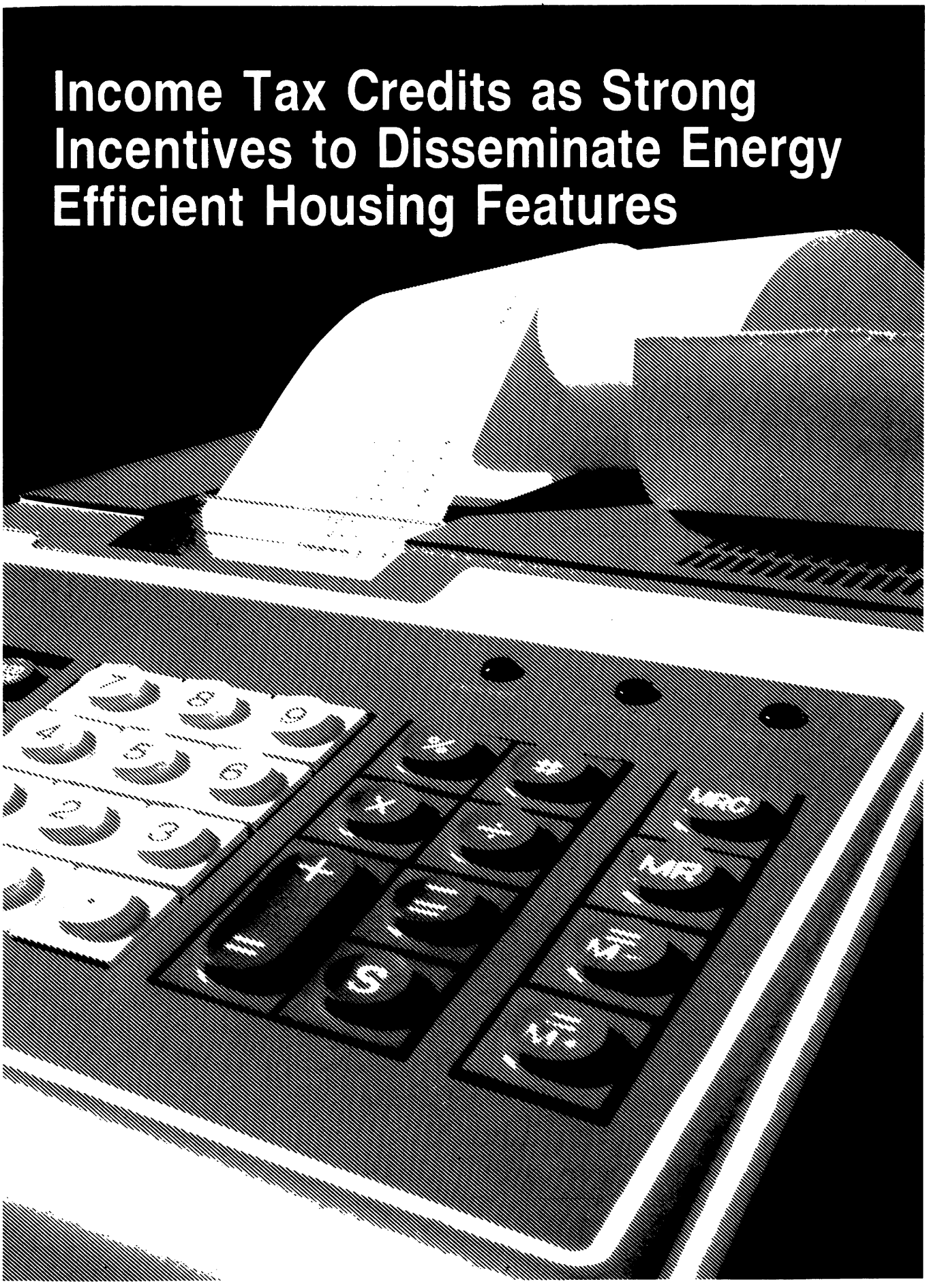
Income Tax Credits as Strong Incentives to Disseminate Energy Efficient Housing Features



BULLETIN B-779 • MAY 1986 • AGRICULTURAL EXPERIMENT STATION
DIVISION OF AGRICULTURE • OKLAHOMA STATE UNIVERSITY

Income Tax Credits as Strong Incentives to Disseminate Energy Efficient Housing Features

Margaret J. Weber

Yeun Sook Lee

Introduction

There have been arguments on whether the fuel shortage has reached crisis proportion. Is there really an energy crisis in America? This crisis has been seriously identified by many authorities and experts. One of the biggest issues in dealing with this energy problem has been development and application of alternative energy sources (Tatum, 1978; U.S. Housing and Urban Development, 1976; Winek, 1980). Major alternative sources mentioned today include solar, earth and wind which are limitless.

Legislation by the U.S. Congress and several state legislative bodies provide direct financial assistance for energy investments, generally in the form of income, property and sales tax credits. More and more tax assistance programs are being put into law all the time, and some programs are expiring (Ritchie, 1980.)

The biggest tax saver on energy investments is the Federal residential energy tax credit, provided for in the National Energy Act that became law in November, 1978. These federal tax credits are dollar for dollar reductions in the taxes people owe the Internal Revenue Service, not merely deductions from taxable income. People can write off up to $2,200 in payments on investments in power homes with alternative sources of energy which includes solar, wind or geothermal systems. The credit is 30 percent of the first $2,000 invested and 20 percent of the next $8,000. The credit is non-refundable, and the equipment must have been installed before January 1, 1986. However, excess credit can be carried forward until 1978 (Ritchie, 1980).

Most passive and active solar systems for space heating and domestic water heating qualify, as well as the equipment to tap geothermal sources for space and water heating, and wind powered electrical generating plants. An attached solar greenhouse may qualify only if it is built primarily to collect solar heat

*Professor, Housing, Interior Design and Consumer Studies, College of Home Economics and former graduate research associate currently Assistant Professor, College of Home Economics, Yonsei University, Seoul Korea respectively.

for dwelling space. People can also claim up to $300 in tax credits for money spent on insulation, weatherstripping, caulking and other energy saving materials such as an energy-efficient furnace, new storm doors, storm windows, clock thermostats, and electric ignition systems for furnaces and water heaters. This conservation credit is 15 percent of the first $2,000 spent, and expired December, 1985 (Ritchie, 1980).

State legislatures have passed a number of laws favoring energy conservation and natural energy development. In the state of Oklahoma, income tax credits for solar energy devices of 25 percent of the cost, to a maximum of $20,000. The credit may be taken only once, but the total amount can be applied on taxes for up to three years.

The Internal Revenue Service reports nearly six million American taxpayers claimed more than $4 billion worth of energy saving devices on their tax returns in 1977-78. Obviously, American people are not waiting for Washington to agree on how serious the energy problem is or what should be done about it (Ritchie, 1980). Many factors have affected and will affect the rate at which alternative energy has been and will be introduced into the housing market. The research reported here was prompted in part by the issue of the expiration of income tax credits for energy efficient equipment.

Specific objectives of this study were: (1) to determine the awareness of tax benefits among residents living in energy efficient alternative housing in Oklahoma, (2) to determine whether the tax benefits have functioned as strong incentives to distribute alternative energy efficient features to residents living in alternative housing in Oklahoma, and (3) to determine what energy features have been claimed among residents living in alternative housing in Oklahoma.

Procedures

Questions related to tax credits were included in a larger study as part of the Southern Regional Project S-141. The questions included awareness of federal and state income tax credits, consumer's responses about improvements if the tax benefits had not been available, and items for which people have received tax credits.

Residents within the state of Oklahoma who were living in energy efficient alternative houses such as solar, earth sheltered and wind-generator houses comprised the target population for this study. Since a list of all such Oklahoma households was non-existent, an effort was made to identify these households through a variety of means. A total of 359 alternative dwelling types was identified. Of the alternative dwellings thus identified, 199 were usable and comprised the population of the study. Since all houses were used for mailing, the inferential population and original sample list were the same for households of solar, earth-sheltered and wind-generator houses.

Residents living in alternative houses, who were selected through the sampling procedure described above, provided data. Data were collected between March and May, 1983. Of the 359 alternative dwellings identified, 199 (55 percent) responses were received. Data were analyzed using the statistical analysis system (SAS). Frequency, percentage and chi-square were used.

Results

For questions about awareness of tax benefits, results are summarized in Table 1. Respondents living in both conventional housing and energy efficiency housing were equally aware of the federal income tax credit. Of the 86 percent who were aware, 34 percent of the respondents made claims for tax credits in conventional housing. Among those living in energy efficient housing, including solar, earth sheltered and wind generator homes, of the 92 percent who were aware, 78 percent had made claims for tax credit. A significant difference was found among those living in conventional and energy efficient housing using chi square analysis ($X^2 = 36.06$ significant at the .0001 level).

More conventional dweller respondents were unaware of the state income tax than energy efficient dwellers. Of the 87 percent living in conventional housing that were aware of the income tax credit, only 22 percent had made claims. Of the residents living in energy efficient housing, over 95 percent were aware of the state tax credit and 82 percent had made claims. When compared to the two housing types, significant differences were found ($X^2 = 102.39$ significant at the .001 level).

Table 1. Tax Benefits Information by Conventional Versus Alternative Housing

Variable	Category	Conventional		Alternative		X^2
Federal Income Tax	Not Aware of Benefit	7	14.0	11	7.4	35.61*
	Aware, but no Claim	26	52.0	21	14.1	
	Aware & Claim Made	17	34.0	117	78.5	
State Income Tax	Not Aware of Benefit	8	9.6	8	3.5	100.86*
	Aware, but no Claim	56	67.5	31	13.5	
	Aware & Claim Made	19	22.9	190	83.1	

*Significant at p = .0001

The respondents living in the alternative housing types were very much aware of the tax benefits and the use of them. Table 2 presents information among the residents by housing type. In all three housing types most of the respondents were aware of the federal income tax credit. Those living in solar and wind generator homes made more claims, 85.4 percent and 94.4 percent respectively. Earth sheltering as a concept usually does not qualify for the specific factors of the tax credits. Thus, it would appear that information about available tax benefits is well disseminated. The chances of taking advantage of the benefits seems very high.

For the state income tax credit, when comparing among housing types, a little over 1 percent of the residents in solar and wind were unaware of the state income tax benefit. Once again, those living in solar and wind had a higher percentage of respondents taking advantage of the tax credit.

The respondents were asked what their decision would have been if the benefits were not available. Over 50 percent of the respondents would not have considered the energy related equipment. When compared among housing types, using X^2, significant differences were found. (Table 3). About 68 percent of the residents in earth sheltered homes showed positive responses even

Table 2. Tax Benefits Information Among Residents of Alternative House Types

Variable	Category	Alternative					
		Solar		Earth Sheltered		Wind	
		n	%	n	%	n	%
Federal Income Tax	Not Aware of Benefit	7	8.5	2	6.5	2	5.6
	Aware, but no Claim	5	6.1	16	51.6		
	Aware & Claim Made	70	85.4	13	41.9	34	94.4
State Income Tax	Not Aware of Benefit	2	1.5	7	13.5	1	1.9
	Aware, but no Claim	12	9.4	19	36.5		
	Aware & Claim Made	114	89.1	26	50.0	50	98.1

Table 3. Decision Affected by the Income Tax Credits

Without the Claim, the Decision	Solar		Earth Sheltered		Wind Generator	
	n	%	n	%	n	%
Definitely Not	19	15.2	2	5.0	13	21.7
Probably No	54	43.2	11	27.5	30	50.0
Probably Yes	37	29.6	9	22.5	11	18.3
Definitely Yes	15	12.0	18	45.0	6	10.0

$X^2 = 31.12$, $p = 0.001$

though no benefits existed, while more negative responses were shown among residents in wind generated houses (about 72 percent). It appears residents in earth sheltered houses make decisions based on factors other than tax credits, while those living in solar and wind generated houses did take into account the income tax credit.

If information about tax credits is well disseminated it appears that people will more carefully consider energy efficient features and are more likely to benefit from them. Furthermore, the tax credits functioned as an incentive for the respondents to adopt energy efficient features.

The repondents were asked about the types of claims that were filed for specific features. These are summarized in Table 4. Among the respondents living in energy efficient alternative housing about 55 percent had active solar collectors. Twenty-three percent had wind generator systems. Insulation (22.7 percent), storm doors and energy windows (21.8 percent) were the next largest features of tax credits which were filed.

Some of the features which can be applied to houses regardless of house type, such as insulation, storm doors and indoor energy windows were compared among house types. Over 58 percent of the credits for insulation were made in solar houses while about 27 percent were in wind generated homes and 14 percent in earth sheltered housing. Over 56 percent of the credits for storm doors and indoor energy windows were made in solar houses while about 32 percent in wind generator houses and about 12 percent in earth sheltered houses. Solar residents appeared as decision makers most actively involved in taking benefit of income tax credit.

Summary and Conclusions

Results were summarized under three specific objectives:

(1) Residents living in energy efficient alternative housing such as solar, earth sheltered and wind-generator houses were mostly aware of tax credits.

Table 4. Credits Earned by Housing Types

Housing Type	Respondents		Solar		Earth Sheltered		Wind Generator	
Credits received	n	%[a]	n	%[b]	n	%[b]	n	%[b]
Active solar collectors	142	54.62	116	81.69	15	10.56	11	7.75
Passive features	10	3.85	5	50.00	4	40.00	1	10.00
Insulation	59	22.69	35	59.32	8	13.56	16	27.12
Wind generator	61	23.46	0	0.00	5	8.26	56	91.80
Storm door/indoor energy window	57	21.92	37	56.14	7	12.38	18	31.58
Wood heater	3	1.15	1	33.33	1	33.33	1	33.33
Back up thermostat	2	0.77	2	100.00	0	0.00	0	0.00
Ceiling fan	2	0.77	1	50.00	1	50.00	0	0.00
Geothermal heat pump	5	1.92	3	60.00	3	40.00	0	0.00
Weatherstrip & caulking	3	1.15	2	66.67	0	0.00	1	33.33

[a] Percentage out of the number of respondents 260.
[b] Percentage out of the number of respondents in each item.

Among people who were aware, over 85 percent in solar houses and 100 percent in wind-generator houses made claims for federal income tax credit and over 89.1 percent in solar houses and 98 percent in wind-generator houses made claims for state income tax credits. Among residents in earth sheltered houses who were aware of this benefit, over 55 percent and 42 percent did not make claims for federal and state income tax credits respectively.

(2) Tax credit appeared to have functioned as strong incentives to disseminate alternative energy efficient features to residents living in alternative houses. Over 58 percent in solar and about 72 percent in wind-generator houses answered negatively that they would not adopt this feature if tax credit were unavailable. However, earth sheltered residents showed their strong decisions regardless of the benefits.

(3) Active solar collectors were most frequently claimed which was followed by wind-generators. Some common features applicable to any type of house which were claimed frequently were insulation and storm doors and indoor energy windows. These features were mainly claimed among residents in solar and wind-generator houses in order.

On the basis of this summary of results, certain conclusions were drawn. Decisions to adopt energy efficient features among residents living in solar and wind-generator houses were dependent largely upon available tax credits. Residents in earth sheltered houses had decision strong enough to adopt innovative features regardless of availability of tax credits.

For residents in earth sheltered houses, there has not been any major tax benefits for structural or construction features. There is a great need to consider tax benefits for earth sheltered housing for moderate income families.

Therefore, the expiration of income tax credits which have been established and the addition of tax credits for earth sheltered houses need to be seriously considered if government wants to resolve the energy crisis by emphasizing the use of alternative resources in residential housing.

References

Olson, F.F. State Tax Incentives for Solar Energy. *Journal of Energy and Development,* 6, 1981, 281-296.

Ritchie, J. *Successful Alternative Energy Methods.* Farmington, Michigan: Structures Publishing Company, 1980.

Tatum, R. *The Alternative House,* Los Angeles: Reed Books, 1978.

Tennessee Valley Authority, Residential Energy Tax Incentives. 1983, #TVA/OP/ECR-83/26.

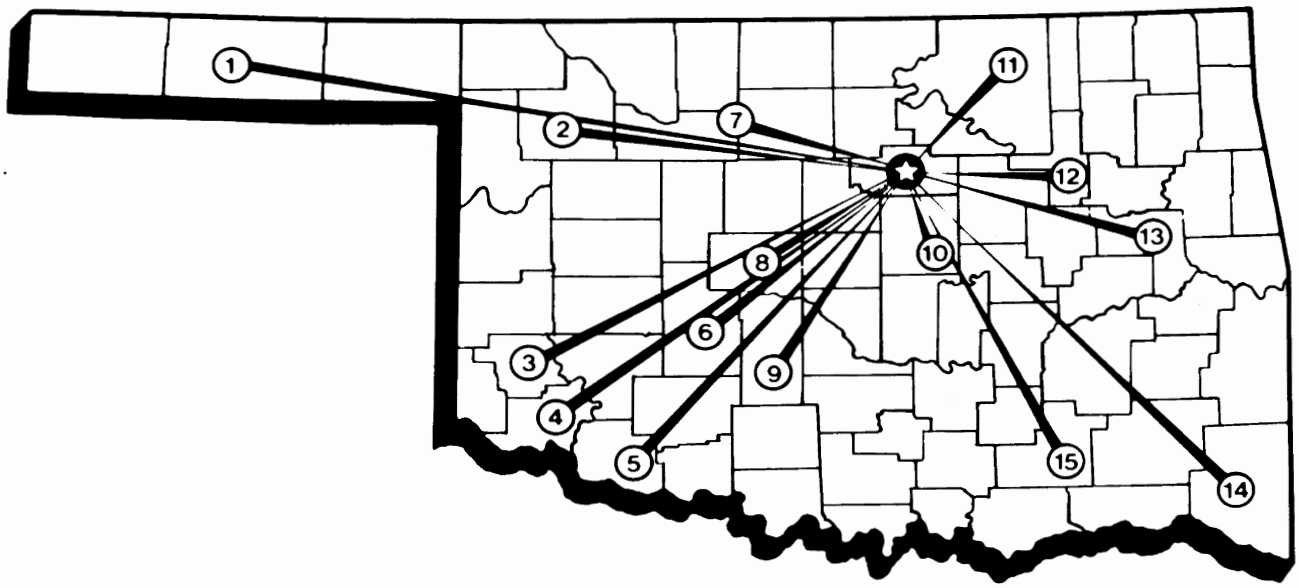
U.S. Department of Housing and Urban Development. *Rapid Growth from Energy Projects,* Ideas for State and Local Action, 1976.

Winek, G.J. Government: Its Energy Policy and Activities. *Man Society Technology.* September/October, 1980, 18-20.

Research reported herein was conducted under Oklahoma Agricultural Experiment Station Project No. 1935.

 This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agriculture and has been prepared and distributed at a cost of $442.15 for 500 copies. AI 5630 0486 PD.

OKLAHOMA
AGRICULTURAL EXPERIMENT STATION
System Covers the State



★ Main Station—*Stillwater, Perkins and Lake Carl Blackwell*

1. Panhandle Research Station — *Goodwell*
2. Southern Great Plains Field Station — *Woodward*
3. Sandyland Research Station — *Mangum*
4. Irrigation Research Station — *Altus*
5. Southwest Agronomy Research Station — *Tipton*
6. Caddo Research Station — *Ft. Cobb*
7. North Central Research Station — *Lahoma*
8. Southwestern Livestock and Forage Research Station — *El Reno*
9. South Central Research Station — *Chickasha*
10. Pecan Research Station — *Sparks*
11. Pawhuska Research Station— *Pawhuska*
12. Vegetable Research Station — *Bixby*
13. Eastern Research Station — *Haskell*
14. Kiamichi Field Station — *Idabel*
15. Southeastern Oklahoma Agricultural Research and Extension Center — *Lane*