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The Arizona Solar Tax Incentives Package

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Abstract

The State of Arizona has enacted into law one of the nation's most comprehensive and consumer oriented set of tax incentives to encourage the use of solar energy devices. The development of these incentives and their required regulations and guidelines are covered.

1. INTRODUCTION

On April 20, 1977, President Jimmy Carter called for the rapid passage of the proposed National Energy Act containing the Federal solar energy tax credits. Despite the nearly 18 months that have since passed, despite the precipitous decline in the solar industry due to the unfulfilled expectations of consumers awaiting the Federal tax credit, despite the unified voice of the top energy officials from all fifty states calling for their immediate passage, despite all that further delay could mean, the Federal government-the Congress and the Administration-have thus far failed in their promise to the American public and the solar industry. However, inspite of this void of leadership at the National level, States have moved forward to offer solar tax incentives of their own, thus helping to alleviate the impact of the delayed Federal solar tax credits.

In 1974, Arizona became one of the first two states to offer tax incentives to encourage the use of solar energy. In that year, Arizona passed an income tax deduction for the use of solar and exempted solar devices from the State property tax. That same year, Indiana also provided relief from their property tax for installing solar systems.

Since 1974, many other states have enacted various forms of tax incentives for solar energy use. As of the start of this year, over thirty states provided some combination of the tax incentive approaches contained in the Arizona Solar Tax Incentives Package. This has most certainly been an area where the states have led and the Federal government has been slow to follow.

2. ARIZONA SOLAR TAX INCENTIVES

The State of Arizona has enacted into law, effective with 1978, one of the nation's most comprehensive and consumer oriented set of tax incentives to encourage the use of solar energy devices. This incentive package includes an income tax credit for residential solar devices and insulation, an income tax deduction and rapid amortization for commercial or residential solar energy devices, an exemption from the state retail sales tax for solar energy devices, and a property tax exemption for the value of installed solar devices.

The present Arizona solar tax incentives are the culmination of a series of pieces of legislation enacted since 1974 and standardized in 1978. These incentives have been designed to be easily obtained and used by the solar consumer and yet workable by the State. The Solar Energy Research Commission has worked closely with the Arizona Department of Revenue to develop reasonable rules and regulations for these tax incentives.

The Arizona Solar Tax Incentives are useful to consider outside of the State because they encompass the four major types of incentives and can be useful to other states in developing or implementing incentives of their own.

2.1 Legal Definition of "Solar Energy Devices"

At the end of 1977, there were four solar tax incentives that had been enacted into law. Each contained a different definition of what a solar device or system was. In 1978, the four acts were unified and a standardized

definition of "solar energy device" was established to avoid the rising confusion over what was and was not included for each incentive. The definition that was adopted for all four solar tax incentives was as follows:

> Solar Energy Device - A system or series of mechanisms designed primarily to provide heating, to provide cooling, to produce electrical power, to produce mechanical power or to provide any combination of the foregoing by means of collecting and transferring solar generated energy into such uses either by active or passive means. Such systems may also have the capability of storing such energy for future utilization. Passive systems shall clearly be designed as a solar energy device such as a trombe wall and not merely a part of a normal structure such as a window. Component parts purchased during the taxable year which are incorporated in an operating solar energy device as defined herein shall be eligible for the tax credit.

This definition was developed to allow both passive and active solar systems without allowing devices or designs which only serve an incidental solar purpose such as a south window in an ordinary house. Component parts are also included to permit the sales tax exemption.

The development of a clear, workable definition for the legislation establishing the incentives is critical. Administrative decisions can clarify or extend, but they must be based on the law. A poorly worded law can make an incentive unworkable, or worse, can change it into a barrier by confusing the public.

2.2 Property Tax Exemption

Solar energy devices on systems installed on residential or commercial property are exempt from the state property tax. The value of such equipment is not included in the assessment of the property value for tax purposes. The tax assessors simply ignore the solar systems up to the point of integration with the conventional systems. An active solar domestic water heating system using a single conventional gas or electric tank is exempt up to the tank. For a two tank system, the second tank is exempt as it would not be present with a "conventional" system. If a single special "solar tank" designed specifically for use in a solar system is used, then the tank is excluded. Passive systems are more difficult to determine and cause the most difficulty in developing reasonable regulations and guidelines for any of these incentives. Again, the concept of "beyond the conventional" or "up to the point of integration with the conventional system" apply. An architectural feature such as a drum wall "specifically designed" as a passive solar feature and not performing structural functions (i.e. non-load bearing) would qualify as a solar device assuming the capabilities of collection, storage, transport, and control (active or passive) are present in the "device." A load bearing drum wall would only be partially exempt since it performs both a solar function as well as a structured function that would normally be present. These same considerations apply in determining items qualifying for the other incentives.

The major problem with a property tax incentive is assuming that all assessors understand it and realize that the Solar Commission can provide technical assistance in resolving unclear cases. A short training workshop will be set up to aid in solving this problem. The major benefits of this incentive are two fold. First, there is a strong psychological incentive to utilizing solar when the consumer realizes that he can make a real property improvement that will increase the actual value of his property without increasing his property tax. Secondly, even though on a year-by-year basis this is normally not as significant of an incentive as an income tax credit or deduction, on a cumulative basis this type of incentive can have a major impact.

2.3 Retail Sales and Use Tax Exemption

The Retail Sales and Use Tax Exemption exempts solar energy devices from the State's four-percent Transaction Privilege and Use Tax. This applies to component parts that will be incorporated into a solar system as well as collector panels or complete solar systems. It was necessary to include the components to provide a benefit to the do-it-yourselfers and the component part solar stores that are beginning to appear. This, however, has opened a Pandora's box. Copper pipe, lumber, even nails can be components of a solar system. There appears little way of being sure that such merchandise is indeed intended for solar use. It has been decided to require that the seller has a short form filled out and signed by the buyer stating, under penalty of law, that the merchandise bought under this exemption will be installed in an operating solar device within one year. If the buyer failed to do so, the State could recover the unpaid taxes and invoke a penalty.

The sales tax exemption appears to be the least important and most difficult to administer of the tax incentives. The removal of the four-percent tax is not as important of an incentive as the other three tax incentives. In addition, as long as the cities do not also lift their sales tax on solar devices-and none yet have in Arizona-the reporting burden on the solar seller is nearly as great with or without the State tax. Many of the administrative problems could be avoided if addressed in the legislation. In our attempt to standardize our solar incentives laws, the State revised the laws to all apply to "solar energy devices" and to contain the same definition of the devices. This causes no problems when referring to completed operating systems under the property tax or income tax regulations. But, to offer a sales tax requires the exemption to be allowed on components of

uncompleted solar systems since a complete, operating solar system is seldom sold under retail sales as such. We would recommend that sales tax exemptions be defined independently of other solar incentives and be strictly limited to those components or devices specifically designed and sold as solar components or devices and not allow common building materials such as pipe or lumber. This approach would make this incentive much more reasonable from both the State's point of view and the seller's.

One other problem arose in the promulgation of the Arizona sales tax incentive out of a quirk in State law. Presently this exemption does not apply to sales made by contractors for equipment and installation unless the sale of the equipment and the installation are handled under separate contracts so the sale of the materials can be considered a "retail" sale. This is because the sales tax law appear under four seperate provisions of law. The two provisions dealing with retail sales were amended to include the solar exemption. Unfortunately, the two sections dealing with the sales tax paid by contractors on materials were not addressed due to an oversight. Until this is corrected, contractors providing and installing solar equipment under a single contract will have to pay the sales tax and pass it on to the consumer.

2.4 Income Tax Deduction

A tax deduction is provided for the installation of solar energy devices on residential commercial, or industrial properties including those designed for experimental or demonstration purposes. This deduction permits the taxpayer to amortize the adjusted basis of the device based on a thirty-six month period beginning with the month in which the device is completed or acquired and is placed in service by the taxpayer. This deduction is in lieu of any depreciation allowance.

This deduction is off the gross income, the so-called "top line." Homeowners can elect to claim this deduction or the solar tax credit described below, but not both. For most solar projects, the homeowner benefits much more from the credit which is against the tax liability, or the "bottom line." However, in some cases involving the more expensive solar systems such as space conditioning systems exceeding five or six thousand dollars, the deduction could be of greater benefit.

2.5 Income Tax Credit

Arizona homeowners can claim a credit against their State tax liability for the installation of solar energy devices. The allowable credit for the tax year 1978 is 35% of the installed cost of the solar system(s) with a maximum credit of $1,000.00. This credit is used to offset tax liability and can not be rebated. Any excess credit can be carried over for up to five years, to offset future State income tax liability. This tax credit is independent of any Federal tax credit that may be enacted. If the proposed Federal solar tax credit is passed, then the credit allowed by the Federal law would be additive to the State tax credit (30% of the first $2,000 and 20% of the next $8,000). For installations installed in 1978, this would result in combined tax credits for an $1,800 solar domestic water heater of 65%, or 10% greater than the California tax credit of 55% which is not additive with the Federal credit. The California credit allows a maximum combined State and Federal credit of 55%. An Arizona taxpayer could recover two-thirds of the cost of his solar system in combined tax credits. Figure 1 shows an example of the use of this credit.

Figure 1. 1978 Solar Tax Credit Example

During 1978, a homeowner purchased a solar water heating system for his house at a cost of $1800. His tax liability without the credit is $386. His allowable tax credit would be applied as follows:

Tax Liability.	$386.00
Less Solar Device Credit	-$630.00
35% of $1800 not to exceed $1000	
1978 tax liability remaining . .	$ 0.00
Arizona income tax withheld. . . (from W-2)	$318.00
Amount refunded to taxpayer. . .	$318.00
Solar tax credit utilized. . . .	$386.00
Balance of credit to be carried over to 1979 tax return	$244.00

Without the tax credit, the taxpayer in figure 1 would have owed $68.00 in taxes beyond the $318.00 that had been withheld. The solar tax credit zeroed out his tax liability for 1978 causing the entire withholding to be excess withholding paid eligible to be refunded. The remainder of the credit is carried forward since rebates are not permitted.

In Arizona, without tax incentives, an $1800 solar water heater would have a simple payback period of about six years when compared to electric water heating. With the 35% State solar tax credit this reduces to about four years. If the still-to-be enacted Federal credit is added, this reduces the the period to only two years.

A homeowner can only claim a maximum of a $1,000.00 State solar credit for a given residence. This may be for a variety of devices over different tax years as long as the cumulative total credit does not exceed the $1,000.00. In addition, the percentage allowed as a credit decreases by 5% each year until the credit expires at the end of 1984, as Figure 2 shows.

Figure 2. Percentage Allowed As Solar Tax Credit

TAX YEAR	CREDIT PER CENT	MAXIMUM CREDIT
1978	35%	$ 1000
1979	30%	1000
1980	25%	1000
1981	20%	1000
1982	15%	1000
1983	10%	1000
1984	5%	1000

Development of those items that do and do not qualify for the credit was a critical matter. Decisions were based on the concepts of requiring "devices" be specifically designed to collect and transfer the solar generated energy, not only being incidentally solar, and that the solar system ends where it is integrated or connected to a "conventional" energy system. The following are some of the items that qualify for the solar energy tax credit;

- Flat plate or concentrating solar collectors
- Solar domestic hot water systems
- Solar space heating and/or cooling systems
- Solar pool heaters including cost of pool covers if incorporated as an integral part of an active solar system
- Passive solar features such as Trombe walls and attached solar greenhouses for space conditioning
- Photovoltaic devices providing electrical power to the residence
- Solar ovens permanently affixed to the property
- Heat transportation systems required by solar system
- Thermal storage devices for storing solar produced heat including; rock beds, water tanks, drum walls, and heat of fusion devices
- Controls and monitoring devices required in solar system including movable insulation to minimize night heat loss in direct solar heat gain areas
- Metal hydride equipment for storage of solar produced hydrogen
- Batteries used for storage of solar produced electricity
- Services, licenses, or permits directly related to the use of solar installation costs directly required for the solar system
- Partial cost (50%) of thermal contact ceilings for energy collecting roofs
- Partial cost (see figure 3) of solar wall glazing materials

Figure 3 illustrates the method of determining the amount of glazing on a south facing "solar wall" that will be eligible for the solar credit.

Figure 3. Method For Determining Credit For Solar Wall Glazing

X - Percentage of glazing contained within the designated solar surface of the south facing wall in respect to the area of that wall

Y - Percentage of glazing on non-solar surfaces; north, east, west, and non-solar south walls in respect to the area of those walls.

Z - Percentage of glazing eligible for solar tax credit.

$$Z = X - Y$$

The percentage of glazing eligible for solar tax credit (Z) then is multiplied by the total invoice cost of the glazing used on only the designated solar surfaces of the south facing walls.

The following are some of the items that do not qualify for the solar energy tax credit;

- Claimant's personal labor costs
- Greenhouses not designed and used as residential solar "furnace"
- Reflective screen for air conditioners
- Masonry walls or Subterranean retaining walls
- Auxiliary heating systems not incorporated in solar storage devices
- Equipment for electrolysis of water
- Organic waste piles
- Evaporative coolers or cooling towers
- Vegetation or landscaping
- Swimming pool blankets or covers not incorporated in an active solar pool heating system

A greenhouse may be considered solar energy equipment when used in the form of a solar heat furnace to supply heat for the actual residence and is so designed as to be insulated to prevent nocturnal heat losses. Solar pool heating systems are also included along with pool covers incorporated in the active system to reduce heat losses. Pool covers by themselves are not considered solar devices. They merely reduce losses from the pool and, at least to a degree, actually attenuate the solar heat gain of the pool. Masonry or adobe walls or floors are

also not eligible unless they are specifically designed as a solar device such as a trombe wall where their main purpose is not structural or insulative, but solar heat collection and transfer.

Also provided with the solar tax credit is a 25% credit for added insulation and certain energy-savings devices. This credit has a maximum of $100 and allows no carry over. The items that qualify under this credit include;

- Roll, loose fill, rigid, foam insulation
- Reflective glass, screen or reflective films
- Awnings over sun exposed windows
- Sunscreens
- Patio covers over sun exposed windows
- Insulating windows (storm windows and multiple glazed windows)
- Thermal insulating doors
- Wind driven turbine attic ventilators
- Mechanically driven attic ventilators
- Passive roof vents
- Waste heat water heaters
- Water heater insulating jackets

This does not include aluminum foil on windows, drapes or any other device not specifically designed to retard heat flow in or out of the building envelope such as paint or vegetation. To qualify for the tax credit, the insulation must be in addition to that existing in the residence or in addition to that normally installed in a new residence.

2.6 Incentive Regulations

The regulations for tax legislation are the responsibility of the Arizona Department of Revenue. The regulations for the solar tax incentives were developed as a combined effort of the Department of Revenue and the Solar Energy Research Commission utilizing input from the Arizona Office of Energy Programs, the Legislative staff, the energy conservation industry, and the solar industry. The credit regulations were the first and most important developed and served as the basis for the other incentive regulations. Public hearings were held on the credit and sales tax incentives prior to adopting the regulations.

The major point of controversy was whether or not pool covers were to be considered solar devices. Even though some covers fall under the California credit, after lengthy discussion it was decided that such covers did not fit the Arizona determination of "solar energy devices."

This type of cooperation between State agencies, allowing for a great deal of public input is vital in developing useful regulations for such solar incentives. Many potential problems or opportunities would have been overlooked in a more closed approach. The aid of an agency, expert in solar matters, is especially necessary to any tax agency in such matters.

2.7 Problems and Changes Still To Be Addressed

Though Arizona has what is most likely the most comprehensive solar tax incentive package in the Union, there are still areas of concern and room for improvement. The following are some of the recommended changes to be addressed for legislation this next year.

The delay in the Federal solar tax credits and lifting of portions of the State's natural gas moratorium combine to create a sagging condition in the solar market. It will be recommended that the 35% level of the tax credit be continued through 1981 before beginning the de-escalation by 5% per year. In addition, the credit or deduction should be tied to some quality assurances to prevent the State from subsidizing sub-standard equipment. While not going as far as the California standards, it is recommended that Arizona require a one-year minimum warranty and certification of testing by a third party independent testing laboratory in accordance with ASHRAE 93-77, except for site-built collectors, and that a copy of such warranties and test reports be on public file with the Solar Energy Research Commission for the system to be eligible for the credit.

To provide an incentive for home builders to include solar on new homes, it is recommended that the tax credit be extended to the home builders who could pass it on to the home buyer. To provide an incentive to low-income families, a low interest State guaranteed solar loan program for low-income families is proposed. This avoids the many problems inherent in allowing the credit to be rebatable.

Two other items have also been recommended to clean up the present legislation. First is to extend the sales tax exemption to the contractor related portions of State sales tax law. The second is to add pool covers as an eligible item under the insulation and energy-savings tax credit.

3. CONCLUSION

Solar tax incentives are powerful tools that the States can use to encourage the more rapid development of solar energy utilization. These State efforts, rather than being a drain on a State's treasury, can help to improve a State's economy by making more rapid the development of this new industry with its many and varied jobs and economic benefits. Proper design of the enabling legislation and regulations developed in a cooperative

effort between the State's tax and solar/ energy offices with open public input is critical to providing successful and useful solar tax incentives. It is also necessary for the State's to mount a major public information campaign to inform the public about the tax incentives. Arizona is only now launching such a large scale campaign, now that the regulations have been promulgated.

States considering solar tax incentives are encouraged to write the Arizona Solar Energy Research Commission for a copy of the "Digest of Arizona Solar and Insulation Tax Incentives-Legislation and Regulations." This digest will contain the actual legislation creating the solar tax incentives and the regulations and guidelines that have been developed to enact them.

The Arizona experience can be useful to other states, enabling them to learn from our mistakes and successes. It can also provide a guideline to start from rather than beginning from scratch. The passage of the Federal solar tax credits will not remove the need for states to develop incentives of their own for solar development. The benefits to each state doing so will undoubtedly far exceed the costs.

4. BIOGRAPHY

Mr. Donald E. Osborn is the Associate Director of the Arizona Solar Energy Research Commission, the State Agency charged with the development and promotion of solar energy in the State. He is responsible for development and analysis of solar and energy conservation legislation, technical analysis, and supervision of State solar projects and research programs, and the State's energy public information program including the Arizona Energy Extension Service development program.

A graduate engineer of the University of Arizona, he has been professionally involved in solar research and development since 1975, in both private industry and at the University level before coming to the Commission in July 1977. He is also Vice-Chairman of the Arizona Solar Energy Association.