ALTERNATIVE ENERGY EQUIPMENT INVESTMENTS: THE EFFECTS OF RAPID AMORTIZATION

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INTRODUCTION

In 1980, the California Legislature enacted AB 2893 (Chapter 1327, Statutes of 1980), which shortened the time period over which certain "alternative energy" equipment can be depreciated for California tax purposes. Specifically, AB 2893 provides that specified alternative energy equipment placed in service before January 1, 1986, can be depreciated over either a one-year or five-year period when the equipment is located in-state, and over a five-year period when the equipment is located out-of-state. Prior to AB 2893, the amortization period for this equipment generally corresponded to the equipment's useful economic life. This could be as much as 20 years or more.

The Legislature's intent in enacting AB 2893 was to stimulate investment in alternative energy equipment by making it more profitable, and thereby make the production and use of energy within California more efficient.

PURPOSE OF THE REPORT

Assembly Bill 2893 also required the Legislative Analyst's office to submit to the Legislature a report on alternative energy equipment investments in California. This report must evaluate the measure's effects on both state revenues and taxpayers, determine the conditions under which the investment incentive of rapid amortization is maximized, and provide data on the number and kind of alternative energy equipment facilities that have been established in California.

(In a related report to the Legislature--Cogeneration Equipment Investments: The Effects of Rapid Amortization, Report Number 85-16--we discuss the effectiveness of accelerated depreciation in stimulating the purchase of cogeneration equipment.)

OUTLINE OF THE REPORT

This report is divided into five chapters.

Chapter I presents general background information related to AB 2893, including a description of "alternative energy" equipment, and how AB 2893's rapid amortization provisions have changed the way that this equipment may be depreciated for California tax purposes.

Chapter II presents data on the number and kinds of alternative energy equipment facilities in California, including the number of new facilities that have come "on line" since AB 2893 was enacted.

Chapter III discusses the effects on taxpayers of the reduced amortization periods provided by AB 2893.

Chapter IV assesses the impact of AB 2893 on state revenues.

Lastly, Chapter V presents our recommendation to the Legislature regarding the amortization period for alternative energy equipment.

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EXECUTIVE SUMMARY

In 1980, the Legislature shortened the time period over which certain "alternative energy" equipment can be depreciated for California tax purposes. This equipment includes equipment used in solar, wind, geothermal, small-scale hydroelectric, biomass, and nonconventionally fueled cogeneration applications. The intent of AB 2893 was to stimulate investment in this type of equipment by making it more profitable, and thereby make the production and use of energy in California more efficient.

Principal Findings

- Since 1980, identifiable investment in alternative energy equipment within California has totaled well over $6.1 billion (1984 dollars). Of this amount, about $1.3 billion potentially qualifies for rapid amortization under the provisions of AB 2893. Most of the balance--approximately $4.3 billion--has qualified for the solar tax credit, and consequently is not likely to be eligible for rapid amortization.
- The shorter depreciation periods provided by AB 2893 do not appear to have increased significantly alternative energy investments in California.
- AB 2893 appears to have cost the state more in tax revenues than it has generated.
- The Legislature could make rapid amortization a somewhat more powerful investment incentive, but it is not at all clear that doing so would increase investment in alternative energy equipment by any significant amount.

- Providing rapid amortization at the state level is inherently inefficient as a means of stimulating investments in alternative energy equipment (and, for that matter, investment in most other types of equipment as well). This is because most of what it costs the state to provide this incentive represents "windfall" benefits to both taxpayers whose behavior is unaffected by the incentive and the federal government.

The primary reason why AB 2893 has not had a significant impact on the level of investments in alternative energy equipment is that the shorter amortization period does not provide a strong financial inducement to this type of investment. For example, it appears that for a typical medium-sized alternative-energy project, AB 2893 shortens the payback period (normally in the range of three to seven years) by only one to four months, and increases the annual rate of return (normally in the range of 10 percent to 35 percent) by no more than 0.6 to 1.8 percentage points. This conclusion is also supported by the survey data that we collected from biomass-fueled cogeneration projects.

As a result, the main effects of AB 2893 appear to be (1) an increase in investors' after-tax income, and (2) a redistribution of revenues from California to the federal government because of state-federal tax interactions.

Recommendation

Absent data demonstrating that AB 2893's rapid amortization provisions are a cost-effective means for stimulating investment in alternative energy equipment, we recommend that the Legislature not extend these provisions beyond December 31, 1985, when they are scheduled to expire.

CHAPTER I

BACKGROUND

In 1980, the Legislature enacted AB 2893, which shortens the time period over which "alternative energy equipment" can be depreciated for California tax purposes. Specifically, AB 2893 provides that such equipment can be depreciated over either a one-year or five-year period when the equipment is located in-state, and over a five-year period when the equipment is located out-of-state. (The same options for claiming depreciation on state tax returns were available prior to 1980 to taxpayers investing in certified pollution control facilities.) Prior to AB 2893, the amortization period for alternative energy equipment corresponded to its useful economic life, which could be as much as 20 years or more.

Assembly Bill 2893 also specifies that:

- Any depreciation claimed using rapid amortization must be computed using the straight-line method, as opposed to one of the "accelerated" methods permitted in California such as the double-declining balance or sum-of-the-years digits methods.
- The portion of equipment costs which may be rapidly amortized depends on the equipment's economically useful life-span. If its life-span is not over 15 years, its entire depreciable cost can be rapidly amortized under the one-year or five-year options. If, however, the equipment's life-span exceeds 15 years, only a portion of this cost can be rapidly amortized--the portion corresponding to the percent that 15 years bears to the total

life-span. For example, if the equipment's life-span is 22 years, 68 percent of its depreciable cost (that is, 15 years divided by 22 years) can be rapidly amortized. The remaining portion of the equipment's depreciable cost--32 percent in this example--must be depreciated over 22 years using one of the regular alternative depreciation methods permitted for tangible personal property in California.

- Taxpayers who elect to use the five-year amortization period may, at any time during the five years, change their minds and switch back to using normal depreciation methods.
- If a taxpayer's alternative energy equipment qualifies for both rapid amortization under AB 2893 and the state's solar tax credit, only one of these benefits may be chosen. That is, rapid amortization is "in lieu" of the solar tax credit.

Assembly Bill 2893 was accompanied by AB 1404 (Chapter 1328, Statutes of 1980), which made the rapid amortization provisions in AB 2893 available to cogeneration equipment, as well. The Legislature's intent in enacting both bills was to stimulate equipment investments in energy technologies which would make energy production and use in California more efficient.

The provisions of AB 2893 apply only to alternative energy equipment placed in service before January 1, 1986, and for which no building permit or binding financial commitment relating to the equipment had been applied for before January 1, 1980.

Definition of Alternative Energy Equipment

In order to qualify for rapid amortization under AB 2893, equipment must be used to produce or convert energy using either solar energy, geothermal energy, biomass energy, small-hydroelectric energy, or cogeneration techniques. These sources are defined in AB 2893 as follows:

- Solar energy: The use of solar or wind energy devices for production of electricity, mechanical work, space heating, water heating, or industrial process heat.
- Geothermal energy: The use of heat from the earth to generate electricity or for heating purposes.
- Biomass energy: The use of vegetative material to generate steam, electricity, or mechanical energy by direct burning or conversion to another form of fuel.
- Small hydroelectric energy: The use of hydroelectric generating equipment with an installed capacity of less than 25 megawatts.
- Cogeneration: The use of cogeneration technology as defined in Section 25134 of the Public Resources Code of the State of California. This code section defines "cogeneration" as the sequential use of energy for the reproduction of electrical and useful thermal energy, in either order, subject to the following two conditions:
  - At least 5 percent of a cogeneration project's total annual energy output must be in the form of useful thermal (as opposed to electrical) energy,

- For a cogeneration system where the useful thermal energy is produced after the electricity is produced, the system must meet a minimum level of efficiency in converting fuel to electricity. (Specifically, its useful annual electricity output plus one-half its useful annual thermal energy output must be at least 42.5 percent of any natural gas and oil energy input.)

The bill also restricts the rapid amortization option to equipment or projects which do not use either fossil fuel (e.g., oil, natural gas, and coal) or nuclear fuel as their primary energy source.

CHAPTER II

THE NUMBER AND KIND OF ALTERNATIVE ENERGY EQUIPMENT FACILITIES IN CALIFORNIA

It is difficult, if not impossible, to identify precisely the number and characteristics of alternative energy equipment facilities in California. This is due to a number of factors, including the rapid growth in the alternative energy equipment industry that has taken place during the last several years, the small size of many facilities, and the absence of any single comprehensive data bank containing information on these facilities. Nevertheless, information on alternative energy equipment can be obtained from such sources as utility companies, industry trade associations, governmental entities such as the California Energy Commission (CEC) and the Franchise Tax Board (FTB), and private energy research firms.

This chapter summarizes the available information on the alternative energy equipment in California which potentially qualifies for rapid amortization under AB 2893. It focuses on the following major types of this equipment: solar energy systems, biomass systems, nonfossil-fueled cogeneration systems, geothermal facilities, and small-scale hydroelectric facilities.

A. Solar Energy Equipment Facilities

Data are available on three different categories of solar energy equipment: (1) active solar water heating and space heating equipment (2) wind energy systems and (3) photovoltaic and solar thermal electric systems.

1. Active Solar Water Heating and Space Heating Equipment

Table 1 summarizes the number of active solar water heating (SWH) and solar space heating (SSH) systems installed between 1977 and 1984. The data in the table reflects estimates made by the FTB and CEC, based on claims for the solar tax credit filed by California taxpayers. Table 1 indicates that:

- SWH and SSH installations through 1984 are estimated at 296,040 and 19,130, respectively.
- Since 1980, when the provisions of AB 2893 became effective, SWH and SSH installations have amounted to 284,220 and 13,050, respectively.

Solar water heating and SSH equipment vary considerably in terms of their capital costs, size, useful life-span, and energy-producing capabilities. The CEC, however, has developed a set of economic and energy-performance characteristics which it believes define "typical" SWH and SSH systems. These characteristics form the basis for the data presented in Table 2. Tables 1 and 2 suggest that, from 1977 through 1984, SWH investments have totaled $1.6 billion and SSH investments have totaled $270 million, for a total of about $1.8 billion.[1]

1. To the extent that California solar tax credits are not claimed for all SWH and SSH installations, these figures are downward biased.

Table 1

Active Solar Water Heating and Space Heating Installations
in California
1977 through 1984[a]

Year[b]	Number of Solar Equipment Installations			
	Active Solar Domestic Water Heating Equipment		Active Solar Space Heating Equipment	
	Annual	Cumulative	Annual	Cumulative
1977	2,340	2,340	1,190	1,190
1978	3,380	5,720	3,120	4,310
1979	6,100	11,820	1,770	6,080
1980	20,670	32,490	3,470	9,550
1981	67,310	99,800	1,510	11,060
1982	62,170	161,970	4,390	15,450
1983	91,570	253,540	2,580	18,030
1984	42,500	296,040	1,100	19,130

a. Source: California Energy Commission (CEC). This table excludes data on "passive" solar equipment installations, such as shading devices, which is not available.

b. Data for 1977 through 1983 are derived from solar tax credit claims compiled by the FTB. Data for 1984 are estimated by the CEC and its consultants, using historical data combined with "logistic market-penetration" models. (These models are designed to account for the fact that generally there are "time lags" before investors become fully aware of new technologies, such as alternative energy equipment.)

Table 2

Selected Characteristics of "Typical" Solar Energy Systems[a]

System Characteristic	Type of Solar Energy System: Active Domestic Solar Water Heating System	Active Solar Space Heating System	Wind Energy System	Photovoltaic System[b]	Solar Thermal Electric System
A. Capital and Installation Costs	$5,250[c]	$14,000	$145,080	$10,590 per kilowatt of capacity	$4,500 per kilowatt of capacity
B. Size	64 ft^2 collector	333 ft^2 collector	78 kilowatt turbine	Varies	Varies
C. Economically Useful Life-Span	15 years	25 years	10 years	30 years	30 years
D. Operation and Maintenance Costs	0.5% of system cost, per year	1.5% of system cost, per year	$0.015 per kilowatt hour	$8.30 to $14.50 per kilowatt per year	$57 per kilowatt per year
E. Energy-Producing Performance	196 therms per year[d]	360 therms per year	22% of capacity size per year	33% of capacity size per year	30% of capacity size per year

a. Source: California Energy Commission (CEC). Dollar figures reflect 1984 dollars.
b. Assumes two-axis tracking flat plate system.
c. Weighted-average costs of "new" and "retrofit" installations. "New" means installation in a new home or building; "retrofit" means installation in an existing home or building. The CEC estimates that the ratio of "retrofit" to "new" installations is about nine to one. "New" installations range in cost from $2,000 to $4,000 per system; "retrofit" systems range in cost from $4,000 to $7,000 per system. Computations assume the midpoint of these ranges, weighted as explained above.
d. Average of therm output for "new" installations (155 therms per year) and "retrofit" installations (200 therms per year), weighted as explained in footnote "c" above.

2. Wind Energy Systems

Table 3 summarizes the CEC's estimates of how many wind energy systems have been installed in California since AB 2893 became law. It indicates that between 1981 and 1984, 8,469 systems were installed with a total capacity of 630 megawatts. Installation of an additional 526 megawatts is anticipated in 1985, which would bring total installed capacity to 1,156 megawatts.

Table 2 shows the economic and performance characteristics of a "typical" wind-energy system. The table shows an average capital cost of $145,080 per installation, which suggests that the total investment value in 1984 dollars of the installations shown in Table 3 is about $2.3 billion.

3. Photovoltaic and Solar Thermal Electric Systems

Table 3 also shows the number and electricity-generating capacity of photovoltaic and solar thermal electric systems. It indicates that the total capacity installed from 1982 through 1985 is 58.3 megawatts for solar thermal systems and nine megawatts for photovoltaic systems.

Table 2 shows the economic characteristics of "typical" equipment for each of these two types of systems. The table shows an average capital cost for photovoltaic systems of $10,590 per kilowatt capacity, and $4,500 per kilowatt capacity for solar thermal electric systems. This suggests that the total investment value (1984 dollars) of these projects equals $262 million for solar-thermal systems and $95 million for photovoltaic systems, for a total of $357 million.

Table 3

Wind-Energy, Photovoltaic and Solar-Thermal
Electric System Installations
in California
1981 through 1985[a]

Year	Wind Energy Systems		Capacity Installed For:	
	Systems Installed[b]	Capacity Installed[c]	Photovoltaic Systems[c,d]	Solar Thermal Electric Systems[c,d]
1981	144	10	--	--
1982	1,145	66	--	10.0
1983	2,493	177	--	--
1984	4,687	377	7.5	18.3
1985	7,071[e]	526	1.5	30.0
Cumulative Totals, 1981 through 1985	15,540	1,156	9.0	58.3

a. Source: California Energy Commission.
b. Number of wind turbines installed.
c. Capacity in megawatts.
d. Data on numbers of systems installed are not available.
e. Estimated by Legislative Analyst's office, assuming the weighted-average megawatt capacity of systems installed from 1981 through 1985.

Summary

In sum, the total investment value (1984 dollars) of all solar energy equipment installations since the effective date of AB 2893 has exceeded $4.3 billion.

B. Biomass and Cogeneration Facilities

As noted earlier, biomass facilities involve the use of vegetative material to generate steam, electricity, or mechanical energy by direct

burning or conversion to another form of fuel. In other words, this technology converts waste residues to more usable energy forms. The conversion process can involve direct combustion, gasification, or methane fermentation, and can include cogeneration operations. Residual biomass fuel sources can be both "solid" and "nonsolid" in nature. Nonsolid fuel can include digester gas and landfill gas, which are produced using gasification techniques at water treatment plants and landfills. Solid fuel sources can include, among others, wood chips, wood bark, sawdust, tree prunings, cotton stalks, grape prunings, nut shells, and fruit pits. This fuel can be used either directly, or compressed into pellet form for transport and subsequent sale. Most biomass facilities in California use solid, as opposed to nonsolid, fuel sources.

The CEC currently attempts to maintain an up-to-date solid-fueled biomass project data base and to track all solid-fueled biomass facilities in the state. This data base includes information on biomass-fueled cogeneration facilities, which are essentially the only types of cogeneration facilities which qualify for rapid amortization under AB 2893, since systems fueled by fossil fuels and nuclear fuels are specifically excluded. In developing these data, the CEC relies on a variety of data sources, including the reports of utility companies who purchase electricity generated at biomass facilities, and CEC staff contacts with biomass projects.

Table 4 summarizes the commission's data as of September 1985. While some of the data are preliminary, the CEC believes that they constitute the most complete information currently available on biomass. The table shows that:

- As of September 1985, there were 221 biomass projects in California, with electrical capacity of 2,158 megawatts (MW) and annual biomass fuel needs of 21.6 million tons. About 37 percent of the projects were cogeneration facilities. Eighty-nine of the projects were operational (having electrical capacity of 241 megawatts and annual fuel needs of 4.5 million tons), while an additional 62 projects were in the planning, permit or construction phase (having electrical capacity of 1,139 megawatts and annual fuel needs of 9.7 million tons). The remaining 70 projects were either inactive (18 projects), abandoned (35 projects) or shutdown (17 projects). Of the 89 operational projects, all but two were privately owned.
- Approximately 46 projects qualify for rapid amortization under AB 2893. These projects have actual or anticipated operational dates after 1979 and before 1986, and account for 288 megawatts of electricity-producing capacity.
- Only 31 of 89 projects (or 35 percent) of the operational projects have come "on line" since January 1, 1980, and thus potentially qualify for rapid amortization. They account for 31 percent and 51 percent, respectively, of the fuel consumption and electrical capacity of all currently operative biomass projects in the state.

Table 4

Solid-Fueled Biomass Projects in California

	Number of Projects[a]	Fuel Required (tons per year)	Electrical Capacity (megawatts)
A. All Identified Projects			
Planning stage	36	6,162,445	722.2
Permit stage	19	2,794,900	325.5
Operational	89	4,495,050	241.4
Inactive	18	2,409,792	280.2
Abandoned	35	4,202,883	482.8
Shutdown	17	762,904	14.8
Construction stage	7	777,900	91.4
Subtotals	221	21,605,874	2,158.3
B. Projects Potentially Qualifying For Rapid Amortization[b]			
Planning stage	6	897,415	104.0
Permit stage	--	--	--
Operational	31	1,393,628	124.0
Shutdown	4	199,791	10.3
Construction stage	5	425,150	50.0
Subtotals	46	2,915,984	288.3

Source: California Energy Commission (September 1985).

a. Includes both complete biomass systems and modifications or additions to existing systems. Thus, a given biomass facility can account for more than one "project."

b. Includes projects that either became operational beginning in 1980 or later, or are expected to become operational before 1986. Projects listed as "operational" or "shutdown" would not have qualified for rapid amortization under AB 2893 if the operators had applied for building permits or binding financial commitments prior to 1980. No data are available to determine how many of the projects shown, if any, fall into this category. Projects identified as "shutdown" are not presently claiming rapid amortization, but could have for a period of time, since their original operational date was in 1980 or later.

We estimate that the combined original investment value of the projects potentially qualifying for rapid amortization is around $460 million (1984 dollars). This estimate is based on the CEC's "rule-of-thumb" that capital costs per kilowatt of biomass-related electric generating capacity equals $1,500, as well as on various other assumptions linking electrical capacity to fuel needs and fuel needs to capital costs.[1]

Special Factors Affecting Biomass Investments

Clearly, there has been strong growth in the number of biomass-fueled alternative energy systems installed since 1980. The following key factors have contributed to this expansion:

- The Public Utility Regulatory Policies Act (PURPA) has limited the problems that investors in alternative energy systems face in profitably marketing their electricity by guaranteeing a market and favorable price for it. As implemented by the California Energy Commission, PURPA requires utilities to purchase electricity from small power producers, regardless of whether they need the power, at a price equal to what the utilities would pay if they secured the electricity from other sources such as new power plants ("avoided costs"). The PURPA also enables small power producers to buy back at regular rates and for their own use the electricity they sell to a utility. In most cases, the price at which the utility purchased the electricity exceeds the

1. The CEC's $1,500 per-kilowatt "rule of thumb" cost estimate is based on a variety of data, including building permit valuations and actual cost data for completed facilities, and building permit data for yet-to-be completed facilities.

utility's regular rates, allowing small power producers to "make a profit" on the transaction.

- The federal government liberalized its rules for depreciating energy equipment when it enacted the 1981 Accelerated Cost Recovery System (ACRS). In addition, a 15 percent federal energy tax credit is available to purchasers of qualified biomass and other energy-related equipment.
- The California State Agricultural and Forestry Residue Utilization Act of 1979 (effective January 1, 1980) established a $10 million fund to assist in the development of projects designed to convert agricultural and forestry residues into usable energy. This fund can provide interest-free loans equal to 50 percent of the capital costs for biomass equipment.
- The California Biomass Energy Demonstration Program was established in 1981 to support biomass farming demonstration projects.
- Financial assistance for qualified biomass projects has also been available since January 1, 1981, through (a) the California Pollution Control Financing Authority, (b) the Energy Conservation, Renewable Resources and Solar Energy Technologies Assistance Program in Agriculture, (c) the California Alternative Energy Source Financing Authority Act, and (d) the State Assistance Fund for Energy, Business and Industrial Development Corporation (SAFE-BIDCO).

C. Geothermal Power-Producing Facilities

Geothermal energy involves the use of heat from the earth's interior for heating purposes or to generate electricity. There are three types of geothermal energy facilities in California--direct-use facilities (where geothermal energy is used on-site), small-scale electric producing facilities, and large electric power plants. According to the CEC, reliable data are not available for the first two types of facilities. The CEC indicates, however, that the share of geothermal power capacity and capital investments in these two categories is minuscule compared to capacity and investment in the third category--large power plants.

Table 5 summarizes the number and power-producing capacity of California's large-scale geothermal power plants. A total of 26 plants having 1,806 megawatts of capacity are expected to be operational on January 1, 1986, and another four plants with 475 megawatts of capacity are expected to come "on line" by mid-1989. Twenty-seven of these plants (2,135 megawatts of capacity) are geothermal geyser plants located in Sonoma and Lake Counties. These plants use underground steam heat to drive electricity-producing turbine generators. All but eight of them are operated by Pacific Gas and Electric Company. The other three plants shown in Table 5 (146 megawatts of capacity) harness hot underground water and are located in Imperial County.

Since AB 2893 became effective, 13 large-scale geothermal plants (1,160 megawatts of capacity) have become operational. Of these, seven having a combined capacity of 532 megawatts appear to qualify for rapid amortization. The costs of these seven plants was $616 million.

Table 5

Large-Scale Geothermal Power Plants in California[a]

	Number of Plants	Megawatt Capacity
A. All Identified Projects		
1. Geyser (Steam) Facilities		
a. Operational as of January 1, 1986	23[b]	1,693
b. Under Construction	2[b]	165
c. Permits Applied For	2	277
Subtotals	27[c]	2,135
2. Imperial Valley (Non-Steam) Facilities		
a. Operational as of January 1, 1986	3[d]	113
b. Operational after January 1, 1986	--[d]	33
Subtotals	3	146
B. Projects That Have Become Operational Since AB 2893 Was Enacted		
1. Geyser (Steam) Facilities	10	1,047
2. Imperial Valley (Non-Steam) Plants	3	113
Subtotals	13	1,160
C. Projects Potentially Qualifying for Rapid Amortization[e]		
1. Geyser (Steam) Facilities[f]	4	419
2. Imperial Valley (Non-Steam) Plants	3	113
Subtotals	7	532

a. Source: California Energy Commission.
b. Includes the Department of Water Resource's $91 million South Geysers project, with planned capacity of 55 megawatts. Although by October 1985, nearly $51 million had been expended on this project, it appears that the steam supply available at the site is capable of generating only 21 megawatts of capacity. The state reportedly is considering (1) purchasing steam from another energy company and piping it to the site, (2) forming a limited partnership with a company that has access to more steam, or (3) terminating the project.
c. Excludes three plants in the planning stage for which no capacity size or target operational dates have been set.
d. Includes one 67 megawatt facility which will be only one-half operational prior to January 1, 1986.
e. Excludes facilities owned and operated by tax-exempt entities.
f. Operational and maintenance costs for these plants average around $10,000 per megawatt of capacity per year, whereas load factors run at between 80 percent and 90 percent. Estimated load factors and operating costs for Imperial Valley plants are not available.

D. Small-Scale Hydroelectric Facilities

Hydroelectric power generation occurs when nonthermal energy is extracted mechanically from water, and then converted into usable energy. This conversion is accomplished in one of two basic ways: by harnessing the pressure from static water (such as water stored behind a dam), or by harnessing the kinetic energy created by a flow of water (such as in streams, rivers, canals, and pipelines). Hydroelectric facilities normally use water wheels or hydraulic turbines coupled to electric generators in order to transform mechanical energy into electrical power. This power can then either be used on-site, or sold to one or more utility companies. The CEC indicates that most of the electricity produced by California's small-scale hydroelectric facilities is sold to utilities, under the provisions of PURPA (discussed earlier).

Table 6 shows the number and energy-producing capacity of California's hydroelectric facilities. It indicates that:

- There were 255 hydroelectric facilities with combined capacity of nearly 8,400 megawatts in operation as of July 1985. More than 7,500 megawatts came from 60 large (over 30 megawatt-capacity) facilities, while about 850 megawatts came from 195 small (under 30 megawatt-capacity) facilities.
- Since 1980, 176 of these small-scale (under 30 megawatt-capacity) facilities, accounting for 259 megawatts of capacity, have come "on line." Thus, most of California's small-scale facilities have become operational since AB 2893 went into effect.

Table 6

Power-Producing
Hydroelectric Facilities in California[a]

	Number of Projects	Electricity-Producing Capacity of Projects (in megawatts) Total Capacity	Average Capacity Per Facility
A. All Identified Operational Facilities[b]			
1. Large Facilities (over 30 megawatts)	60	7,536	125.6
2. Small Facilities (under 30 megawatts)	195	848	4.3
Subtotals	255	8,384	32.9
B. Small Facilities Potentially Qualifying for Rapid Amortization[b]			
1. By Year of Installation			
1980	3	14	4.7
1981	2	10	5.0
1982	16	26	1.6
1983	44	62	1.4
1984	34	32	0.9
1985[c]	77	115	1.5
Subtotals	176	259	1.5
2. By Type of Developer			
a. Nonutility private sector party	78	60	0.8
b. Governmental entity[d]	92	196	2.1
c. Utility company[e]	6	3	0.5
Subtotals	176	259	1.5

a. Source: California Energy Commission (CEC).
b. As of July 1985. The CEC also estimates that an additional 138 to 463 projects having total capacity of from 535 megawatts to 2,165 megawatts could become operational at some point in the future, based on evidence it has collected regarding construction permits and applications for licensing.
c. Includes projections of projects which were not operational as of July 1985, but were expected to be "on line" as of January 1, 1986.
d. Rapid amortization is available only for projects which are owned by taxpayers and then leased, lease-purchased or rented by tax-exempt governmental entities.
e. Rapid amortization of facilities operated by municipal utilities which are tax-exempt may not be claimed by the utility itself. It can be claimed by certain taxpayers if they own the facilities and then lease, lease-purchase, or rent them to the utilities.

It is these 176 small-scale projects which, based on their size and operational dates, potentially can qualify for rapid amortization. The number that can actually claim rapid amortization, however, probably is less than half of the total. This is because over half of these projects have been developed by governmental entities which are exempt from taxation.[1,2]

We estimate that the total investment expenditure (1984 dollars) associated with those small-scale projects that have become operational since 1980 is in the range of $775 million. Of the total, about $225 million appears to reflect expenditures on private-sector facilities for which rapid amortization potentially could be claimed.[3]

Summary

Since 1980, when AB 2893 became effective, the volume of identifiable investment expenditures on alternative energy equipment in California has totaled over $6.1 billion (1984 dollars). Of this amount,

1. Rapid amortization could still be claimed on these "governmental" projects if they were being leased, lease-purchased, or rented from owners who themselves were subject to paying taxes. However, the CEC indicates that government-used hydroelectric facilities that are privately owned are relatively rare at present.
2. Indentifying the number of small hydroelectric facilities claiming rapid amortization is further complicated because the CEC data define "small" facilities as those having under 30 megawatts of capacity, whereas AB 2893 defines them as having under 25 megawatts of capacity. As shown in Table 6, however, small facilities, on the average, tend to have under 5 megawatts of capacity, and it appears that few facilities lie in the 25 megawatt to 30 megawatt range. Thus, as a practical matter, this definitional difference does not pose a problem for this report.
3. According to the CEC, capital costs per kilowatt of capacity can range from a low of $1,000 to a high of $6,000, depending on a facility's size and technical features. The aggregate capital cost estimates in the report were derived using CEC-developed "supply curve" data for small hydroelectric power plants.

about $1.3 billion appears to potentially qualify for rapid amortization under AB 2893. This "qualifying" amount excludes over $4.3 billion in investments for which the more-valuable solar credit has been claimed in lieu of rapid amortization.

CHAPTER III

THE EFFECTS OF RAPID AMORTIZATION ON TAXPAYERS AND INVESTMENTS

The decision to invest in alternative energy equipment typically is influenced by a wide variety of factors, including the total capital costs of the equipment, the terms of financing its acquisition, the future revenue streams and operating and maintenance costs associated with the equipment, and the risks and uncertainties involved in projecting these revenues and costs. In general, however, two criteria dominate most investment decisions:

- The project's payback period--that is, the number of years it takes for the project to "pay for itself" from the net revenues which it generates, and
- The project's after-tax rate of return--that is, the average annual percentage return on the amount of money invested in the project, computed over the project's entire economically useful life-span.

Normally, the shorter the payback period and the higher the rate of return, the more attractive an investment project becomes. Thus, understanding the effects of rapid amortization on the payback period and rate of return for alternative energy projects is the key to evaluating the economic and fiscal effects of AB 2893.

How Shortened Amortization Periods Can Affect Investment Payback Periods and Rates of Return

Shortening the amortization period for tax purposes improves the attractiveness of an investment because it both reduces the investment's payback period and increases its rate of return. This occurs even though the total amount of depreciation which may be claimed is not changed.

Rapid depreciation, in effect, makes an investment more profitable after taxes in the early years of a project's life, and less profitable thereafter. Because, however, a dollar of after-tax profits realized "sooner" is worth more than the same dollar of after-tax profits realized "later," this has the effect of shortening the payback period and raising the rate of return.

Obviously, the tax advantages of rapid amortization are available directly to only those investors who are subject to the income tax. Nonprofit organizations and governmental entities, however, can benefit indirectly from rapid amortization by leasing capital facilities from entities that are subject to taxation. Because the lessors benefit directly from rapid amortization, they usually are willing to lease equipment for less than they would otherwise. Consequently, both taxable and tax-exempt investors in alternative energy equipment can benefit from rapid amortization.

Effects of Rapid Amortization on Energy Investments

Because the characteristics of alternative energy projects show considerable variation from one to another, the effects of rapid amortization will also vary from project to project. Nevertheless, we can

illustrate the effects of rapid amortization on a "typical" project, and thereby demonstrate how rapid amortization, in principle, affects alternative energy investments.

Table 7 shows how shortened amortization periods can affect both the payback period and financial returns on a medium-sized biomass-fueled cogeneration project, with an initial equity-financed capital cost of $10 million and an economically useful life-span of 22 years. The table illustrates the effects using three different assumptions regarding the magnitude and timing of the project's net income flows and, therefore, its basic overall profitability. The alternative assumptions reflect the general range of financial returns that past surveys and our own research indicate are characteristic of these projects. Our discussions with CEC staff suggest that these assumptions also are applicable to many other types of alternative energy projects as well.

Table 7

Illustrative Effects of AB 2893 on the Profitability of Alternative Energy Investment Projects

	Average Annual After-Tax Rate of Return	Payback Period[b]	Dollar Value Over Project's Life-Span of:[a] After-Tax Profits[c]	State Taxes Paid	Federal Taxes Paid[d]
Project A[e]					
1. Without AB 2893	36.3%	3.50 years	$20,449,092	$2,353,044	$9,415,238
2. With AB 2893					
a. Five-year option	37.1	3.44 years	20,540,574	2,183,632	9,493,167
b. One-year option	38.1	3.40 years	20,599,257	2,074,960	9,543,157
3. Maximum effect of AB 2893	1.8%	-1.2 months	$150,165	-$278,084	$127,919
Project B[e]					
1. Without AB 2893	15.5%	5.00 years	$11,532,251	$599,486	$1,819,410
2. With AB 2893					
a. Five-year option	16.0	4.87 years	11,623,733	430,075	1,897,340
b. One-year option	16.4	4.87 years	11,682,416	321,402	1,947,329
3. Maximum effect of AB 2893	0.9%	-1.6 months	$150,165	-$278,084	$127,919
Project C[e]					
1. Without AB 2893	7.3%	6.50 years	$9,473,510	$194,620	$65,668
2. With AB 2893					
a. Five-year option	7.7	6.16 years	9,564,992	25,209[f]	143,598
b. One-year option	7.9	6.16 years	9,623,675	-83,464[f]	193,587
3. Maximum effect of AB 2893	0.6%	-4.1 months	$150,165	-$278,084	$127,919

a. Details may not add to totals due to rounding. Dollar values are shown in "present value" terms, assuming a constant discount rate of 10 percent per annum.
b. Computed using undiscounted after-tax profits. Payback periods are longer than shown if discounted after-tax profits are used.
c. Computed as gross revenues minus operating expenses, maintenance costs, and tax payments. This amount exceeds the net present value (NPV) of the project by $10 million, which is the initial capital cost of the project.
d. Prior to offsets for the investment tax credit and the energy tax credit.
e. Details on the specific characteristics of each of these projects and the assumptions used in computing how rapid amortization affects them are presented in the Appendix.
f. Large first-year depreciation and small annual net revenues produce a negative present-value state tax total. California generally does not permit the carrying-forward of negative taxable business income into future years. Therefore, this example assumes that the taxpayer's nonproject taxable income always exceeds the amount of negative project income in any particular year, so that full use of depreciation deductions may be made.

The table shows that:

- Project A (a high-return project). Without AB 2893, this project has an annual average after-tax rate of return equal to 36.3 percent and a payback period of 3.5 years. With AB 2893, the project's return rises to 37.1 percent if the five-year amortization option is chosen, and to 38.1 percent if the one-year option is chosen, while its payback period drops to 3.44 years and 3.4 years, respectively. Thus, the maximum effect of AB 2893 for this project is to raise the rate of return by 1.8 percentage points and reduce the payback period by about 36 days.
- Project B (a moderately profitable project). Without AB 2893, this project has an annual average after-tax rate of return of 15.5 percent and a payback period of five years. With AB 2893, the return rises to 16 percent for the five-year option and 16.4 percent for the one-year option, while the payback period drops to about 4.9 years. Thus, the maximum effect of AB 2893 for this project is to raise the return rate by 0.9 percentage points and reduce the payback period by about 48 days.
- Project C (a lower-profit project). Without AB 2893, this project has an annual after-tax return rate of 7.3 percent and a payback period of 6.5 years. With AB 2893, the return rate rises to 7.7 percent for the five-year option and 7.9 percent for the one-year option, while the payback period drops to about 6.2 years. Thus, the maximum effect of AB 2893 for this project is to raise the return rate by 0.6 percentage points and lower the payback period by about 124 days.

These three examples clearly demonstrate that shortening the amortization period does, indeed, reduce the payback period and raise the rate of return for alternative energy equipment. However, the magnitude of these effects is relatively small, especially when compared to the effects of other available investment incentives, such as federal and state energy equipment tax credits, federal accelerated depreciation under ACRS, financing incentives such as interest-free state loans in the case of biomass projects, and guaranteed ability of power producers to sell generated electricity to utility companies at favorable prices, as mandated by PURPA. Given this, we conclude that shortening the amortization period is limited in its ability to stimulate new investment and thereby yield such benefits as increased income, employment and energy efficiency. This is particularly true if the investor amortizes the costs of the project over five years, rather than one year.

This conclusion is supported by other information collected in the course of our study:

- First, it is consistent with the results of a statewide survey covering some 200 cogeneration projects which we conducted in conjunction with our study of cogeneration investments. Some of the survey respondents were investors in alternative energy biomass-fueled projects which qualify for rapid amortization under AB 2893. Of these investors:
  - 40 percent were not even aware of the rapid amortization provisions at the time they made their investment decisions;
  - about half were not taking advantage of AB 2893's provisions;
  - none were using the one-year amortization option; and

- 80 percent said their investment decision was not influenced by the provisions.

- Second, few investors in solar energy equipment, which accounts for the majority of all alternative energy equipment, would choose to claim rapid amortization. This is because rapid amortization can only be claimed "in lieu" of the solar credit, which is far more valuable to a taxpayer than the present-value dollar gains of shifting a given depreciation allowance between years using rapid amortization.[1] The credit allows the taxpayer to reduce his or her taxes by an amount equal to up to 25 percent of qualified equipment costs. Consequently, rapid amortization has not been a viable financial incentive for the single largest segment of the alternative energy equipment industry.

- Third, based on our conversations with various representatives of geothermal power plant operators we estimate that rapid amortization is being claimed on behalf of no more--and probably less--than one-third of the facilities that qualify for it.

Our conclusion that rapid amortization has a limited ability to simulate investment in alternative energy equipment also is consistent with the views of many individuals with which we spoke in the course of our

1. Because depreciation is a tax deduction, as opposed to a credit, its "value" to a taxpayer depends on the taxpayer's marginal tax rate. The maximum value to a taxpayer of one dollar in depreciation is 11 cents under the personal income tax and 9.6 cents under the bank and corporation tax, since the maximum marginal tax rates for these two taxes are 11 percent and 9.6 percent, respectively. In contrast, the state's solar credit offers a benefit of up to 25 cents per dollar of equipment costs. Thus, even if equipment is fully depreciated in only one year, the value of the deduction is less than one-half the value of the solar credit.

research. These individuals include staff members at the Public Utilities Commission (PUC), the Department of General Services, and certain utility companies. It is also consistent with the conclusions of numerous research studies which have found it impossible to conclude unambiguously that state energy-related tax incentives, generally, have been effective in stimulating new investments or economic activity overall.[1]

The Efficiency of Rapid Amortization as an Investment Incentive

Our analysis indicates that rapid amortization is an expensive way for the state to encourage investment in alternative energy equipment. There are two reasons for this:

- First, because rapid amortization may be claimed by taxpayers who would have invested in alternative energy equipment anyway, the state tax benefits received by these investors constitute a "windfall" for which the state gets nothing in return.
- Second, the costs to the state of providing rapid amortization for a particular project are likely to be considerably greater than the tax savings which investors in the project actually realize. This is because a significant portion of the investors' state tax savings will be offset by increases in their federal income tax liabilities. The reason for this is that state income tax payments can be deducted from adjusted gross income on federal income tax returns, thereby reducing federal tax

1. For example, see U.S. General Accounting Office, Studies on Effectiveness of Energy Tax Incentives Are Inconclusive, March 1982, and Leonard Rodbeg and Meg Schauhter, State Conservation and Solar Energy Tax Programs: Incentives or Windfalls? Studies in Renewable Resources Policies, Council of State Planning Agencies, 1980.

liabilities. By reducing state income taxes, rapid amortization has the effect of increasing the amount of income that is taxable at the federal level. This offset is shown in Table 7. Because the lifetime value of federal income tax liabilities associated with our "typical" energy projects increases by up to $128,000 when rapid amortization is claimed, investors get to "keep" only about $150,000 (or 54 percent) of the $278,000 that it costs the state to subsidize these projects. The federal government collects the balance.

In sum, we conclude that the primary effect of California's rapid amortization option is not an increase in alternative energy investments, but rather, a redistribution of income--to those investors who would have purchased the equipment anyway, as well as to the federal government. These "windfall" benefits come at the expense of the California taxpayers who must directly or indirectly pay for them. Consequently, rapid amortization is a relatively inefficient means of attempting to encourage investment in alternative energy equipment.

Options for Increasing the Incentives for Investment

There are three options available to the Legislature for making the incentives to invest in alternative energy equipment more powerful.

- First, the Legislature could permit taxpayers to amortize their investment over any period of time one year or greater. This would help those investors who do not have sufficient income to fully amortize their equipment in one year, but could fully amortize it in less than five years. (Project C in Table 7 is an example of a project that would benefit from this change in the amortization period.)

- Second, the Legislature could permit all investors to fully depreciate their alternative energy equipment in one year, and then carry forward any portion that was in excess of their income into the following tax year.
- Third, it could again permit all investors to fully depreciate their alternative energy equipment in one year, and provide a refundable credit based on the "tax value" of the amount by which such depreciation exceeded income for that year.

Each of these options would make the rapid amortization provisions a more powerful incentive to invest in alternative energy equipment. If the Legislature decided to continue AB 2893's rapid amortization provisions beyond 1985, the first option should be considered, since it does not seem logical to let investors depreciate equipment over a one-year or five-year period, but not for some period in between. The remaining two options, however, raise a fundamental issue of tax policy. This is because, at present, California law does not generally permit taxpayers with negative income either to carry their losses forward or to receive refundable credits based on unused depreciation allowances.[1]

1. Although California provides no general operating loss carry forward as the federal government does, the state recently has permitted operating loss carryovers in three limited special situations. Specifically, (a) a "new small business," as defined, is allowed a carryover for up to 15 years, to a cumulative total of $100,000, for losses incurred during its first 24 months of operation; (b) businesses qualifying under the Enterprise Zone Act may carry forward, for up to 15 years, losses attributable to operations in an "enterprise zone"; and (c) businesses qualifying under the Employment and Incentive Act may carry forward, for up to three years, losses attributable to operations in a "designated depressed area."

While these three options would provide somewhat greater inducements to investment in alternative energy equipment, they would not avoid the inefficiencies that are inherent in tax incentives of this type.

CHAPTER IV

THE STATE REVENUE EFFECTS OF RAPID AMORTIZATION

The net effect of AB 2893's rapid amortization provisions on state revenues depends on two factors:

- First, it depends on the amount of state income tax revenues that are lost due to the fact that some taxpayers claiming rapid amortization would have invested in alternative energy equipment even in the absence of AB 2893 and, therefore, receive "windfall" benefits.
- Second, it depends on the amount of additional income tax, sales tax and other tax revenues that are gained as a result of investments in alternative energy equipment that would not have occurred without AB 2893. (The size of any such gain depends both on the amount of new investments induced by AB 2893, and the extent to which these investments do not simply replace other types of investments.)

Data Availability

Unfortunately, data regarding the actual number and dollar amount of depreciation claims filed under AB 2893 by California taxpayers are not available from the California Franchise Tax Board. This is because the FTB's data information retrieval system is not set up to identify separately those individual and corporate taxpayers that rapidly amortize alternative energy equipment. To our knowledge, no other entity (including the CEC and PUC) has studied, or developed data related to, the economic and revenue effects of AB 2893's rapid amortization provisions.

Given this, it is not possible to state definitively how AB 2893 affects state revenues. Nevertheless, it is possible to illustrate the general magnitude of the act's effects on state revenues, using reasonable assumptions.

Potential Magnitude of State Revenue Effects

We can provide a rough illustration--not an estimate--of AB 2893's potential effects on state revenues by making assumptions about:

- The dollar volume of investments in alternative energy equipment that qualify for rapid amortization, given the equipment's physical characteristics and operational dates.
- The portion of these qualified investments for which either one-year or five-year rapid amortization actually is claimed (that is, AB 2893's "utilization rates").
- The portion of new investment for which rapid amortization is claimed that is due to AB 2893 (that is, AB 2893's "attribution rate") and which replaces alternative investments that would have occurred otherwise (that is, AB 2893's "displacement rate").
- The economic performance characteristics of the installed equipment, including payback periods, rates of return and life-spans.

Using the data presented in Chapter II, we estimate that the volume of investment expenditures qualifying for rapid amortization is about $1.3 billion (1984 dollars). This amount excludes expenditures for solar-related equipment, since investors in this equipment almost certainly claim the more-valuable solar credit in lieu of rapid amortization.

Of the $1.3 billion in qualifying expenditures, our research suggests that:

- the "displacement rate" falls in the range of 20 percent to 60 percent;
- the "attribution rate" ranges from 5 percent to 20 percent; and
- the "utilization rates" for the one-year and five-year amortization periods range from 5 percent to 20 percent and from 60 percent to 75 percent, respectively.

Finally, as discussed in Chapter III, we believe it is reasonable to assume that equipment life-spans average around 20 years and that payback periods generally range from 3½ years to 6½ years.

Table 8 shows what the effect of AB 2893's rapid amortization provisions on state revenues would be, given the assumptions discussed above. The table indicates that:

- The maximum direct state revenue loss attributable to AB 2893 would range from $12 million to $19 million over the life of the equipment, averaging about $550,000 to $865,000 annually. In the early years, however, the revenue loss to the state would be much larger than the "average" loss because the losses under AB 2893 come early in the asset's life. In calculating the maximum loss, we assume that AB 2893 itself does not induce any new investment in alternative energy equipment.
- If, instead, we assume that AB 2893 does induce some new investment in alternative energy equipment, the direct revenue loss attributable to AB 2893 would of course be less. It is even possible that the increased income and sales taxes associated with this new investment could yield an increase in revenues.

Again, we must point out that the revenue effects shown in Table 8 are based on assumptions regarding attribution rates, utilization rates, and displacement rates. Since no one knows exactly what these rates are, it is not possible to say with absolute certainty whether the overall state revenue effects of AB 2893 are positive or negative. However, an examination of the data in Table 8 indicates that the revenue effect is positive only when attribution rates are on the high end (e.g., 20 percent) of their probable range, displacement rates are low (again, in the 20 percent range), and investments are characterized by very short payback periods and very high rates of return.

In our judgment, it is unlikely that all of these conditions are satisfied. We believe it is more realistic to assume that attribution rates are a bit lower than, and displacement rates a bit above, 20 percent. Consequently, we believe that the direct effect of AB 2893 on state revenue is negative. If, for example, the attribution rate averages 10 percent, the displacement rate averages 40 percent and equipment payback periods average five years, direct state revenues losses over the life-span of equipment currently in operation would be in the $7.9 million to $13 million range, for an average annual loss of $360,000 to $650,000. Even when the "multiplier" effect of new investments is taken into account, the average annual loss of revenues would be $160,000 to $300,000.

Table 8

Effect of AB 2893 On State Revenues Under Alternative Assumptions

Assumptions Regarding Average Project Performance[b]	Utilization Rate[c]		State Revenue Effect (dollars in millions)[a]									
			Attribution Rate[d]									
				5%			10%			20%		
				Displacement Rate[e]			Displacement Rate[e]			Displacement Rate[e]		
	One-Year Option	Five-Year Option	Zero	20%	40%	60%	20%	40%	60%	20%	40%	60%
A. High Returns	5%	60%	-12.0	-4.5	-6.4	-8.3	3.0[f]	-0.8[f]	-4.5	17.9[f]	10.4[f]	3.0[f]
	10%	65%	-14.3	-5.7	-7.9	-10.0	2.9[f]	-1.4[f]	-5.7	20.2[f]	11.6[f]	2.9[f]
--Payback period=3.5 years	15%	70%	-16.7	-6.9	-9.3	-11.8	2.9[f]	-2.0[f]	-6.9	22.5[f]	12.7[f]	2.9[f]
--Annual return=36 percent	20%	75%	-19.0	-8.1	-10.8	-13.5	2.9[f]	-2.6[f]	-8.1	24.8[f]	13.8[f]	2.9[f]
B. Moderate Returns	5%	60%	-12.0	-9.3	-10.0	-10.6	-6.5	-7.9	-9.3	-1.0[f]	-3.8[f]	-6.5
	10%	65%	-14.3	-11.2	-12.0	-12.8	-8.0	-9.6	-11.2	-1.7[f]	-4.8[f]	-8.0
--Payback period=5 years	15%	70%	-16.7	-13.1	-14.0	-14.9	-9.4	-11.3	-13.1	-2.3[f]	-5.9[f]	-9.5
--Annual return=16 percent	20%	75%	-19.0	-15.0	-16.0	-17.0	-11.0	-13.0	-15.0	-3.0[f]	-7.0[f]	-11.0
C. Lower Returns	5%	60%	-12.0	-10.4	-10.8	-11.2	-8.7	-9.5	-10.4	-5.4[f]	-7.1[f]	-8.7
	10%	65%	-14.3	-12.4	-12.9	-13.4	-10.5	-11.5	-12.4	-6.7[f]	-8.6[f]	-10.5
--Payback period=6.5 years	15%	70%	-16.7	-14.5	-15.1	-15.6	-12.4	-13.4	-14.5	-8.0[f]	-10.2[f]	-12.4
--Annual return=7 percent	20%	75%	-19.0	-16.6	-17.2	-17.8	-14.2	-15.4	-16.6	-9.4[f]	-11.8[f]	-14.2

a. Revenue figures are in millions of dollars, converted into present-value terms using a 10 percent annual discount rate factor. Computations assume that of the total value ($1.3 billion) of alternative energy equipment facilities qualifying for rapid amortization, 80 percent is depreciable, and 70 percent of equipment acquisition and installment costs are subject to the state sales and use tax.

b. For details on these assumptions, see Table 7 in Chapter III.

c. Defined as the percent of alternative energy equipment investment expenditures that is rapidly amortized under AB 2893.

d. Defined as the percent of alternative energy equipment investment expenditures that would not have occurred had rapid amortization under AB 2893 not been available.

e. Defined as the percent of alternative energy equipment investment expenditures which merely displaces other competing energy-related and nonenergy-related investments.

f. Indicates that the state revenue effect is positive after accounting for the "multiplier" effect of increased investment expenditures. These estimates assume an economy-wide macroeconomic multiplier factor for alternative energy equipment investment spending of 2.5 for California (this is somewhat less than the multiplier factor normally used for the nation, due to the significance of interstate trade flows). They also take into account the fact that there is a "negative multiplier effect" associated with the leakage of AB 2893's state tax savings to the federal government in the case of investments which would have occurred even in the absence of AB 2893.

CHAPTER V

RECOMMENDATION TO THE LEGISLATURE

We conclude that AB 2893 has not stimulated much new investment in alternative energy equipment facilities within California. Since it appears that the Legislature's primary objective in enacting AB 2893 was to encourage alternative energy investments in California, we therefore conclude that AB 2893 has not been successful to date. In addition, we believe that AB 2893 probably has cost the state more in foregone tax revenues than it has generated.

On this basis, we recommend that the Legislature allow the rapid amortization provisions of AB 2893 to lapse on December 31, 1985, as current law provides, and not extend these provisions.

APPENDIX

The computations for Table 7 assume an investment project having a fully depreciable initial capital cost of $10 million and no salvage value at the end of 22 years. First-year net revenues are assumed to equal about $2.9 million for Project A, $1.5 million for Project B, and $1.2 million for Project C, these being the net effect of gross revenues minus maintenance and operating costs (including fuel costs). Both current-dollar revenues and current-dollar costs are subject to 6 percent inflation per year, whereas "real" (that is, constant-dollar) revenues and costs are assumed to fall and rise, respectively, by 1.5 percent per year due to equipment wear-and-tear and loss-of-efficiency over time. Tax rates are assumed to equal those currently levied on corporations: 9.6 percent for state purposes and 46 percent for federal purposes. Computations also assume that, for federal tax purposes, the 10 percent investment tax credit is claimed on 98 percent of capital costs and the 15 percent energy tax credit is claimed on 65 percent of capital costs. Depreciation for federal purposes is calculated using the Accelerated Cost Recovery System (ACRS), enacted as part of the Economic Recovery Tax Act of 1981. This system permits most alternative energy equipment to be depreciated over a five-year period using percentages of the equipment's depreciable cost basis equal to 15 percent in year one, 22 percent in year two, and 21 percent in years three, four, and five. In addition, ACRS requires that for property placed in service after 1982, either (a) the depreciable basis of the property must be reduced by an amount equal to 50 percent of the regular investment tax credit, or (b) the investment tax credit must be

reduced by 2 percentage points (in the above case, from 10 percent to 8 percent). The figures shown in the table assume the first option, since for the particular hypothetical projects it maximizes the present-value of their investment returns.

Regarding depreciation for state tax purposes in the absence of AB 2893, the sum-of-the-years digits method is used because, of any single depreciation method for which simulations were run, it resulted in the highest present-value investment return for the particular hypothetical investment projects shown above. Because these projects' useful economic life-spans equal 22 years, approximately 68 percent of their capital cost qualifies for rapid amortization under AB 2893. The remaining 32 percent is depreciated over the full 22-year period using accelerated depreciation (in this case, the sum-of-the-years digits method).