (e.g. FHA, FNMA) can be used to overcome the financing barriers which hinder the use of solar technology. That is, can or should these programs and institutions be expanded to include solar initiatives? Or, alternatively, should a new institution be set up to deal with solar financing problems?

Policy initiatives advanced to remove the barriers described above have focused on changes in two sets of financial activities (private and public):

- Direct lending programs operated by the government or by private banks.
- Secondary financing organizations (i.e. FNMA, GNMA) which provide liquidity and security to mortgage lenders.

These policy initiatives have concentrated on achieving the following objectives:

- changing financing practices in the residential sector by forcing consideration of energy factors in lending decisions (e.g. changing appraisal practices).
- providing subsidies to purchasers of solar equipment by lowering interest rates and increasing amortization periods.

ATTACHMENT I

How Current Institutions Help Overcome Housing Market Financial Barriers

Barrier	Organization	Method
Risk	FHA	Insures mortgages, home improvement loans
	VA	Guarantee
	GNMA	Guarantee
	MGIC, PMI (etc)	Insures mortgages
Liquidity	FNMA, GNMA, FHLMC	Operates secondary market
Subsidy	HUD	
	<ul style="list-style-type: none"> - FHA - GNMA 	<ul style="list-style-type: none"> ● Below market interest rates for mortgage/home improvement loans (subsidy goes to developer/owner) ● Direct payments for rent made to owner-operator ● FHA insurance, VA guarantees extend term of loan, lower down payment requirements

- increasing the liquidity for lenders who lend on solar equipment.
- assuming, through governmental guarantees, the risks of lending on solar systems.

There have been three broad classes of policy options considered to accomplish the above objectives:

1. Modify existing governmental programs and institutions (e.g., GNMA, FNMA) so that these institutions more effectively promote the use of solar
2. Create a new and separate institution to undertake a number of financing functions, primarily as a secondary financing entity (but with standby direct lending authority). Such an institution would encourage lending for solar systems and homes by existing lenders.
3. Create a direct federal loan program.

Each option can mitigate each of three generic barriers to a greater or lesser degree (See Attachment 2: "Examples of How Options Would Overcome Barriers" on following page). Each option, however, has its own set of relative strengths, weaknesses and costs. For example:

- Option 3 (direct lending) offers the surest and fastest means of providing funds directly to solar users. Use of direct lending, however, would mean large federal outlays, federal preemption of private lending functions, and creation of a large federal bureaucracy.

ATTACHMENT 2

EXAMPLES OF HOW OPTIONS WOULD OVERCOME BARRIERS

BARRIER	OPTION 1 (Modify Existing Programs)	OPTION 2 (New Federal Institution)	OPTION 3 (Direct Federal Lending)
Risk:	FHA guarantees rules modified to give special consideration to solar loans	Solar bank guarantees solar loans made by private lenders	Federal Government assumes risk of lending to solar users
Liquidity:	FNMA, GNMA, FHLMC facilities used with appropriate modifications	Solar bank operates new secondary market for solar loans	Federal Government borrows at its costs lends directly to solar users at a rate set by government policy makers
Subsidy:	Use of NEA tax credits	Solar bank subsidizes below market interest rate mortgage and	Federal Government lending rate can be set at any level thought necessary to stimulate solar demand

- Option 1 would use existing institutions and would therefore cost less than Option 3 but would require legislative and administrative changes which could be time consuming to achieve.

In evaluating these options, therefore, it is important to thoroughly understand:

- the barriers to be overcome in each market segment (e.g., residential hot water, residential heating and cooling, commercial and industrial use).
- the effectiveness of policy tools available to overcome these barriers (e.g., tax credits, direct loans, interest subsidies).
- the costs (administrative and direct) of implementing each option.

Current Situation

Many solar groups strongly favor creating a separate Solar Bank which would perform some of the financing functions currently performed by institutions such as FNMA and GMA, as well as new functions. The purpose of the bank would be to overcome the generic financial barriers cited by the DPR. A separate bank is thought necessary because:

- it would be a highly visible entity and symbol of federal commitment
- it could channel capital to solar without large federal outlays

- it could rapidly develop the necessary lending policy standards and procedures necessary to get solar into the marketplace.
- it could independently develop and implement innovative lending programs necessary for solar commercialization without having to integrate such programs into existing Federal programs.

Two major arguments have been made for not using existing institutions and programs:

1. Existing institutions and programs may be limited, by legislation, charter or regulation, in their ability to rapidly and adequately address solar financing needs. Changing legislative and regulatory authorities may be time consuming.
2. Existing institutions have a broad range of concerns (financing housing construction, providing loan guarantees for subsidized housing), therefore, they may not be willing to give solar the high policy priority it may require.

Analysis of Issues in the Current Policy Debate

As pointed out above, the principal issue in the solar financing debate is whether or not existing programs and institutions designed primarily to serve the housing market can be modified to effectively overcome the financial barriers faced by solar. The alternative to modifying these institutions and programs is to create a new institution to specifically overcome the financial barriers identified by the DPR. Initial analysis indicates that a number of questions outlined below remain, as yet, unanswered.

These questions include:

1. Is the entire range of solar uses uniformly affected by all three generic categories of barriers? Or, does each market segment representing a specific form of solar use (e.g. solar hot water heating) face a unique set of barriers which require a tailored set of actions to overcome?
2. How would each policy option affect the barrier in each market segment and at what cost?
3. Is it necessary to segregate lending to solar equipped homes from other residential lending? Can such lending be done within existing institutions?
4. Do existing institutions have the capability to meet current and projected loan demands, or, will a new solar-related institution be required?
5. Are there other policy tools available which could be used to overcome the barriers cited at lower cost, with greater effectiveness, and in less time?
6. Will the creation of a new institution be disruptive or conflict with existing financial institutions?
7. Will the creation of a separate organization specifically designed for solar financing hinder the ultimate acceptance of solar as a viable energy alternative (i.e., will solar continue to be viewed as an exotic energy form if it is necessary to have special financing devices necessary to assure its use)?

8. Is it necessary to create a large broad-scale organization to address the broad range of solar financing problems? Or, can more targeted and focused programs address specific problems?
9. Can, or should solar financing programs designed to serve the housing market be merged with or separated from programs designed to serve the commercial/industrial market?

Because these questions are unanswered at this time, there is no good analytical basis for choosing which broad class of options should be used to overcome the financial barriers to solar. Despite this lack of specific information as to the comparative costs/benefits and impacts of each class of options, there is a strong demand for immediate action. This demand, particularly among solar advocate groups, focuses on the need to create a separate solar development bank which would have a broad range of functions (See Attachment 3 for a summary of the functions to be performed under the Option 2 solar development bank). As pointed out above, however, this option may:

- be more costly than modifying existing programs
- create a new and cumbersome institution and set of processes which will have to interface with existing institutions anyway
- be disruptive to existing programs
- potentially impede the acceptance of solar
- not be as cost/effective as other possible/potential options

Recommendations

In light of the concerns discussed above, it may be appropriate to recommend that more analysis of the cost/benefit and impacts of Options 1 and 2 be undertaken. If the decision is made to select Option 2, decisions as to the specific functions and status of the new organization should be deferred, pending further interagency study and analysis.

Attachment 3

Proposed Functions of the Solar Development Bank

(Option #2)

The Solar Development Bank would establish six programs to meet solar needs, as identified by the DPR. The proposed program would create:

1. An FHA subsidized home improvement loan purchase program.
2. An FHA and conventional home improvement loan purchase program.
3. A solar refinanced conventional and FHA/VA insured mortgage purchase program.
4. A lending program for solar refinanced conventional and FHA/VA insured mortgages and new conventional and FHA/VA insured mortgages.
5. A conventional solar mortgage purchase program.
6. An FHA/VA insured solar mortgage purchase program.

APPENDIX

Functions and Participants in the Secondary Mortgage Market

Functions of the Secondary Mortgage Market

The creation and function of the secondary mortgage market grew out of an inability, by private lending institutions, to keep pace with a growing national demand for mortgage money. The existence of a secondary market has served to help address the supply - demand imbalance by providing an opportunity to mortgage lenders, to recoup lost liquidity (lendable funds) by selling their mortgages in the secondary market to either government institutions or private investors. This access to liquidity permits the lending institution to make a greater number of loans than would otherwise be possible in the absence of a secondary market. This is because the secondary market frees lenders from making mortgage loans in direct proportion to savings deposits. Moreover, the presence of a secondary market permits organizations such as mortgage bankers, to make loans even in the absence of savings deposits. In addition, the secondary market has had a stabilizing influence on the residential construction industry. That is, it has helped assure a constant, though changing, flow of funds into the residential construction industry by assuring an adequate supply of lendable funds for construction purposes.

It is important to point out, however, that the mortgage lender gains more than just liquidity when he sells a mortgage in the secondary market. For example, lenders usually charge an "originating fee" plus a "service fee" when loans are sold. The originating fee is simply to compensate for the initial paper work, etc.; the service fee is to pay for subsequent collections and disbursements of monthly mortgage payments. Thus, the

combination of access to liquidity and potential fee income serve as strong inducements to the mortgage lender to participate in the secondary market.

Institutional Participants

There are several institutions which operate in the secondary mortgage market; however, for the purposes of this paper, only three are discussed in brief: Federal National Mortgage Association (FNMA-"Fannie Mae"), Government National Mortgage Association (GNMA-"Gennie Mae"), and the Federal Home Loan Corporation (FHLMC-"Freddie Mac").

Federal National Mortgage Association

The Federal National Mortgage Association has the authority to purchase and sell several different types of mortgages. These include:

- Federal Housing Administration (FHA) insured mortgages
- Veterans Administration (VA) guaranteed loans
- Mortgages backed by securities guaranteed by the government National Mortgage Association (GNMA)
- Conventional mortgages not federally underwritten

Typically, these loans are purchased from savings and loan associations, insurance companies, and banks or large mortgage bankers. The purchase prices are determined through a "Free Market System Auction," conducted biweekly at prevailing secondary market rates. Lenders may submit bids for consideration, either at a competitive price or at the mortgage price of the auction day. If a lender sells a mortgage to FNMA, he may qualify as an eligible servicer by the Association's standards, sign a servicing agreement,

and continue to service the loan. If not, he will provide FNMA with an acceptable service agreement. Although the major emphasis has been in the area of mortgage purchases, at times an equally important function may be mortgage sales. Inherent in the performance of secondary market functions is that under certain conditions it is in the best interest of an orderly market that FNMA be a seller as well as a buyer. Sales from the portfolio of the secondary market operations are made at prices based on prevailing prices for similar classes of mortgages in the general secondary market.

Government National Mortgage Association

The government National Mortgage Association has three primary functions. The first function is to purchase or make commitments to purchase, service, and sell any mortgages offered to it by HUD where the Secretary has deemed their acquisition to be in the best interest of efficient management and liquidation. The second function is to provide special assistance in connection with certain residential mortgages when the President determines that such assistance is in the best public interest. This assistance usually takes the form of purchases or commitments to purchase loans made on houses in underdeveloped areas, pending the establishment of their marketability.

The third primary function is to guarantee the timely payment of the principal and interest on securities that are based on or backed by a pool of mortgages insured by the FHA or the Farmers

Administration or those guaranteed by the VA. The Department of Justice has rendered an opinion that the GNMA guarantee constitutes the full faith and credit of the United States and the Treasury has ruled that GNMA may properly borrow from the Treasury to meet its obligations.

Federal Home Loan Mortgage Corporation

"Freddie Mac" is designated to serve as a secondary market facility for real estate mortgages under the sponsorship of the Federal Home Loan Bank System. The FHLMC has the authority to buy and sell FHA and VA loans, conventional loans, and mortgage participations. It was created to improve secondary market facilities for residential conventional mortgages which have not had the benefit of federal insurance or guarantees.

	PURPOSE	SOURCE OF FINANCING	FUNCTIONS
FNMA st. 1938	1) Provide secondary market for federally insured mortgages.	1) Original capital and surplus (\$10 m) (\$1 m) 2) Issuance of FNMA debentures and short term notes. 3) Issuance of long term subordinate notes. 4) Issuance and marketing of securities backed by pools of mortgages.	1) Buy and sell both federally insured or guaranteed mortgages and conventional mortgages. 2) Direct lending on FHA-insured first mortgages. 3) Buy and sell loans for construction and modernization of hospitals. 4) Absorb losses from ownership and disposition of federally insured mortgages.
GNMA st. 1968	1) Management and liquidation of mortgages held. 2) Special assistance lending in support of federal programs. 3) Guarantee eligible mortgages.	1) Borrowing from US Treasury. 2) Interest form mortgages held. 3) Purchase and marketing fees. 4) Issuance of debentures.	1) Review all applications for issuance of certificates on pools of mortgages. 2) Purchase and sale of FHA/VA mortgages in cooperation with FNMA. 3) Backing of certificates for interest rate futures options. 4) Guarantees securities issued by FHA, Farmers Home Administration or VA.
FHLMC st. 1970	1) Provide secondary market for mortgages sponsored by Federal Home Loan Band System 2) Particularly to provide for residential <u>conventional mortgage secondary market</u> .	1) Federal Home Loan Bank Capital Shares (\$100 m). 2) Borrowing from FHLB. 3) Issuance of GNMA-guaranteed mortgage-backed bonds. 4) Issuance of participation sale certificates. 5) Direct sale of mortgages held.	1) Over-the-counter continuous purchase and sale of mortgages and securities backed by mortgages. 2) Establishment of AMNET (Automated Mortgage Market Information Network). 3) Offering commitments to purchase mortgages.

PRESIDENTIAL SPEECH

Today I wish to discuss an important and exciting new initiative toward surmounting the energy problems facing the nation. Over the course of this decade we have come to realize the magnitude and the many facets of the problem; but perhaps most clearly of all, we've realized that the old solutions are no match for it. New directions have been explored at the same times as we have worked to meet our immediate demands for energy. We can now begin to reap the benefits of these path-breaking efforts in the form of solar power. I have been informed that as a result of government and private research and development, it is now technically feasible for us to begin the switch from equipment which uses conventional fuel and power to solar powered units.

Having reached this point we should not be afraid to set solar objectives toward which the nation can move. We should set them high and work rationally to achieve them.

The good reasons for doing so are clear if we examine the nature of the over-all energy problem which the U.S. faces.

The high standard of living which the average American enjoys is sustained by economic activity which requires an adequate and reliable energy system. Fuel and power are needed for manufacturing, communication, transportation space heating and cooling, and countless other processes on which we all depend. These many uses have made the U.S. the world's largest energy consumer. Although we need not increase our fuel consumption in direct proportion to the growth of the economy, there will be new energy needs in the years to come and we must plan for them. Lead times, the time in between planning and actually getting new energy supplies to users, are long; thus, the future is in our hands today.

As things stand, today the nation is heavily dependent on depletable energy resources. Although oil, gas and coal have fed the nations growth well for many years the particular problems associated with each of these fuels have become both better-known and increasingly serious. It is unreasonable for the country to continue or increase its reliance on these resources in view of the health hazards, degradation of the environment, and uncertainty of availability which they pose. Nuclear power which was once thought to be the answer to these problems has presented us with other concerns serious enough to make us look for new alternatives.

The U.S. must not increase its dependence on unsecure supplies of foreign oil. The recent events in Iran demonstrate that other countries oil supplies to our country are a subject do disruption not only as a result of actions of the governments themselves but also from forces far beyond those governments control. Given the present level of dependence the US. is vulnerable to both economic coercion and the threat of a total cut off of oil.

Domestic oil and gas cannot be relied upon to reduce our dependence on foreign or to provide for all our future needs. Although these native resources should be utilized they can be expected to be costly and in increasingly short supply.

Looking to the future, as we must, it is clear that all new energy supplies, whether they come from conventional sources or solar, will carry a large price tag. This means that we must protect our economic well-being by moving toward a national energy system which has costs which are both predicatable and reasonable.

Solar energy will play an important role in a balanced program of energy management for this country. Such a program must require efficient use of the conventional energy resources, oil, gas, and coal, and limited use of nuclear facilities. Furthermore, conservation must be raised to a position of win greater importance in the energy system. But, in addition, there must be an enlightened and active acknowledgement of the many possible uses which we can make of god's gift to man, solar energy. Now more than ever before can the U.S. benefit from it. It is, above all, a secure source. The sun cannot be monopolized by any outside power and will never be depleted by man's use of it. Although we have learned to take it for granted, it has, after all, provided virtually 100% of mankind's needs since time began in the form of crops and heat. Through the use of technology we can make the sun a more complete provider. Indeed, the many ways in which we can use that sun's power recommends it. It can be used to heat water for homes, heat homes and offices, make electricity, provide industrial process heat, and even to make oil to be used instead of petroleum products.

I'm qualified to know that tens of thousands of homeowners have already installed solar systems of various kinds and that hundreds of private organizations have been actively developing and manufacturing solar equipment. Although these far sighted individual actions and the contribution which have been made by government research and development programs are to be applauded for bringing our knowledge and experience to the level

it has reached to date, they are far, far short of a stage of solar power development and usage which I think this country can and should attain.

The Federal Government must now commit itself to helping to set and to accomplish national solar goals. Unless the government takes a significant role in its development, most of the potential for solar power in the U.S. may remain unrealized for solar energy faces a unique set of obstacles. First it must be acknowledged that solar devices are new and different. This fact has important ramifications: all solar equipment firms and their equipment are new - there is no track record or performance history by which consumers can be guided. Building codes do not take solar building characteristics into account; financing institutions have difficulty determining the value of solar homes or improvements.

In general, homeowners, bankers and industrialists are understandably hesitant to invest and trust in equipment with which they are unfamiliar. The proper government policies can help to induce individuals and institutions to cross that confidence hurdle by protecting them from some of the risks which they would otherwise incur.

An additional obstacle to the development of solar power use independent of federal action is the fact that existing conventional energy systems present low costs which are possible because the major investments were made years ago. If they had to be replaced today the costs would be much higher but that is a consideration which does not enter hard calculations. Hence, when present costs are compared, solar energy, requiring new investments cannot compete

economically. The need for federal action to reduce the effect of these natural obstacles is evident.

Today, I have sent to Congress a bill which would establish a Solar Energy Development Bank. It is my belief that this represents a crucial step toward bringing solar power to consumers who want it and to the nation which needs it.

The Solar Energy Development bank will serve many groups. For you, the home owner, it will provide loans at preferred rates for up to \$15,000, for up to 15 years; as much as \$1,500 for over five years will be for solar hot water heating. New homes will be able to get these loans not only for active system but also for passive solar use, that is designs orienting the home for maximum natural solar benefit.

The Bank will also have stand-by direct lending authority for the benefit of owners of larger buildings. Industry will also receive special loans at reduced rates.

The details of the full Solar Energy Development Bank services will be available at local banks and savings and loan associations.

Throughout history banks have played an important role in mobilizing resources to accomplish people's goals. I'm confident that this bank can do the same. It, along with research and development, information dissemination, revised building codes and other programs such as tax credits.....