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RESEARCH DESIGN FOR INSTITUTIONAL ANALYSIS OF HUD'S SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

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MIT Energy Laboratory Report MIT-EL-79-029
May 1979

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ABSTRACT

This paper is one of a series prepared under the sponsorship of DOE's Photovoltaic (PV) Program as part of the institutional analysis of housing. After an introduction describing the theory and methods of institutional analysis, the paper is organized into three sections. ABSTRACT, the first section, presents the research design used for institutional analysis of HUD's Solar Heating and Cooling Demonstration Program. It contains an hypothesized institutional arena, which describes the institutional entities in the housing arena by function and activity and then arrays them according to intensity of interaction across function. The second section of the paper describes the HUD program and describes how it serves as the perturbation prompter for institutional analysis. The third section of the paper presents the specific research design used in the study. From the first three cycles of the HUD program, 11 projects were chosen for on-site case study. A special open-ended semi-structured survey instrument was used to collect information from a set of informants identified for each project. The results of this data collection effort are reported in subsequent reports in this project.

The author gratefully acknowledges Michael Furlong, Steven Heim, Patricia McDaniel, Barbara Parker, Andrew Reamer, and Carole Swetky, all of the PV Institutional Analysis Project at MIT; Jeffrey Cruikshank, who provided editorial services; David Moore, Director of HUD's Solar Heating and Cooling Demonstration Program; and Etta Roth of Real Estate Research Corporation. Without their help and support, this paper could not have been completed.

The drawing is the architect's rendering of the Friends Community, a Cycle 3 project in North Easton, MA.

This paper is one of a series resulting from institutional analysis of photovoltaic (PV) acceptance. These studies are undertaken with sponsorship of the US Department of Energy (DOE) as part of its Photovoltaic Program. In addition to institutional questions, DOE is interested in economic, marketing, and technological issues, and is sponsoring a series of studies and field tests on these topics. Institutional analysis studies have typically been undertaken in relation to particular PV field tests, though in some cases studies have focused on comparable technologies and institutional forces influencing their acceptance.

The housing institutional arena is being investigated in relation to the PV program, in the context of the DOE-HUD Solar Heating and Cooling (SHAC) Demonstration. The SHAC demonstration program involves direct federal grants to assist project developers in incorporating solar thermal approaches into various building forms. In this context, institutional analysis is directed to understanding those forces which influence the rate and nature of innovation acceptance in the housing sector. (For a more detailed discussion of the theory of institutional analysis, see Nutt-Powell, et al., 1978.) An institutional analysis involves seven steps:

- (1) Identify the sector (i.e., economic, geographic) to be studied; determine study objectives.
- (2) Prepare a preliminary sector exploration -- i.e., an overview that could be applied to any location-specific sector.
- (3) Construct an hypothesized institutional arena.
- (4) Identify the "perturbation prompter."
- (5) Devise the specific research design.
- (6) Monitor perturbations.
- (7) Analyze the institutional arena.

This paper incorporates material relevant to the third, fourth and fifth of these steps: constructing an hypothesized institutional arena, identifying a "perturbation prompter," and devising the specific research design for an institutional analysis of the Solar Heating and Cooling Demonstration Program. Its organization follows the theoretical and methodological constructs for institutional analysis of innovation acceptance presented in an earlier paper in this series. (Nutt-Powell, et al, 1978). That paper posits six types of institutional entities -- formal and informal organizations, members, persons, collectivities, and social orders. Institutional action consists of exchanges, for which the critical datum is information. Such exchanges occur within an institutional arena. Innovation forces institutional action by disrupting existing social meaning.

This paper is preceded in the study by five others, each a background paper serving as an element of the preliminary sector exploration of the housing institutional arena. These papers deal with research and socialization (Furlong and Nutt-Powell, 1979), governmental involvement (McDaniel and Nutt-Powell, 1979), standard setting (Parker and Nutt-Powell, 1979), energy provision (Reamer, Heim, and Nutt-Powell, 1979) and housing production (Swetky and Nutt-Powell, 1979). Taken together, these papers provide the basis for constructing an hypothesized institutional arena for housing.

An hypothesized institutional arena is a means of representing institutional entities characteristically involved in a given sector, and of indicating the nature of their typical exchanges. At any point in time there is an identifiable pattern of exchanges between and among institutional entities. This is called a "resource configuration." It is possible to postulate a relative homeostasis of an institutional arena's resource

configuration in order to establish researcher perspective as well as a starting place for data collection. This postulation is the hypothesized institutional arena.

A review of the hypothesized institutional arena leads to the identification of where and how the introduction of an innovation could prompt a perturbation (that is, cause exchanges between and/or among institutional entities which are not routine). For research purposes, one can identify three types of institutional analysis, based on the time and nature of perturbation prompting. The first studies the introduction of an actual perturbation during its introduction; the second examines a perturbation after it has been introduced; and the third studies a perturbation introduced solely for research purposes. This project, which has included work in four different institutional sectors, has been based on studies using each of these approaches.

Once an hypothesized institutional arena is constructed and a perturbation prompter identified, it is possible to devise a specific research design for institutional analysis. The research design establishes how perturbations occasioned by the innovation will be monitored.

This paper has three major sections. The first presents an hypothesized institutional arena for housing; the second discusses the perturbation prompter for this study; and the third presents the specific research design devised for this study. Subsequent papers in this series will report the findings of these investigations.

AN HYPOTHESIZED INSTITUTIONAL ARENA FOR HOUSING

Institutions are defined along three planes: function, activity, and role. Function is the broadest parameter, including, for example, production and research. Activities are undertaken in support of a function; for example, assisting or analyzing. Finally, role is the particular implementation strategy adopted by an institutional entity with regard to its function and activity; for example, vendor or linking-pin. In defining an hypothesized institutional arena, the analyst focuses on function and activity as the two generalizable defining planes.

The hypothesized institutional arena for housing presented here is based on information gathered during the preliminary sector exploration stage, and is presented in the five preliminary exploration working papers of this study. The work described in these papers was initiated by taking each of the seven institutional functions (finance, research, political, regulation, production, service, socialization) as a separate starting point. Data obtained from literature and key informants established the division of institutional entities into the five topics reflected in the titles of the working papers, a clustering which is the consequence of institutional entities serving more than one function. Thus, two papers are combinations maintaining function designation -- research and socialization (Furlong and Nutt-Powell, 1979) and production (Swetky and Nutt-Powell, 1979) -while the other three present clusters of institutional entities meeting many or even all functions -- governmental involvement (McDaniel and Nutt-Powell, 1979), energy provision (Reamer, Heim and Nutt-Powell, 1979) and standard setting (Parker and Nutt-Powell, 1979).

This paper does not repeat the extensive description and discussion of institutional entities in housing contained in these earlier papers.

Most particularly, it does not present detailed definitions of these entities and the manner in which their characteristic functions and activities are manifested. Rather, each entity is defined briefly here according to the functions it fulfills, and the activities it performs in meeting those functions. These definitions are found in Tables 1-7 (one for each of the seven functions).

The definition of institutional entities by function and activity is then used to develop a series of interaction matrices, representing the exchanges characteristic of institutional entities by function, and indicating the relative intensity of this interaction. The intensity of interaction is represented by a four-level ordinary scale: none, low, medium, high. The assignment of an intensity rating was by a pooled judgement of the research team. The interaction matrices are presented as Charts 1-28.

The set of figures and charts together represent an hypothesized institutional arena for housing, with particular reference to exchanges important to solar energy innovation acceptance.

Table 1 INSTITUTIONAL ENTITIES PERFORMING THE FINANCE FUNCTION IN HOUSING

ENTITIES	ACTIONS
Veterans Administration (VA)	Insures, guarantees home loans
Federal Housing Administration (FHA)	Provides housing subsidies, loans
Department of Housing and Urban Development (HUD)	Provides loans, grants, subsidies
Farmers Home Loan Administration (FmHA)	Provides housing loans, grants
Federal National Mortgage Association (FNMA)	Trades mortgages in the secondary market
General National Mortgage Association (GNMA)	Trades mortgages in the secondary market
Federal Home Loan Mortgage Corporation (FHLMC)	Trades mortgages in the secondary market
Federal Deposit Insurance Corporation (FDIC)	Provides deposit insurance
Federal Savings and Loan Insurance Corporation (FSLIC)	Provides deposit insurance
State Housing Finance Agencies (HFAs)	Provides housing loans, insurance, grants, subsidies
State Department of Community Development (DCAs)	Provides housing loans, grants, subsidies
Congress/Internal Revenue Service (IRS)	Provides financial incentive through tax policies
States, Counties, Municipalities	Sets & collects property tax
Federal Reserve Board	Sets monetary policy
Federal Home Loan Bank Board	Sets monetary policy
State Bank Regulatory Boards	Sets monetary policy
Mortgage Companies	Provide loans
Private Mortgage Insurance Companies	Insures mortgages
Insurance Companies	Provide loans
Real Estate Investment Trusts	Provide means to accumulate and invest capital

<u>ENTITIES</u> <u>ACTIONS</u>

Pension Funds Provide loans

Savings & Loans Provide mortgages

Commercial Banks Provide construction loans

Mutual Savings Banks Provide mortgages

Individuals Provide loans

Equity Syndications Provide means to accumulate capital

Finance Companies Provide home improvement loans

Credit Unions Provide home improvement loans

Tax Assessors Provide financial incentives through

tax policies

Table 2 INSTITUTIONAL ENTITIES PERFORMING THE RESEARCH FUNCTION IN HOUSING

ENTITIES	ACTIONS
Washington Strong Stron	ACTIONS
Congress	Conducts policy-oriented research
President	Conducts policy-oriented research
State legislatures	Conduct policy-oriented research
Governors	Conduct policy-oriented research
Municipal Planning & Budget Agencies	Conduct policy-oriented research
Federal Housing Authority (FHA)	Conducts housing market analyses
U.S. Department of HUD - Policy Development and Research (PDR)	Conducts long-term broad-based policy studies at local, regional and national levels
U.S. Bureau of the Census	Collects and analyzes demographic and housing statistics
Private research	Performs research on contract with other actors in the housing arena
Trade and professional associations	Perform subject-related research
Unions	Perform subject-related research
Universities	Perform basic and applied research related to housing on contract or grant
Banks	Research economic and fiscal trends, local housing market characteristics
Federal Reserve Board (FED)	Performs economic research
Federal Home Loan Bank Board (FHLBB)	Performs economic research
Commission/Task Force, Staff	Carry out special, highly visible studies
Cabinet Officers, Staff	Carry out focused policy and program- related research
Congressional Budget Office (CBO)	Studies economic and fiscal impacts of Congressional appropriations and policies

ENTITIES

General Accounting Office (GAO)

Office of Management and Budget (OMB)

Interest Groups (Federal/State/Local;
 General Special/Specific Special/
 Public Interest/Specific Public
 Interest)

Banking Commissions

Voluntary Standard Setting Commissions (ASTM, ANSI)

U.S. Department of Energy (DOE)

<u>ACTIONS</u>

Performs reviews and evaluations of

existing federal programs

Researches program impacts and

fiscal needs

Perform subject-related research

Research bank policies and mortgage

practices

Research nature, characteristics & performance relative to standard

setting

Performs energy-related research

Table 3

INSTITUTIONAL ENTITIES PERFORMING THE POLITICAL FUNCTION IN HOUSING

ENTITIES

Congress

President

U.S. Cabinet departments/officers

General Accounting Office (GAO)

U.S. Office of Management & Budget (OMB)

State legislatures

Governors

State cabinet departments/officers

Local governing councils

Local chief executives

Local cabinet departments/officers

Voluntary standard commissions (e.g., ASTM, ANSI)

<u>ACTIONS</u>

Determines policy

Proposes/approves/administers policy

Propose /debate /administer policy; determine policy at a lesser level

Proposes policy; determines minor

policy regarding reporting requirements

Determines federal budget and

management practices

Determine policy

Propose/approve/administer policy

Propose /debate /administer policy; determine policy at a lesser level

• •

Determine policy

Propose/approve/administer policy

Propose/approve/administer policy

Determine standards

Table 4

INSTITUTIONAL ENTITIES PERFORMING THE REGULATION FUNCTION IN HOUSING

ENTITIES	ACTIONS
Building Inspectors	Inspect construction regarding structural standards
Housing Inspectors	Inspect housing regarding health and safety standards
Federal Home Loan Bank Board (FHLBB)	Sets and administers regulations for savings & loans
Federal Reserve Board (FED)	Sets and administers regulations for commercial banks
U.S. Department of the Treasury	Sets and administers broad financial, tax, and fiscal regulations
State Banking Commissions	Set and administer regulations regarding state-chartered banks
U.S. Department of Housing and Urban Development (HUD) Office of Interstate Land Sales	Regulates interstate land sales
HUD Secretary	Regulates secondary mortgage market
Securities Exchange Commission (SEC)	Oversees interstate corporation financial practices
Internal Revenue Service (IRS)	Sets and administers tax regulations
Environmental Protection Agency (EPA)	Enforces anti-pollution laws
Council on Environmental Quality (CEQ)	Oversees the environmental impact statement process
Office of Coastal Zone Management (CZM)	Regulates permissible uses within designated coastal zones
Occupational Safety and Health Administration (OSHA)	Regulates worker health and safety conditions
Fire Departments	Enforce fire regulations
Design Review	Regulates construction to meet aesthetic standards
Courts	Adjudicate disputes in the housing arena

TABLE 4, cont'd

ENTITIES

Interstate Commerce Commission (ICC)

Unions

Insurance Commissions

National Labor Relations Board (NLRB)

State Realtor Regulatory Boards

Professional Registration Boards

Trade and Professional Associations

Federal Energy Regulatory Commission (FERC)

State Public Utilities Commissions

Department of Justice

Nuclear Regulatory Commission (NRC)

State Facility Siting Boards

Fair Housing/Equal Opportunity Employment (EEO) Agencies

ACTIONS

Regulates materials transportation

Regulate member behavior

Regulate insurance company behavior

Arbitrates labor disputes

Regulate realtor behavior

Regulate entry to professions

Regulate member behavior

Sets interstate energy prices

Regulates local utility behavior

Enforces antitrust laws

Regulates construction and operation

of nuclear power plants

Determines where energy facilities

may be sited

Enforce fair housing and equal

opportunity laws

Table 5 INSTITUTIONAL ENTITIES PERFORMING THE PRODUCTION FUNCTION IN HOUSING

<u>ENTITIES</u> <u>ACTIONS</u>

Developers Initiate, coordinate, oversee the

production process

Architects Design housing product

Consulting Engineers Advise

Lawyers Design corporate structure

Surveyors Determine site specifications

Real Estate Brokers Facilitate site acquisition

Trade Unions Provide labor for construction

Contractors Build, manage, organize

Subcontractors Build

Materials Manufacturers Manufacture housing components.

whole structures

Materials Distributors Distribute housing components

Public Housing Authorities Develop public housing

State Developers Develop

Community Development Corporations (CDCs) Develop

Energy Companies Supply energy in production process

Public Service Provide roads, infrastructure to

facilitate production

Table 6

INSTITUTIONAL ENTITIES PERFORMING THE SERVICE FUNCTION IN HOUSING

ENTITIES ACTIONS Consulting Engineers Advise **Planners** Assess alternatives and market need Lawyers Advise on legal options Title Companies Guarantee title Real Estate Brokers Facilitate sales, assess market demand Materials Distributors Advise on product use Welcome Wagon Does direct advertising for local merchants Insurance Companies Insure property of owner and/or occupant Repair Personnel Advise on, assist in maintenance **Energy Companies** Supply energy, service lines, advise Utilities gas, electric on energy use 0i1 Solar Municipal Police | Provide security re: crime Fire Provide security re: fire Provide continued use of sewer system Sewer Provide continued use of water system Water Security Companies Provide security for structures and occupants Provide building & grounds maintenance Maintenance Firms Oversees operation, management and Property Management maintenance Equal Employment Opportunity (EEO)/Fair Housing Agencies (Federal, State, City)

Consumer Protection Agencies

Tenants Organizations

Mortgage Financers

Investigate and adjudicate complaints

Investigate and adjudicate complaints

Arrange debt structure

Advocate constituent interests

TABLE 6, cont'd

ENTITIES

Neighborhood Associations

Trade Associations

Professional Societies

Unions

Standards

ASTM ANSI

NBS

HUD National Flood Insurance Act

Materials Manufacturers

ACTIONS

Advocate constituent interests

Provide advice and information

Provide advice and information

Provide advice and information

Organizes standards setting process Legitimates standards

Investigates standards

Provides flood insurance

Provide advice on product use

Table 7

INSTITUTIONAL ENTITIES PERFORMING THE SOCIALIZATION FUNCTION IN HOUSING

ENTITIES	ACTIONS
Designers	Set construction parameters through design preferences
Trade Associations	Socialize members, government, and the public through newsletters, advertising, and lobbying
Professional Associations	Socialize members, the government, and the public through newsletters, advertising, and lobbying
Unions	Socialize members, the government, and the public through newsletters, advertising, and lobbying
Educational Institutions	Directly socialize students; indirectly socialize the public, government officials
Standard Setting Bodies	Socialize manufacturers and users of building components
Lending Institutions	Set construction parameters through lending preferences
Congress	Sets parameters for housing preferences through choice of legislative issues
President	Sets parameters for housing preferences through public statements, legislative programs, and administrative directives
State Legislatures	Set parameters for housing preferences through choice of legislative issues
Governors	Set parameters for housing preferences through public statements, legislative programs, and administrative directives
Commissions	Legitimate new directions and ideas
Cabinet Officers	Set parameters for housing preferences through public statements, legislative programs, and administrative directives
Interest Groups	Advocate the acceptability of parti- cularized views on housing

TABLE 7, cont'd

ENTITIES	ACTIONS
Historical Form	Establishes the familiar as a parameter
Public Services	Establish existing service forms as parameters
Tax Assessors	Set construction parameters through assessment practices
Developers	Influence construction practices through financial risk-taking preferences
Real Estate Brokers	Establish housing parameters through broker preferences
Welcome Wagons	Convey community norms
Property Management Firms	Socialize owners and occupants through management practices
Materials Distributors and Manufacturers	Set construction parameters through advertising, offering, and endorsement of products
Insurance Companies	Set construction and market parameters through insuring preferences
Fair Housing/Equal Opportunity Employment (EEO) Agencies	Set market parameters through public pronouncements
Energy Companies	Set construction and market parameters through range and cost of services offered
Neighborhood/Tenant Associations	Exert influence on property owners, government agencies
Media print	Reflect and formulate taste in the residential market
journals	Socialize professional and trade association members
visual	Reflect and formulate taste in the residential market
State Energy Offices	Set construction parameters through public pronouncements on energy

CHART 1 Institutional Entity Interaction in the Housing Arena: Finance and Finance Function

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High Medium Low None

CHART 2 Institutional Entity Interaction in the Housing Arena: Finance and Research Functions

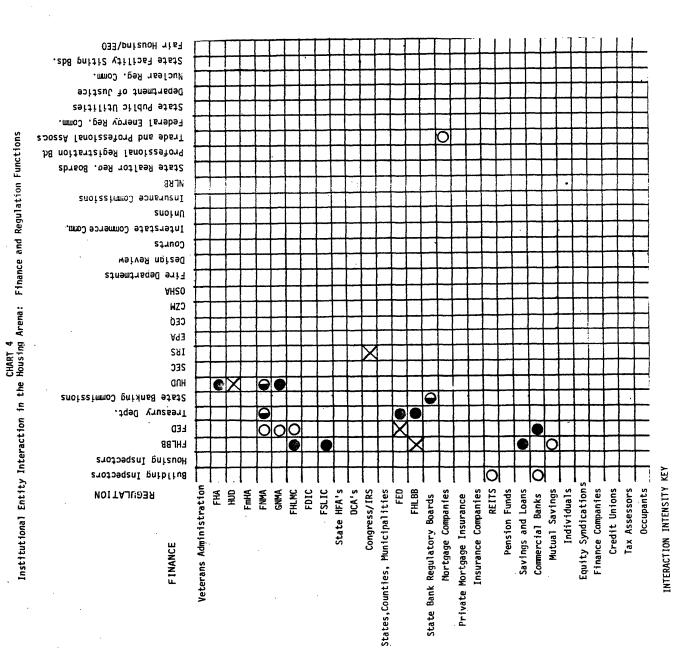
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INTERACTION INTENSITY KEY
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Medium
Low
None

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CHART 3 Institutional Entity Interaction in the Housing Arena: Finance and Political Functions

Low



High Medium Co

CHART 5 Institutional Entity Interaction in the Housing Arena: Finance and Production Functions

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INTERACTION INTENSITY KEY

High Medium

Low None CHART 6 Institutional Entity Interaction in the Housing Arena: Finance and Service Functions

Credit Unions Finance Companies Equity Syndications **Individuals** Mutual Savings Commercial Banks Savings and Loans Penston Funds Insurance Companies Private Mortgage Insurance Mortgage Campanies State Bank Regulatory **EHL** B8 Congress/IRS States, Countles, Municipalities FED State HFA's 2'ACO EZFIC FDIC **EHCMC** AMNO **AMN** 3 AHMA dUH AHT Veterans Administration FINANCE Energy Companies - Solar Energy Companies - Utility Energy Companies - 0il Neighborhood Associations Materials Manufacturers Property Management Trade Associations Professional Societies Standards - ASTM Standards - NBS HUD - Flood Insurance

Municipal - Fire

Municipal - Sewer

Municipal - Water

Security Companies

Maintenance Firms

Municipal - Police

EEO/Fair Housing

Mortgage Financers

Tenant Organizations

Consumer Protection

Unions

Standards - ANSI

INTERACTION INTENSITY KEY

Medium High Low

SERVICE

Consulting Engineers

Planners

Lawyers

Real Estate Brokers

Materials Distributors

Title Companies

Insurance Companies

Repair Personnel

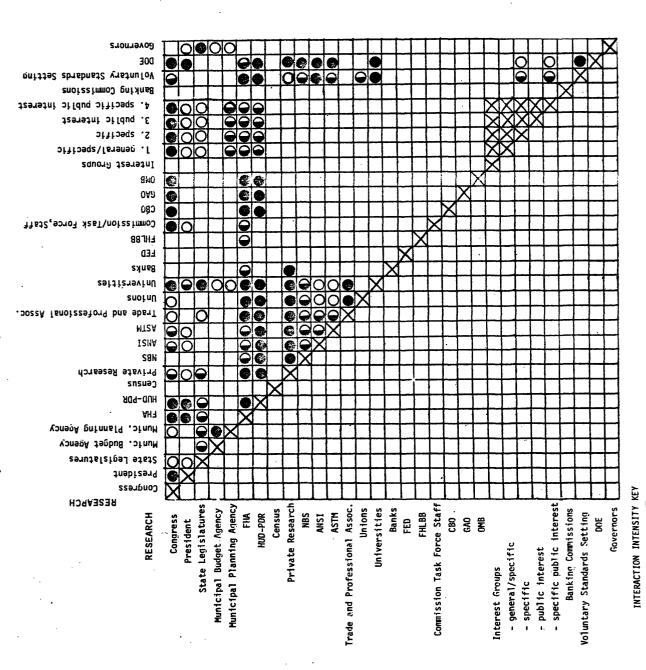
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Occupants Tax Assessors

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REITS INTERACTION INTENSITY KEY (tilong not) znangizaC States, Counties, Municipalities Savings and Loans State Bank Regulatory Boards Private Mortgage Insurance Equity Syndication Mortgage Companies FHLBB FHLMC FDIC FSLIC Commercial Banks Individuals Finance Companies State HFA's DCA's Credit Unions Tax Assessors Occupants SOCIALIZATION **Veterans Administration** Congress/IRS Pension Funds Mutual Savings Medium High

Low Low

CHART 8 Institutional Entity Interaction in the Housing Arena: Research and Research Functions



Medium

Low

High

Research and Political Functions

0000 U.S. Department of Energy 00 Voluntary Standards Commissions 0 O é 0 Banking Commissions 00 9 60 Interest Groups -- Local Interest Groups -- State Interest Groups -- Federal 0 0 MB 0AD \bigcirc Congressional Budget Office 0 0 0 9999 U.S. Cabinet Officers,Staff Commission/Taskforce, Staff **L**HFBB **LED** 0 Banks Universities CHART 9 Institutional Entity Interaction in the Housing Arena: **enoinU** Trade and Professional Assoc. Private Research ceusns 0 HUD-PDR ΑНЯ Municipal Plng.& Budget Agencies 0 Governors 0 State Legislatures President Congress Voluntary Standards Commission OMB Local Cabinet Departments GA0 State Legislatures Governors Local Government Councils Local Chief Executives President U.S. Cabinet Departments State Cabinet Departments Congress **BESEVECH** POL 1T ICAL

INTERACTION INTENSITY KEY

 ${\it CHMRT 10}\\ {\it Institutional Entity Interaction in the Housing Arena:} \ {\it Research and Regulation Functions}$

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INTERACTION INTENSITY KEY

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CHART 11 Institutional Entity Interaction in the Housing Arena: Research and Production Functions

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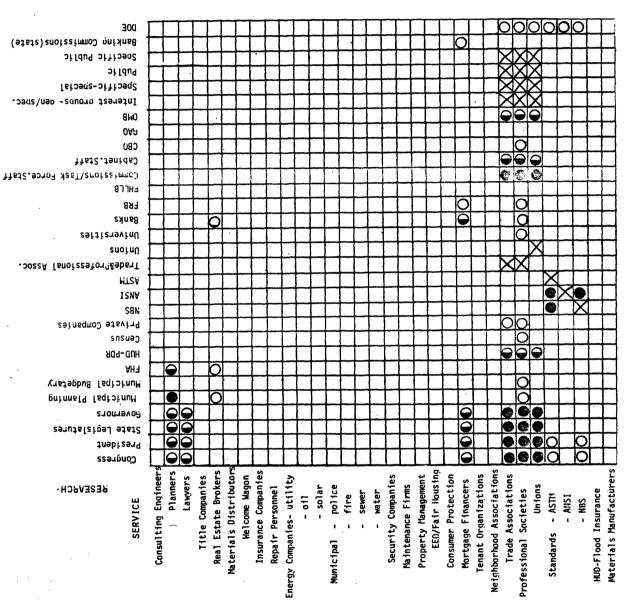
Medium

None Low

High

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CHART 12 Institutional Entity Interaction in the Housing Arena: Research and Service Functions



INTERACTION INTENSITY KEY

High	Medium	Low	None

INTERACTION INTENSITY KEY
High
Medium
Low
None

CHART 14 Institutional Entity Interaction in the Housing Arena: Political and Political Functions

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Local Cabinet Officers State Cabinet Officers

State Legislatures

POLITICAL

Local Governing Councils Local Chief Executives U.S. Cabinet Officers

Voluntary Standard Commission

congress Président

Governors

Congress

President State Legislatures Governors

Local Governing Councils Local Chief Executives U.S. Cabinet Officers

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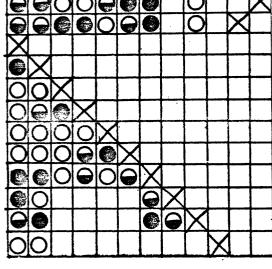
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Voluntary Stand. Comm. State Cabinet Officers Local Cabinet Officers

Medium High

None Low

INTERACTION INTENSITY KEY



Institutional Entity Interaction in the Housing Arena: Political and Regulation Functions CHART 15

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INTERACTION INTENSITY KEY

Voluntary Standards Commission

Cabinet and Officers

POLITICAL

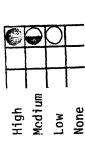
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Institutional Entity Interaction in

Local Chief Executive Local Governing Council Governors State Legislatures Executive/President ssaubuog Materials Distributors Public Service Public Housing Authorities C.D.C.s Architects Trade Unions **Developers** Subs Consulting Engineers Surveyors Real Estate Brokers Contractors Energy Companies Lawyers Materials Manufacturers State Developers PRODUCT 10N

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INTERACTION INTENSITY KEY



35

ОAЭ Cabinet Officers Local Chief Executives Local Governing Councils Governors 000 State Legislatures Executive აგანაძე Energy Companies - utilitiy Consumer Protection Mortgage Financers Professional Societies **HUD-Flood Insurance Meighborhood Associations** Materials Manufacturers Materials Distributors Property Management Tenant Organizations Welcome Wagon Unions Title Companies Real Estate Brokers Trade Associations -- ANSI Standards -- ASTM Consulting Engineers Planners Lawyers Insurance Companies Repair Personnel Security Companies EEO/Fair Housing - solar Maintenance Firms - ofl SERVI Municipal -- police -- sewer -- water . -- fire

INTERACTION INTENSITY KEY

Medium High None Low

Political and Socialization Functions

Institutional Entity Interaction in the Housing Arena: CHART 18

POL ITICAL

Designers

Trade Organizations

SOCIALIZATION

Congress

GAO President U.S. Cabinet Departments

OMB

State Legislatures

0

Governors

State Cabinet Departments

Local Government Councils

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Materials Distributors& Mfgs.

Fair Housing/EEO Insurance Companies

Energy Companies

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60 Property Management Firms Welcome Magon Real Estate Brokers 0 0 Developers Tax Assessors Public Services Historical Form Interest Groups 0 Cabinet Officers SnoissimmoJ State Legislatures Lending Institutions Standard Setting Bodies Universities/Educa. Institu Professional Associations

> KΕΥ INTERACTION INTENSITY

Local Cabinet Officers

Voluntary Standard Commissions

Local Chief Executives

Medium High None Low

CHART 19 Institutional Entity Interaction in the Housing Arena: Regulation and Regulation Functions

REGULATION

Building Inspectors

RESULATION

HUD Secretary Housing Inspectors Federal Reserve Board State Banking Commissions **HUD-Interstate Land Sales Building Inspectors** Dept. of Treasury FHL BB

SEC IRS EPA CEQ OSHA

Fire Depts.

Destan Peview Courts

Interstate Commerce Comm.

Unions

NLRB Insurance Commissions

State Realtor Reg. Boards Prof. Registration Boards Federal Energy Reg. Commission Trade & Professional Associa.

Department of Justice, Antitrust Nuclear Reg. Commission State Facility Siting Boards Fair Housing/EEO State Public Utilities Comm.

INTERACTION INTENSITY KEY Medium High Low

WZ00 Fair Housing/EE0 State Facility Siting Board Department of Justice Antitrus State Public Utilities Comms. Trade & Professiona? Assoc. Professional Regis, Boards State Realtor Reg. Boards 0 4 NEB Insurance Comm. anoinU Interstate Commerce Comm. 00 courts Design Review Fire Depts. AHSC CEO 0 0 0 EPA S&I SEC HUD Secretary HUD Interstate Land Sales State Banking Commissions Treasury FR8 ô LHE BB O Housing Inspectors

. Institutional Entity Interaction in the Gousing Arena: Regulation and Production Functions

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State Public Utilities Comms															O	
Federal Energy Red. Comm.															0	
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INTERACTION INTENSITY KEY

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CHART 22 Institutional Entity Interaction in the Housing Arena: Regulation and Socialization Functions

Medium High

Institutional Entity Interaction in the Housing Arena: Production and Production Functions **666** Energy Companies O Community Develop. Corps. State Developers Public Housing Authorities Materials Distributors Materials Manufacturers Contractors Real Estate Brokers Consultina Engineers KΕΥ Developers Real Estate Brokers. PRODUCTION Developers Surveyors Trade Unions INTERACTION INTENSITY Lawyers Consulting Engineers Contractors Architects Subcontractors Materials Manufacturers Public Housing Authorities Materials Distributors State Developers Public Service PRODUCT ION Community Development Corps. Energy Companies

High

Medium None Low

42

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Subcontractors

Contractors Trade Unions

Materials Manufacturers

Materials Distributors

INTERACTION INTENSITY KEY Medium High LOW

None

State Developers

Public Housing Authorities

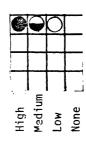
Community Development Corps.

Energy Companies Public Service

Institutional Entity Interaction in the Housing Arena: Production and Socialization Functions CHART 25

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INTERACTION INTENSITY KEY

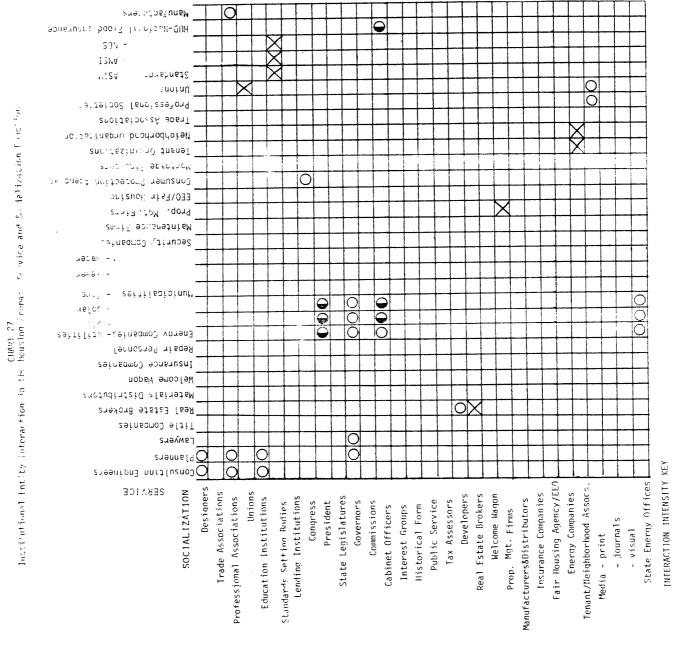


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CHART 26 Institutional Entity Interaction in the Housiny Arema: Service and Service Functions

High

INTERACTION INTENSITY KEY Medium Low



High Medium C Low None

CHART 28 Institutional Entity Interaction in the Housing Arena: Socialization and Socialization Functions

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Fair Housing AgencyEEO Tenant/Neighborhood Assoc'n.s Manufacturers&Distributors Insurance Companies Energy Companies Welcome Magon Prop. Mgt. Firms

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ΚĒ INTERACTION INTENSITY Medium High

None Low

THE PERTURBATION PROMPTER

The 1973 oil embargo provided dramatic evidence of the nation's reliance on imported non-renewable energy resources. It prompted the passage in 1974 of the Solar Heating and Cooling Demonstration Act (P.L. 93-409), which authorized a wide range of federal activities intended to help establish solar energy as a viable energy resource for the US. A comprehensive program is being conducted by the Department of Energy (DOE) under the authorization of this and related legislation. As part of this effort, DOE is conducting the National Program for Solar Heating and Cooling of Buildings. According to DOE's 1978 annual report on the program, its thrust is to promote and demonstrate the economic viability of solar energy for the heating and cooling of buildings. There are four basic elements:

Research and technology development of new and advanced system approaches and subsystems or components to reduce costs, improve reliability, and provide solutions to problems.

Engineering development aimed at bringing systems, subsystems, and components to a marketable stage for utilization.

Demonstration of solar heating and cooling in commercial and residential buildings, using available systems installed both in new and existing buildings, and the associated collection, evaluation and dissemination of data and development of standards and performance criteria.

Market development to assure than an institutional framework exists for widespread use of solar energy including technology transfer, environmental and resource assessment, and studies on barriers and incentives.

(DOE, 1978c.)

The activities other than residential demonstration that have been completed are summarized in two DOE documents. (DOE, 1978a; DOE, 1978b.)

The Department of Housing and Development (HUD) has responsibility for residential applications. HUD has developed a demonstration program

which provides grants to builders and developers who equip new residential construction or existing housing with solar systems. HUD's residential demonstration program is designed to:

finance solar systems in both new and existing dwellings; develop performance criteria and test procedures for solar dwellings; disseminate solar heating and cooling information;

undertake market development efforts to encourage the rapid and widespread acceptance of solar heating and cooling technologies by the housing industry throughout the US. (HUD, 1976, p. vii.)

The solar systems may be used for water heating and home heating and/or cooling. The program has proceeded in a series of award cycles, each initiated by Requests for Grant Applications (RFGA) announced through the solar and construction press and through HUD's own solar mailing list (HUD, 1978). Five cycles of awards have been made in the HUD residential demonstration, with awards announced on January 19, 1976 (Cycle 1), October 15, 1976 (Cycle 2), May 30, 1977 (Cycle 3), March 29, 1978 (Cycle 4), and September 28, 1978 (Cycle 4a). In addition, HUD (with DOE and the Solar Energy Research Institute) has sponsored a Passive Residential Design Competition and Demonstration, with design prizes and construction grants. Awards were announced December 20, 1978.

While the oil embargo/energy crisis serves as the general perturbation prompter, the specific perturbation prompter is the HUD residential demonstration program, and in particular the RFGA defining the nature of activity required to receive a grant. HUD asked that applicants provide information in two areas: (1) technical aspects of the solar energy system to be used; and (2) reasons why the particular project should be funded as part of a demonstration program. (HUD, 1978). HUD assumed the marketability of the

applicant's projects, as the awards were to cover only the incremental costs of using a solar system. (In all cases backup systems were provided for.)

SPECIFIC RESEARCH DESIGN

The HUD Heating and Cooling Demonstration Program represents a deliberate public intervention into the housing market to accelerate the acceptance of an innovation, solar energy. The HUD program uses solar thermal technologies. Because solar energy is an innovation in housing, the introduction of both solar thermal and photovoltaic (PV) will have comparable impact in the housing institutional arena. It is for that reason that the study of HUD's program provides useful guidance to framers of programs to accelerate the acceptance of PV in residential applications.

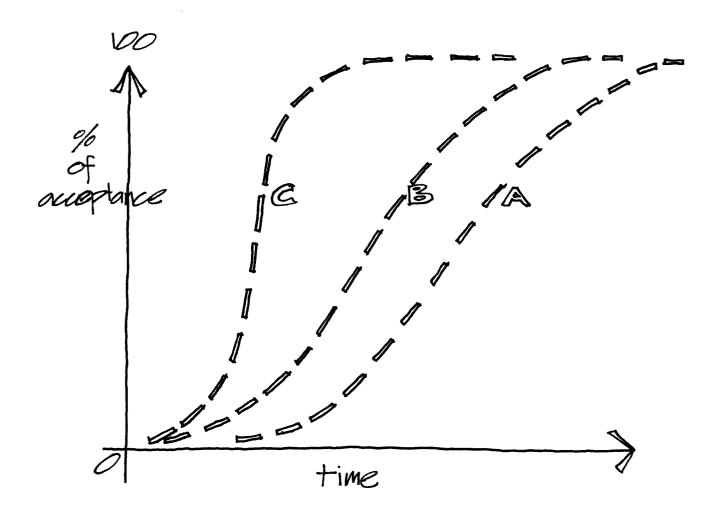
In an economy based on free marketing assumptions, it is necessary to justify market interventions by public bodies. In housing, for example, interventions have been justified by appeals to inequities in access (for housing subsidies), and to the societal importance of historic form (for special tax treatment of income-producing rehabilitated historic structures). Intervention to encourage use of indigenous renewable energy resources (such as solar) is justified on the grounds of political independence and the control of inflationary forces. Because the housing sector is a high consumer of energy, there are several intervention efforts. The efforts include those aimed at user practices (for example, energy conservation practices including thermostat settings and automobile usage) as well as those aimed at equipment used (for example, energy efficiency ratings on major appliances and gas mileage ratings on automobiles.) The HUD Solar Heating and Cooling Demonstration Program fits into the second category.

In general, public intervention into market practices to accelerate innovation acceptance is based on an "S-curve" model of innovation diffusion.

As shown in Figure 1, private market acceptance of an innovation occurring

FIGURE 1

INNOVATION ACCEPTANCE UNDER NORMAL, MARKET-BASED PUBLIC INTERVENTION AND INSTITUTIONALLY-BASED INTERVENTION CONDITIONS



A = normal conditions

B = market-based public intervention conditions

C = institutionally-based public intervention conditions

through time is plotted by curve A. Market-based public intervention theory is plotted by curve B. Curve C plots innovation acceptance prompted by institutionally-based public intervention. In the case of curve C, the public intervention not only prompts the acceptance of the innovation earlier in time, it also encourages the acceptance to occur more rapidly once begun. Hence, where curves A and B are identical in slope and duration, with curve B merely beginning sooner, curve C has a sharper slope and begins sooner.

The difference between curves A/B and C effectively reflects a difference between market and institutional analysis. In A/B the factors influencing acceptance are reduced to cost. Government intervention strategies to accelerate innovation are premised on impacting cost, typically to minimize the initial costs of innovation development by the private sector. However, once the acceptance process begins, it follows a trajectory no different from private market acceptance. The only difference is that it has begun sooner.

By comparison, institutional analysis identifies multiple currencies influencing the innovation acceptance decision. Institutional exchanges consist of information, of which cost is only one type. Among other currencies of exchange are source (From whom do I hear the information?), form (In what form do I acquire the information?), context (In what institutional context am I acting?), and application (How easily can this be made part of my routine?). The various currencies interact to yield some measure of comprehensibility of the innovation. To the extent that the innovation is comprehensible, its acceptance will accelerate.

The HUD Solar Heating and Cooling Demonstration Program uses a marketbased public intervention strategy. The program proceeds on the hypothesis that financial incentives are both necessary and sufficient to accelerate acceptance of solar technologies in housing. It further hypothesizes that the financial incentives can be focused on a single actor, the developer/builder.

A sound research design for institutional analysis of this program includes cost as one of the currencies of institutional exchange which contribute to the comprehensibility of an innovation. But the research design must also account for the other currencies listed above: sources, form, context, and application.

Method

Acceptance of HUD's RFGA and solar increment grants to developers as the perturbation prompter, combined with research constraints of time, funds and personnel (and in light of the fragmentation, disaggregation and localization of the housing arena), led to a decision to adopt an illustrative case study method for this research. Specific projects were selected for detailed study based on their possible usefulness in representing institutional currency exchange processes relevant to solar innovation acceptance in housing. The case studies are intended to illustrate particular currency exchange dynamics in various localized housing institutional arenas.

Sample Selection

Though HUD focused on developers as the critical actors to whom to demonstrate solar technologies, it did not make grants according to the type of developer. The work completed in preparing the hypothesized institutional arena for housing revealed that factors contributing to comprehensibility would vary according to developer type. Hence, the first variable used in sample selection was developer type. A second primary variable was market location. Finally, high intensity interactions between institutional entities (as shown in the hypothesized institutional arena) were used to cull possible cases for sample selection.

The sample universe was all grant awards made in Cycles 1, 2, and 3.

As shown in Table 8, this consisted of 317 recipients. The grant recipients were categorized according to ten developer types. The ten types of developer are:

55

- + Small builder -- primary activity is the construction of housing
- + Small developer -- primary activity is the packaging of housing developments with a volume of up to 75 units/year
- + Housing Authority -- a municipal housing authority
- + Large developer -- primary activity is the packaging of housing developments with a volume of 75 or more units/year
- + Non-profit developer -- primary activity is the packaging of housing developments, with a non-profit incorporation
- + Manufacturer -- primary activity is the manufacture of building materials, with housing development as a secondary activity
- + Designer/Engineer -- primary activity is either as a designer or engineer, with housing development as a secondary activity
- + Utility -- primary activity is as a utility company
- + City -- primary activity is as a municipality
- + Institution -- primary activity is as an institution, such as university Designation as a type of developer was made by project staff members,

based on project information contained in the three summary volumes about HUD's project. (ERDA, 1976; HUD, 1976; HUD, 1977.) The distribution of awards by developer type was shifted during the three cycles, with small builders and large developers being increased proportionally (See Tables 9, 10, and 11.) It was decided that the sample would include at least one project for each developer type (excepting institution and city), with at least one project in each of four regions into which the continental US was divided. The four tegions (and states included in them) are:

^{*} Mid-Atlantic and Northeast -- VT, NH, MA, CT, RI, ME, NY, NJ, PA

HUD-DOE Solar Heating and Cooling Demonstration Program Residential Project Funded by type, size, and developer Cycles 1, 2, and 3

TOTAL	Institution 6.0%	City 2.8%	Utility 1.3%	Designer/Engineer	Manufacturer 0.3%	Non-profit developer	Large developer 9.5%	Housing Authority 5.4%	Small developer 19.9%	Small builder 36.3%	
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9					_		7				75+
23	0	2		2		υ		ω	4	1	10 or less
16	2	2				ъ	ω	w			RETROFIT
16	.4.						7	4			75+
317	19	9	4	35		24	30	17	63	115	TOTAL

HUD-DOE Solar Heating and Cooling Demonstration Program Residential Project Funded by type, size, and developer Cycle 1

	10 or less	NEW 11-74	75+	10 or less	RETROFIT 11-74	75+	TOTAL
Small builder 26.1%	12						12
Small developer	ω						8
Housing Authority 4.3%	2						2
Large developer 4.3%	2						2
Non-profit developer 8.7%	ω						4
Manufacturer 0.0%							0
Designer/Engineer 21.7%	70						10
Utility 0.0%							0
City 8.7%	The second secon	No. (I) and (I) (I) (I) the processor and the delite (I) (I) (I) the contract of the delite (I)	And a second	2			4
Institution 8.7%	4						4
TOTAL	42	7	0	2		0	46

HUD-DOE Solar Heating and Cooling Demonstration Program Residential Project Funded by type, size, and developer Cycle 2

	TOTAL	Institution 5.9%	City 3.9%	Utility 2.0%	Designer/Engineer	Manufacturer 1.0%	Non-profit developer 5.9%	Large developer 6.9%	Housing Authority 7.8%	Small developer 18.6%	Small builder 36.2%	
	68	9%	3	2	8)%	7	3%	3%	17	36	10 or less
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	ω							2				75+
	12	ω			2		2		2	2		10 or less
	6						ш		2			RETROFIT
7	4	2							-			75+
	102	6	4	2	12		6	7		19	37	TOTAL

HUD-DOE Solar Heating and Cooling Demonstration Program Residential Project Funded by type, size, and developer Cycle 3

Indicative Sample by Developer Type & Region

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	Mid-Atlantic & Northeast	Ωο	& Southwest Southwest West West

- * Southeast -- MD, VA, DE, WVA, KY, TN, NC, SC, GA, FL, MI, AL, LA, AR
- * Southwest and West -- TX, OK, NM, AZ, CA, NV, UT
- * Midwest and Northwest -- OH, IN, MI, WI, IL, MT, IA, MN, ND, SD, NE, KS, CO, WY, ID, WA, OR, AK, MO

The regional delineation was based primarily on climatic conditions with particular reference to insolation.

On first review, 34 projects were identified as of potential interest for case study. A detailed review of project application and subsequent development information was conducted using HUD's files. The Real Estate Research Corporation is also conducting research on factors contributing to the acceptance of solar technology on housing, under contract with HUD; where applicable, their field files on the list of potential sample projects were also reviewed. Based on this review, 11 projects were selected for direct contact and on-site case study. The number selected by developer type and region is shown in Table 12.

Data Collection Process

An initial notice of case study activity was directed to the developer of record for each project. A list of additional informants, produced on the bases of hypothesized interaction intensity as revealed in the various matrices, was developed for each project. The developer was asked to supply names and addresses of each actor, for purposes of direct contact by project staff. Insofar as was possible, informants were supplied in advance with some basic information on the purpose of the research.

Interviews were held with informants, with data collected using a specifically developed open-ended semi-structured survey research instrument. (See Appendix A.) Most field research was conducted during January, 1979, with follow-up inquiries conducted by telephone through February, March, and

April. Interviews with additional informants were often scheduled on the site, at the suggestion of one or more informants.

REFERENCES

- DOL (1978a) SULAR HEATING AND COOLING DEMONSTRATION PROJECT SUMMARIES Washington: DOE/CS-OUO9.
- DOE (1978b) SOLAR HEATING AND COULING RESEARCH AND DEVELOPMENT PROJECT SUMMARIES Washington: DUE/CS-U010.
- DOE (1978c)

 NATIONAL PROGRAM FOR SOLAR HEATING AND COULING OF BUILDINGS:
 ANNUAL REPORT
 Washington: DOE/CS-0007.
- ERDA (1976)

 NATIONAL PROGRAM FOR SULAR HEATING AND COOLING OF BUILDINGS, PROJECT DATA SUMMARIES, VOLUME 1, COMMERCIAL AND RESIDENTIAL DEMONSTRATIONS
 Washington: Division of Solar Energy.
- Furlong, Michael and Nutt-Powell, Thomas E. (1979) INSTITUTIONAL ANALYSIS OF RESEARCH AND SOCIALIZATION IN HOUSING: A PRELIMINARY EXPLORATION Cambridge: MIT Energy Laboratory.
- HUD (1976)
 SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM: A DESCRIPTIVE SUMMARY OF HUD CYCLE SOLAR RESIDENTIAL PROJECTS Washington: HUD-PDR-230.
- HUD (1977)

 SOLAR HEATING AND COOLING DEMONSTRATION PROJECTS: A DESCRIPTIVE SUMMARY OF HUD CYCLE 3 SOLAR RESIDENTIAL PROJECTS Washington: HUD-PDR-230-1.
- HUD (1978)

 RESIDENTIAL ENERGY FROM THE SUN: A BRIEF DESCRIPTION OF HUD'S RESIDENTIAL SOLAR DEMONSTRATION PROGRAM Washington: HUD-PDR-351.
- McDaniel, Patricia and Nutt-Powell, Ihomas E. (1979) INSTITUTIONAL ANALYSIS
 OF GOVERNMENTAL INVOLVEMENT IN HOUSING: A PRELIMINARY
 EXPLORATION
 Cambridge, MIT Energy Laboratory.
- Nutt-Powell, Thomas E. with Landers, Stewart, Nutt-Powell, Bonnie R. and Sorrell, Levi (1978) TOWARD A THEORY OF INSTITUTIONAL ANALYSIS Cambridge: MIT Energy Laboratory.
- Nutt-Powell, Thomas E., Furlong, Michael, McDaniel, Patricia, Parker, Barbara and Reamer, Andrew (1979)

 Cambridge: MIT Energy Laboratory.
- Parker, Barbara and Nutt-Powell, Thomas E. (1979) INSTITUTIONAL ANALYSIS
 OF STANDARD SEITING IN THE UNITED STATES: A PRELIMINARY
 EXPLORATION
 Cambridge: MIT Energy Laboratory.
- Reamer, Andrew, Heim, Steven and Nutt-Powell, Thomas E. (1979) INSTITUTIONAL ANALYSIS OF ENERGY PROVISION IN HOUSING: A PRELIMINARY ANALYSIS Cambridge: MIT Energy Laboratory.

Swetky, Carole and Nutt-Powell, Thomas E. (1979) INSTITUTIONAL ANALYSIS OF HOUSING PRODUCTION: A PRELIMINARY EXPLORATION Cambridge, MIT Energy Laboratory.