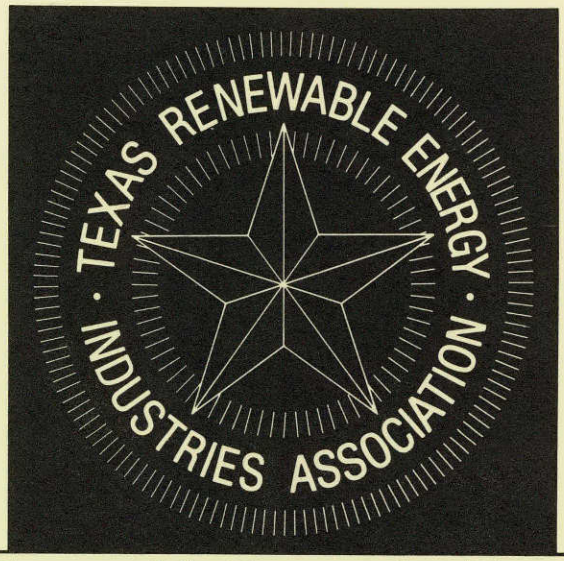
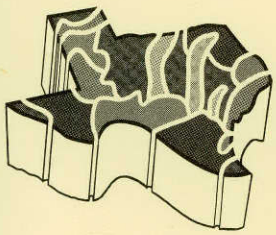


Renewable Energy for Texas: Needs Assessment and Policy Recommendations For the Texas Renewable Energy Industries

Prepared by
The Texas Renewable Energy Industries Association, Inc.



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TEXAS RENEWABLE ENERGY INDUSTRIES ASSOCIATION

May, 1985

This report, Renewable Energy for Texas: Needs Assessment and Policy Recommendations for the Texas Renewable Energy Industries, is the result of an agreement between the new Texas Renewable Energy Industries Association (TREIA) and the Texas Department of Agriculture (TDA). Recognizing the intimate link between renewable energy and agriculture, it was deemed in the best interest of both TREIA and TDA to evaluate the status and needs of the renewable energy industries in Texas. The intent was to provide policymakers with insight as to how State government might best assist the further development of those industries.

For Texas renewable energy leaders to comprehensively evaluate their situation, especially where government involvement is concerned, a three-step process was undertaken:

1) A thorough review of and report on all previous Texas legislative activity was compiled in the areas of Solar Thermal, Electrical Power Generation, Renewable Fuels, and Building Design and Construction.

2) A national meeting was held in Austin and attended by renewable energy association leaders and key state officials from Texas, 12 other states and Washington, D.C. Meeting discussion centered on approaches to State and Federal encouragement of renewable energy.

3) A follow-up meeting brought together renewable energy industry people from across Texas, to further expand the previously-gathered information and add the specifically "Texas perspective." The information from these three activities provided insight and suggestions which ultimately resulted in the development of this document.

The TREIA Board of Directors has adopted this report and its recommendations as the official policy statement of the association. It is hoped that it will provide guidance and assistance to policymakers in State government as they consider measures to foster further development of these important Texas industries.

Respectfully submitted,

Curtis O. Higgs

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RENEWABLE ENERGY FOR TEXAS:
Needs Assessment and Policy Recommendations For the Texas Renewable Energy Industries

CONTENTS

I. SUMMARY

Over the last decade, Texas government has affirmed the positive contribution renewable energy sources can make to the state's economy and its energy mix. Laws have been passed that foster increased use of these renewable energy sources and establishment of several new industries. These industries, however, find themselves at a competitive disadvantage due in part to artificially-perpetuated market imperfections and remaining institutional barriers. There remains a need for continued positive state action in encouraging renewables.

Three major policy documents prepared by Texas governmental bodies in the last six years, have given a rough idea of the massive extent of the state's renewable energy potential. Despite variations in research methodologies, these three reports placed realistic and noteworthy quantitative estimates on the contribution such energy sources could provide. The need for more complete and updated research along these lines, however, is pointed out by this report.

TREIA divided the renewable energy industries in Texas into four groups to accomplish an industry assessment/overview, identify current needs as seen by each industry, and make specific recommendations for addressing these needs. The four industry groups are Solar Thermal, Electrical Power Generation, Renewable Fuels, and Building Design & Construction as reflected by Sections V, VI, VII, VIII of this report. The final section provides discussion and recommendations that cross all the others.

II. RECOMMENDATIONS

SOLAR THERMAL

Recommendation Number 1 (page 4)
TREIA recommends the Texas Legislature: 1) create a statewide license for solar installers, and 2) establish a statewide solar installation code.

ELECTRICAL POWER GENERATION

Recommendation Number 2 (page 7)
TREIA recommends that the Public Utility Commission (PUC) adopt rules changes allowing net energy billing (single meter) for systems of 25 kw and under.

Recommendation Number 3 (page 7)
TREIA recommends that the PUC seek independent assessment of realistic insurance liability on the part of the small scale power producer.

Recommendation Number 4 (page 7)
TREIA recommends that the PUC develop simplified standard interconnection contracts for qualified facilities.

Recommendation Number 5 (page 7)
TREIA recommends that the PUC, through standard contracts or rule, assure that small scale power producers need not meet power standards in excess of those met by the utility company itself.

Recommendation Number 6 (page 7)
TREIA recommends that the Legislature set "avoided cost" rates for renewable energy power production equal to the utilities' retail rate minus their legal rate of return.

Recommendation Number 7 (page 7)
TREIA recommends that the PUC estimate the potential capacity of dispersed non-firm power sources.

Recommendation Number 8 (page 7)
TREIA recommends that the PUC adopt wheeling rates that are in the best interest of the public.

Recommendation Number 9 (page 8)
TREIA recommends that the Legislature give the PUC punitive authority including assessing fines, lowering rates of return, or revoking certification for utilities that do not support development of renewable energy generated electricity on their system.

RENEWABLE FUELS

Recommendation Number 10 (page 10)
TREIA recommends that the Legislature increase the cap on the fund for the ethanol-blended fuel tax credit as, and only as, Texas ethanol production plants come on line.

Recommendation Number 11 (page 11)

TREIA recommends that the Legislature eliminate the phasedown on the five cents per gallon tax credit on ethanol-blended fuel, and retain the credit at the five cent level until 1992, when the Federal credit ends.

Recommendation Number 12 (page 11)

TREIA recommends that the Legislature allow the tax credit on ethanol-blended fuel to apply at levels below and up to 10%, and that the amount of that credit be prorated to a five cents per gallon maximum at 10%.

BUILDING DESIGN & CONSTRUCTION

Recommendation Number 13 (page 13)

TREIA recommends that appropriate state agencies evaluate and promote acceptable locally-developed building energy performance standards, guidelines for achieving these, and rating programs for comparison purposes.

Recommendation Number 14 (page 13)

TREIA recommends that the Legislature require the implementation of a standards program for all new and remodeled buildings owned or leased by the state of Texas, limiting the total amount of energy a building would be designed to use, and providing guidelines for meeting the standards.

GENERAL RECOMMENDATIONS

Recommendation Number 15 (page 14)

TREIA recommends (1) that the Texas Legislature and other government leaders support the extension of the Federal Renewable Energy & Conservation Tax Credits, (2) that the Texas Congressional Delegation be encouraged to support that extension, and (3) that the Congress of the United States act to extend those tax credits.

Recommendation Number 16 (page 15)

TREIA recommends that the Legislature provide incentives to electric utilities for improving efficiency and encouraging the use of renewable energy.

Recommendation Number 17 (page 16)

TREIA recommends that renewable energy education/training efforts sponsored by state agencies be intensified, with special emphasis on use of the media.

Recommendation Number 18 (page 16)

TREIA recommends that the Legislature direct appropriate state agencies to update existing policy reports on renewable energy, expanding information in the areas of economic and marketing issues.

III. INTRODUCTION

The Texas Renewable Energy Industries Association (TREIA) is made up of business people who recognize that renewable energy sources we make available are a small part of a very large and complex energy system already established in this state. We also understand that renewable energy has its limitations and is not likely to provide the major share of Texas' energy needs in this century. We do, however, feel that our technologies offer significant economic and environmental benefits as well as a potential share of our energy supply large enough to merit continued and expanded governmental encouragement.

Experts in our vital fossil fuel industry and in the Railroad Commission of Texas will be the first to tell you that our traditional energy sources, which have provided this state with the great wealth it has enjoyed, are on the decline. Texas has the capability to assure that a reasonable investment is made to extend the life and value of our remaining fossil fuels. Logic would indicate a role for renewable energy in that process. The fact that the largest oil-producing countries are mounting aggressive renewable energy programs should not be lost on us.

Texas' status as an exporter of energy has served us well for many years, providing a primary source of economic stimulation and government revenues. We would like to feel that our children and grandchildren will live out their years in a Texas as or more economically and environmentally healthy as the one we know. We believe renewable energy can help to assure these things come to pass.

Those who govern Texas have determined that development of renewable energy sources in the state is desirable. They have agreed that time alone is not what is needed for that to occur. Legislative and executive branches of our state government have taken steps to begin removing barriers and offering some modest incentives, in hopes that these renewable energy industries take root and grow. While some of those hopes have been realized, there remains a need for some nurturing and tending. We must examine areas where there are still barriers to competition in the marketplace.

IV. RENEWABLE ENERGY POTENTIAL IN TEXAS

Three major policy studies, prepared between 1979 and 1983, defined the state's renewable energy potential; pointed out barriers to achieving it; offered recommendations for state involvement to help overcome them; and put numbers on this vast potential. These studies are: *Report of the Solar Advisory Committee to the Texas Energy & Natural Resources Advisory Council,* (TENRAC), 1980; *Report of the Advisory Committee on Agriculturally Derived Fuels to the TENRAC,* 1979; and *State Buildings and Texas Communities: Final Report of the Senate State-Municipal Planning Study Committee,* 1983.

According to the Solar Advisory Committee's report, which was adopted as state policy by TENRAC, "Solar and wind resources can provide 15% of Texas' energy needs in the year 2000. This is equivalent to 400 million barrels of oil per year, or two billion mcf of natural gas per year (2.3 Quads/yr)."

The Texas agricultural industry, in addition to contributing to the solar and wind percentage, can make large contributions through development of energy derived from biomass, i.e. living material or residues of living material. TENRAC's Agriculturally Derived Fuels Committee did not designate a percent of Texas' energy needs that could be provided from biomass in the year 2000. It did, however, quantify the resource base, showing a sizable potential contribution. For example, just one biomass resource: "residue from five major crops - grain sorghum, cotton, corn, wheat and rice - [total] about 20 million tons, [with a] theoretical heat value of 270 trillion Btu's." This amount approximately equals the amount of energy in fuel purchases for on-the-farm use in 1974, and 1.7 times the energy used in fuel for irrigation in that same year."

In reference to Texas agriculture, the Committee concluded, "the development of alternate and more economical sources of energy for irrigation and other cultural, harvesting and processing practices is essential to the continued growth and development of this industry which is vital to the state's economy and the well-being of its people."

After several years of striving to increase the energy efficiency of our housing stock, and that of commercial buildings as well, there can be little doubt of the positive impact of simply "tightening up" these structures. The solar thermal industry always stressed the concept, "insulate before you insolate," meaning one should undertake basic efficiency measures such as insulation, plugging holes, caulking, and weatherstripping to get maximum benefit from any added solar heating or cooling device or technique. There has been growing awareness of the increased benefits from true "sun-conscious" building design and construction, and the more refined techniques and technologies that have evolved in the last few years.

The Senate State-Muncipal Planning Study Committee revealed some startling ways in which our state, county and municipal governments are losing money daily on buildings that leak energy like sieves. It suggested remedies, many of which appear to have been overlooked. Tremendous opportunities to reduce energy consumption in buildings still exist at all levels, in both the public and private sectors. State government could be a strong leader by setting an example.

By working through four groups (1) Solar Thermal, (2) Electrical Power Generation, (3) Renewable Fuels, and (4) Building Design & Construction, TREIA has stimulated the active participation of renewable energy business leaders to evaluate the condition of their industries in Texas. TREIA thus identified areas where barriers are still present, and in this document has made a series of recommendations on how to address them. These center around continuing efforts to remove institutional barriers, provide economic incentives, assure quality of equipment and service, and disseminate information to assure further development and use of renewable energy in Texas.

V. SOLAR THERMAL

INDUSTRY ASSESSMENT/OVERVIEW

One of the most common and fastest-growing solar energy markets is the use of devices to collect the sun's rays to heat fluids (liquid or gaseous). Solar energy has been used to heat water for homes since before the turn of the century. By 1940, solar water heaters numbered in the many thousands in Arizona, California and Florida. Cheap electricity and gas, in the period from 1930 to 1970, made solar energy relatively less attractive. Increasing energy costs since 1973, however, have made solar water heating relatively economic, especially when it displaces electricity. In some areas of Texas this is true for active solar heating of buildings as well. Cooling of homes with active solar systems is in its infancy, but has great potential in the near future.

A strong case can be made that it is better to invest in solar energy equipment than to invest in more large power plants. The amortized cost per kwh is about the same for each, and when the fuel cost is added, solar's cost is much lower. Energy used for water heating is second only to that used for heating and air conditioning in most all-electric Texas homes, and is equal to the energy used to power a mid-sized American car driven 12,000 miles per year. A properly-sized solar water heater can effectively replace approximately 75% of this energy.

The electric utilities in Texas, and their rate-payers, can reap great benefits from reduction in the demand for electricity during summer peak periods, by having many solar water heaters in use on their systems. When the sun is at its brightest, causing big air conditioning loads, solar water heaters are working at peak performance, thus releasing capacity. The most recent data in support of this peak-shaving characteristic was developed by the Mechanical Engineering Department of the University of Texas at Austin. To the extent that solar offsets electrical energy, thus saving coal, gas, oil or nuclear fuel, it helps alleviate environmental problems associated with them (i.e. carbon dioxide generation, acid rain, radioactive waste).

The city of Austin has come to the same conclusions, and is well on its way to replacing, by 1996, 554 MW of fossil or nuclear fuel generated electricity with energy efficiency and renewable energy measures. Solar thermal systems will provide a significant contribution to that effort, stimulated by utility cash rebates and low interest loans. From the viewpoint of the individual, one becomes an "independent royalty owner" and energy producer by investing in such a system. Although rural homeowners will find it more difficult to connect with a solar water heater sales, installation and service company, the economic benefits and contribution to family independence provided by these systems makes the effort worthwhile.

According to a recent study, "Annual Renewable Energy Review" (published by the Renewable Energy Institute, Alexandria, VA) active, batch and thermosiphon solar heating and cooling systems accounted for $700 million to $1 billion in sales in the U.S. during 1983. The cumulative number of active solar installations through 1983 was 600,000, up from 500,000 in 1982. TREIA estimates that by 1984 there were approximately 100,000 individual solar collectors in use in Texas. In addition to the thousands of residential systems (averaging two collectors each), there are numerous commercial and industrial systems (some with hundreds of collectors) heating water for buildings, restaurants and manufacturing processes.

Solar water heating has great potential on Texas farms and ranches as well. Besides residential applications, heating of barns, brood sheds, incubators and seed beds, as well as crop drying and food processing, are just a few uses which are only beginning to be recognized. To date, this rural market in Texas is largely undeveloped.

Major manufacturers of nationally known solar-thermal equipment located in Texas include Alternative Energy Resources, Inc., El Paso; Cole Solar Systems, Inc., Austin; and Solar King, Inc., Waco. TREIA estimates that in 1984 some 150 businesses in Texas sold approximately $25 million worth of solar thermal equipment in the state. Millions of dollars more in Texas manufactured water heating systems were sold out of state. It is further estimated that market penetration for solar thermal equipment in Texas stands today at less than 5% of its potential. Historically, many new products begin to gain wide acceptance only after about 10% market penetration, after which they have "taken off." Special attention is needed for solar thermal products to help them reach that 10% level.

NEEDS AND RECOMMENDATIONS

Given the current state of the solar thermal industry and market conditions in Texas, TREIA recognizes three main areas of need if the industry is to achieve a 10% market penetration in the near term. These are certification and standards, government financial incentives and increased utility support.

Certification and Standards

Problems concerning qualification of installers of solar systems and quality of solar installations are significant barriers to the industry in Texas today. Improperly-installed systems have caused bad publicity for an industry which, by and large, does a good job.

In many areas of the state, any person can legally install a solar system with little if any training or testing. To further complicate matters, in those areas where requirements are placed on who can install a system, master tradespeople (plumbing, h.v.a.c., etc.) are required where only minimal trade skills are necessary. Use of these master tradespeople adds to the consumer's cost and still does not guarantee a quality installation (many such tradespeople have had no training or experience in solar installation). In addition, contractors trying to do business in several jurisdictions find installer qualifications and requirements may be different in each, further adding to cost and confusion.

To an extent, quality-of-installation problems have been addressed by some cities mostly through minimal codes. Enforcement of permit and inspection requirements is frequently lax, or circumvented altogether. Legislative action establishing statewide installer certification and installation standards, which will supercede local requirements, appears to be the best way to deal with these problems in the interests of both the consumer and the industry.

The issue of products not meeting performance claims was addressed by the Legislature in 1983, when it passed "Standards for Performance Rating of Solar Energy Devices." The PUC rule implementing this went into effect in November, 1984. It requires certain collectors be tested and certified by an independent laboratory in order to continue the equipment's exemption from state sales tax. This law alone will do nothing to deal with the other aforementioned problems.

Recommendation Number 1

TREIA recommends the Texas Legislature (1) create a statewide licensing procedure for solar installers like those for plumbers and heating and air conditioning installers; and (2) estabish a Solar Code (International Congress of Building Officials or similar), as the standard for solar installation in Texas. TREIA will work with other interested trade groups to develop such a bill for presentation to the Legislature in 1987.

Governmental Financial Incentives

Needs in this area cross all the renewable energy technologies and are covered in the General Recommendations Section, page 14.

Increased Utility Support

This need is addressed under General Recommendations, page 15.

VI. ELECTRICAL POWER GENERATION

INDUSTRY ASSESSMENT/OVERVIEW

The production of electrical power using renewable energy is in the dawn of the Texas energy horizon. In 1980, TENRAC's Solar Advisory Committee Report confirmed that, "the state of Texas is one of the best regions in the United States for wind energy." According to the report, "Capturable windpower in Texas is estimated at 250,000 megawatts, about five times the installed electric generating capacity in the state. The energy that it is possible to extract annually from Texas winds is equivalent to the energy in 1.3 billion barrels of crude oil. Use of even a few percent of this potential would obviously have a beneficial impact on the state's economy. Roughly 40% of this potential is in the Texas Panhandle, with another 10% occurring along the Gulf Coast."

In discussions during TREIA's recent national renewable energy association leadership summit in Austin, the Alternative Energy Institute at West Texas State University (WTSU) in Canyon was cited as being perhaps the most active university wind research operation in the U.S.; but few are aware of the significant work being done there. WTSU worked with the nearby Bushland Test Center, and operating experience at the Hope Complex Wind Park near Pampa (a private venture installed in 1981) verify that not only does the Texas Panhandle have a wealth of extractable wind energy, but the wind industry itself is now technologically developed to the point of economic viability.

One of this country's premier wind turbine manufacturers (Carter Wind Systems), is headquartered in Texas. Its market, however, lies in California where a combination of fair avoided cost rates, wind resource, state tax credits and entrepreneurial spirit have combined to produce the equivalent of a major central power plant of renewable energy electrical production to add to that state's energy mix. Also, a large manufacturer of oil rigs near Houston (Skytop Brewster), has recently attained a multi-million dollar contract to manufacture large wind generators. Once again, their production is destined for West Coast wind fields, not West Texas.

Texas has three excellent wind regions, a good tax climate, the right wildcatter spirit and tradition, but an injurious avoided cost rate for non-firm power sources. In addition, institutional barriers still remain that especially discourage those who would install small individual systems such as would be used by farms and ranches or rural residents generally. Consequently, wind generators installed in Texas number only in the low hundreds, producing less than two megawatts of on-line electricity.

Another form of renewable energy already used for electricity production is the burning of biomass residues. A Dallas firm (Valley View Energy Corp.) is building two 50 megawatt plants, in Hereford and Gruver, which will burn manure as a fuel. The power will be purchased by the city of Austin beginning in late 1986. Austin is also building its own generation plant, which will burn up to 600 tons of garbage every day, and provide 10-15 megawatts of power. In West Columbia, private enterprise has entered into contracts with both the city and the utility to burn refuse and produce two megawatts. The power will be sold to Houston Lighting & Power at an initial rate of over seven cents per kwh.

In East Texas, a major timber milling company burns its wood waste to drive generators. Little has been done, however, to exploit the massive amount of crop residues (cotton gin trash, rice hulls, etc.) produced annually by our agricultural industries. Nor has there been exploration of the purposeful propagation of wood or crops for energy, despite a great deal of research in this area.

In Texas today, conversion of sunlight to electricity using photovoltaics (PVs) is gaining acceptance in the remote monitoring and signaling fields. A thriving market has developed offshore on signal buoys and oil rigs while onshore, along the railroads, PVs are showing up more and more frequently. These and other

remote applications may not displace much power, but they do displace unnecessary poles, lines and transformers which would otherwise be added to the utility's rate base, while providing electricity where it would otherwise not be available.

PVs are also beginning to be used in Texas agriculture. Besides powering electric fences, a growing number of farmers and ranchers are finding PV-powered water pumping to be more evenly matched with the water demand than wind-powered pumping, providing more water for herds when they are most thirsty. Stand-alone power systems for residential purposes are currently found primarily in areas where power is either unavailable or undependable during adverse weather conditions. Whether these systems use wind, PVs, diesel generators, or a combination of all three, their occurrence is rare and difficult to estimate.

Large PV "sun farms" of a utility-grade level are already on line in California. The city of Austin is moving forward with plans to build a pilot PV generating plant, with a contract expected to be awarded in April of 1985.

Other forms of large-scale solar electricity using focusing technologies are presently being implemented on a multiple-megawatt scale in California. A good share of that will come from systems which, once again, are headquartered in Texas (LaJet, Solar Kinetics). The value and contribution of these plants should be monitored because they, like most solar technologies, are compatible with the summer peaking load characteristics of most Texas utilities.

Hydro-power is another area of renewable energy electric generation that is enjoying new interest. While the sites with major potential have already been developed, advances in "low head" turbine generators have opened up the potential for some locations not previously considered. Some candidates exist for retrofit or for rehabilitation. The city of Austin is well on its way to adding a three MW facility at Longhorn Dam, for instance, and New Braunfels is looking at possibilities along the Guadalupe River.

Electrical power from direct solar applications, such as solar ponds, is also beginning to show promise. Several cities and areas of the state would be ideal for, and have expressed interest in, large-scale development of such facilities. Performance data from the five MW Bet Ha' Arava solar plant in Israel will be critical to assessing the development of this technology.

Renewable energy can make a substantial contribution to the electrical energy mix of Texas. Renewable energy electrical production does not deplete our capital fuel supplies, it is generally nonpolluting, and it can be placed in service quickly and in small increments as capacity is needed. It is, furthermore, intrinsically indigenous, an advantage over non-local fuel which sends dollars out of the local economy that can not be plowed back into local investment and growth to increase the general wealth of the state. These factors make renewable energy electrical production a goal worthy of immediate attention and support.

NEEDS AND RECOMMENDATIONS

There are varying needs on the part of renewable energy electrical power generators based on system size and energy end user. For purposes of identifying these, we have considered the problems of "small-scale" production" (25 kw and under), and "large-scale production" (above 25 kw). Small-scale production is likely to be installed primarily for onsite use of the power produced, with any excess being sold to the utility company. The large-scale installation, while still small compared to traditional central power stations, will be designed primarily for the sale of power to the utility.

Small-scale Production

The small business, the farmer, the rancher, and even the homeowner who wish to install a renewable energy electrical generation system in Texas often find themselves faced with a maze of requirements and red tape, and an offer of such impossibly-low electricity buy-back rates that they frequently throw up their hands in despair and give up. Among the problems are: burdensome and unnecessary dual metering systems, unrealistic insurance requirements for liability and loss, confusing overly-complex interconnection contracts and "qualified facility" forms, and requirements that the small-scale production facility meet power standards that exceed those of the utility itself. (Power standards include power factor, availability, voltage, frequency, etc. As used here, a "qualified facility" means one covered by Section 201 of the Public Utility Regulatory Policies Act of 1978. Such a facility produces electric power from waste, renewable energy or cogeneration, thus exempting it from the Federal Power Act and allowing it to interconnect with the utility grid.)

Recommendation Number 2

TREIA recommends that the PUC adopt rule changes submitted by TREIA in 1984, which call for net energy billing (single meter) for systems of 25 kw and under. (This would essentially allow small-scale producers to run their meters backward, saving electricity at retail rates.)

Recommendation Number 3

TREIA recommends that the PUC seek independent assessment of what real insurance liability should be for small-scale producers.

Recommendation Number 4

TREIA recommends that the PUC develop simplified standard interconnection contracts for qualified facilities.

Recommendation Number 5

TREIA recommends that the PUC include a statement in standard interconnection contracts which provides that the small-scale production facility need not meet power standards which exceed those of the contracting facility itself. If inclusion in contracts is not sufficient, incorporation into PUC rules is recommended.

Large-scale Production

(A) Avoided Cost

The most critical need for the large-scale producer, and one affecting the small-scale producer as well, is that of a fair buy-back rate for the electricity it sells to the utility company. If the state of Texas truly wishes to foster renewable power production, TREIA feels Texas needs to establish this "avoided cost" rate at a level that encourages such systems.

Recommendation Number 6

TREIA recommends that the Legislature pass a law which sets "avoided cost" for renewable energy power production that is equal to the utilities' retail rate minus their legal rate of return.

(B) Avoided Cost

If the previous recommendation is not pursued successfully, the only way for all renewable energy power producers to receive a buy-back rate that encourages such installations is through inclusion of a capacity credit in that rate.

Recommendation Number 7

TREIA recommends that the PUC, through its Economic Research Division or a knowledgeable subcontractor, "reasonably estimate" the potential capacity of dispersed non-firm power sources, over differing regions, with varying technologies.

Wheeling of Power

The region of Texas where renewable energy power is generated is not always the one where it may be needed. If we are to assure efficient use of such resources statewide, wheeling rates (the charge for moving electricity from one point to another), must be set at a level that not only allows, but encourages renewable energy generated electricity to be exported from resource-rich utility systems to systems of electrical need.

Recommendation Number 8

TREIA recommends that the PUC adopt wheeling rates that are in the best interest of the public.

PUC Punitive Authority

All sorts of laws, rules and recommendations may be placed on utilities that require programs and measures to encourage renewable energy generated electricity. But if the utilities are unresponsive, the PUC has no backup enforcement mechanism. Without punitive authority resting with the PUC, some utilities may never make a reasonable effort to support renewable energy development.

Recommendation Number 9

TREIA recommends that the Legislature give the PUC punitive authority including authority to assess fines for utilities that do not satisfactorily support development of renewable energy generated electricity on their systems.

VII. RENEWABLE FUELS

INDUSTRY ASSESSMENT/OVERVIEW

Biomass, as defined by the Committee on Agriculturally Derived Fuels, is "the volume of living material or residues of living material available in Texas for conversion into energy." The most available materials include wheat, corn, rice and grain sorghum. These are produced widely throughout the state. Other lesser-produced crops such as sugarcane, sugar beets, artichokes, rye, barley, oats and forestry products and by-products contribute to the massive source of materials available for conversion. Additionally, agricultural residues currently being left in the fields or at processing plants after harvest (i.e. cotton gin trash, rice hulls, etc.), are available as sources for burning to produce heat for steam and/or electricity via co-generation. Feedlot wastes, garbage, and plants capable of producing hydrocarbons such as oil and latex (petroculture), constitute other available substances that are considered renewable fuels.

The size of the biomass resource in Texas is hard to quantify, but it is huge. In addition to the 20 million tons of crop residues (220 trillion Btu's), referred to earlier in this report, the *Report of the Agriculturally Derived Fuels Committee to TENRAC* estimates other biomass resources including:

- 3,175,000 acres of high production land, 10,749,000 acres of medium production land and 49,809,000 acres of marginal production land now in pasture, range, forest and other uses that could be converted to cultivation, if needed for energy crops;

- approximately five million tons of logging residues annually from forestry operations (expected to double by 2004), and 45 million tons of rough and rotten trees in standing volume, with two million tons of dead trees available for harvest; and

- 13 million tons of municipal solid waste available annually, including waste from the 16 most-populated counties which represents energy equivalent to 6% of the state's thermal energy requirements for electric power for non-industrial uses.

No estimates were made of the volume of grains available for ethanol feedstocks.

Naturally, only a percentage of this total biomass resource can realistically be expected to be developed, bearing in mind the need to protect marginal lands from damaging erosion and to return certain crop residues to the soil for nourishment of the soil itself. But it is reasonable to pursue a 10% or higher contribution to the state's overall energy needs from these sources by the year 2000.

The Electrical Power Generation section of this report mentions examples of biomass being used in Texas as a fuel for direct burning to power turbines. Another fuel produced from biomass is methane. In Lubbock today, a large poultry operation (Sunnymead Farms), will soon be using electricity generated onsite using manure. A private Texas firm (Organic Fuels, Inc.), has installed technology to produce methane gas for fueling generators. Carbon dioxide (CO_2) scrubbed from the methane will be sold to a local commercial distributor; remaining residues constitute fertilizer, a potentially profitable by-product as well. All elements of the operation are expected to be on-line in 1985.

State-of-the-art technology for converting grains into ethanol (alcohol), which has evolved since the early seventies, also provides high protein flour and CO_2 as by-products. The largest percentage of alcohol produced from grain has historically gone into the compounding of pharmaceuticals and chemicals.

Among the benefits of developing our renewable fuels are:

- an expanded market for agricultural products;
- a reduction in current grain surpluses;
- replacement of an environmentally-detrimental octane booster (lead), with a non-noxious motor fuel blending agent (ethanol); and
- the conservation of fossil fuels.

In 1981, the Legislature instituted a five cents per gallon credit against the Texas Motor Fuels Tax for 10% ethanol-blended gasoline. Combined with a Federal credit of six cents a gallon, this provided an eleven cents a gallon incentive. In 1983 the Legislature placed a cap of $11 million a year on the fund for the state credit. The state credit is scheduled for phasedown beginning in 1987.

At the time the Texas credit was instituted, there was little reason for gasoline refiners to consider blending what was then called "gasohol." Because the credits were set to go to the blender/distributor, the majority of the activity has occurred in a mid-step between the refinery and the retail service station, "terminal blending" or "tanktruck blending." Texas refiners, who produce 30% or more of this country's gasoline, received new impetus for considering ethanol blends in 1984 when the U.S. Environmental Protection Agency ruled on the phaseout of lead in gasoline.

Ethanol-enhanced gasoline sales in Texas in 1984, for the second year, will total approximately 21 million gallons (bumping right up against the cap). Only the cap appears to be preventing a leap in those sales. It should be noted, however, that today two percent of the $11 million a year goes to firms using Texas-produced ethanol. The balance is imported. A plant currently in the works in North Texas is expected to up that to 16%. The total gasoline market in Texas amounts to at least 8 billion gallons annually. Clearly, the potential market for ethanol-blended fuel in the state is tremendous, especially if refiners were to blend in Texas for export.

Economic studies done at the Texas Department of Agriculture indicate two factors that make the most difference in the overall potential economic impact of the ethanol production in Texas: (1) the source of plant feedstock (Texas grain versus imported grain); and (2) the final use of the ethanol (optimized blend versus terminal topping). Texas production from Texas grain and optimized blending have been identified, statistically, as the combination providing the only positive overall impact. Policy decisions geared to encourage this combination appear to be in the best interest of Texans.

NEEDS AND RECOMMENDATIONS

Ethanol is the renewable fuel which appears to offer the most immediate and largest near-term prospect for economic and environmental benefit to Texas, especially in the agricultural sector. TREIA identified **government financial incentives** as the overriding need for development of the ethanol industry in Texas. A secondary area of need relates to information.

GOVERNMENT FINANCIAL INCENTIVES

Given the low percentage of ethanol sold in Texas that is produced in Texas, something must be done to encourage investment in Texas plants. The major barrier to those who would build appears to be the $11 million annual cap on the credit. There is always the fear that, after predicating investment on numbers which include the credit, sufficient additional production will be built in Texas to exhaust the credit, leaving someone out in the cold. To simply remove the uncertainty by removing the cap would do nothing to specifically encourage Texas-based production of the ethanol used in blends. Blender/distributors could simply expand imports.

Recommendation Number 10

TREIA recommends that the Legislature increase the cap on the fund for the five cents a gallon ethanol-blended fuel tax credit as, and only as, Texas ethanol production plants come on line.

The Legislative one-cent-per-year phaseout of the five cent tax credit was based on the assumption that oil price increases would offset the need for subsidy during the phaseout. Events since that time have not

borne out this forecast. There has also been concern expressed that the credit itself is insufficient to stimulate Texas production, especially in light of much-higher credits in some other states such as New Mexico (eleven cents) and Louisiana (sixteen cents, the highest in the U.S.). Coupled with this concern is a fear that, without an increased credit, financing for Texas plants will not be forthcoming.

Recent work at the Texas Department of Agriculture resulted in the following analysis of these issues:

> "Most of the ethanol plants (96%) in the U.S. have been built in states with a five cents (State) credit or less (75% at four cents or less). A five cents Texas credit plus the six cents Federal credit gives the plant limited partners about a three (3) year payback on their investment, or about a 35% annual rate of return. This is competitive with other investments of this general type in the financial markets.
>
> The financing of a plant venture depends **only** on the quality of the proposal, and how that proposal compares to the overall financial market for **all** other investments **at that point in time.** If it gives similar return for similar risk, it will be financed - and whatever is going on in some other state is **irrelevant,** since the timing for each project is different.
>
> It is well accepted within the ethanol industry that the **minimum** state-plus-federal credit is about nine cents. The combined credit in Texas is eleven cents. Keeping the state credit at five cents will keep plant margins positive even under low oil price forecasts."

Recommendation Number 11

TREIA recommends that the Legislature eliminate the phasedown on the five cents a gallon tax credit on ethanol-blended fuel, and retain the credit at the five cent level until 1992, when the federal credit ends.

It appears that one barrier to the entry of Texas refiners into the ethanol-blending arena is the 10% ethanol requirement which is tied to the credit. As one might expect, refiners will tend to lean toward use of their own resources when it comes to octane enhancement (i.e. methanol). Even though numerous problems have to be overcome for fossil-based additives to work as well or be as economical as ethanol, refiners desire the flexibility to vary the percentages of their ultimate mix, in order to achieve efficiency and possible competitive advantage. The absolute 10% requirement discourages this. The refiner, on the other hand, must be encouraged to use the highest possible percentage of ethanol.

Recommendation Number 12

TREIA recommends that the Legislature allow the tax credit on ethanol-blended fuel to apply at levels below and up to 10%, and that the amount of the credit be prorated to a five cents a gallon maximum at 10%.

VIII. BUILDING DESIGN AND CONSTRUCTION

INDUSTRY ASSESSMENT/OVERVIEW

Numerous architects, designers and construction people consider themselves part of the renewable energy industry. They are concerned with how all systems of a building, such as the building shell and equipment, are integrated with the building's use, orientation, operation and climate. These factors and their variations from building to building and site to site create the building's energy-use patterns. For years, both government and private industry have tried to find a simple method to build energy-efficient buildings. However, the process has **no simple solution.**

Proper manipulation of the components of the building's energy-use pattern allows better solutions for specific buildings. Analysis methods are now available to optimize building design and construction, and reduce total consumption without significantly increasing the cost of the buildings. Paybacks of two to five years are common for energy saving, passive and active solar components and strategies. Significant savings can be accomplished with no cost increase and even, in some cases, less first cost of the building.

The Renewable Energy Institute's 1984 *Annual Renewable Energy Review* estimates that passive solar designs are now used by 40% of U.S. builders. While this appears to be based on a very broad definition of "passive solar designs," there has certainly been a large increase in acceptance of such concepts. In Texas, TREIA estimates that less than 5% of the architects do passive solar designs, while under 2% of new structures being built each year have such features consciously incorporated. Obviously there are still obstacles to be overcome, and much room for improvement in the use of this knowledge and the new tools that have evolved.

NEEDS AND RECOMMENDATIONS

There appear to be two main areas of need and potential impact: education/training, and standards for building energy performance. The overall energy efficiency of Texas' building stock could be greatly improved through awareness and support by leaders and members of the established professional and trade associations in building design and construction. Prescriptive government programs are to be avoided, for the most part, and performance-based government programs encouraged.

EDUCATION/TRAINING

This need is addressed under General Recommendations, pp. 15 and 16.

STANDARDS FOR BUILDING ENERGY PERFORMANCE

Private Sector - All too frequently there exists a wide gap between the performance of a building and anticipated-performance claims. Too often buildings are sold as "energy efficient" or "passive solar" with accompanying predictions of low energy consumption when in fact, little has been done to merit that description. Future occupants of such buildings seldom know the difference, for lack of a comparison.

Furthermore, the energy efficiency of new buildings being constructed today will affect the Texas economy and, more directly, the pocketbooks of their occupants for many years to come. Much remains to be done to assure that these new buildings are significantly more energy efficient.

A common yardstick for comparing advantages could be established by setting a minimum standard which new buildings of different types must achieve, providing guidelines for reaching that performance level and beyond, and providing a rating system for identifying that level of energy efficiency. It would also serve to upgrade the energy efficiency of the residential and commercial building stock. Such a program is currently under development by the city of Austin.

Recommendation Number 13

TREIA recommends that local governments throughout the state be encouraged to develop and/or adopt building energy performance standards, guidelines for achieving these, and a rating program for comparison purposes. TREIA further recommends that appropriate state agencies evaluate such standards, guidelines and rating programs and that those judged acceptable be promoted by said agencies as models for adoption by cities throughout the state.

State Buildings - An earlier-referenced report, *State Buildings and Texas Communities,* revealed some disturbing facts about energy considerations in new state buildings. It appears that little has changed since those findings were reported in 1983. According to the report, "Although the Legislature has required the issuance of standards for energy use in new state-owned buildings, the standards are not being adequately enforced. . .a more recent law (requiring) consideration of solar energy use in all new state buildings, according to a survey by the Public Utility Commission, is being ignored by most state agencies."

The report also states that despite a requirement in the law that the standards include limits on the total amount of energy each new building will be designed to use, there are no limits set in the standards issued by the State Purchasing and General Services Commission (SPGSC). Several other states, the federal government and even local governments in Texas have such limits, and their buildings use much less energy than state-owned buildings. A recently-constructed state building in California, maximizing natural lighting and other advanced techniques, was expected to use about half as much energy as Texas state buildings then being planned.

One measure of total energy performance which the Texas energy standards do include, the Energy Efficiency Index (EEI), is supposed to be considered at an early stage. But "in practice, the SPGSC does not apply the EEI to new buildings until construction planning is almost finished."

Some of the energy-saving techniques that might be used effectively in Texas, as they have been in other states, include natural cooling and lighting; heat recovery and storage systems; courtyards, overhangs and porches; solar water heating systems; and computerized controls for heating and cooling systems.

The federal government and local governments in Texas have instituted standards for energy efficiency coordinated with a compliance check. The city of Austin has been particularly active in this area. Energy consumption reductions of 20%-60% have been achieved in their buildings with little or no increase in construction cost. This type of program is now being expanded into the schools in Texas under guidelines developed by the PUC, with similar results expected.

Recommendation Number 14

TREIA recommends that the Legislature require the implementation and enforcement of a standards program for all new and remodeled buildings owned or leased by the state of Texas. Such a program would set limits on the total amount of energy different types of buildings would be designed to use, and would provide guidelines for meeting such standards.

IX. GENERAL RECOMMENDATIONS

TREIA ascertained several needs that are common to all renewable energy industries. These needs fall into four categories: government financial incentives, increased utility support, education/training, and studies.

GOVERNMENTAL FINANCIAL INCENTIVES

All of the renewable energy and energy-efficiency industries covered under the current Federal Renewable Energy & Conservation Tax Credits have benefitted tremendously from them. As discussed earlier, these incentives have been instrumental in creating a foundation for several new industries. But the level of market penetration in Texas is still too low and imbalances in favor of conventional energy sources still too high for these industries to "take off" on their own. Unless or until the market imbalances are corrected by removal of government supports for other energy sources, renewable energy industries will need at least five more years of federal tax credits. These credits are currently scheduled to lapse at the end of 1985. If they are allowed to do so, TREIA feels the emerging industries it represents will be severely hurt by such an abrupt ending.

Recommendation Number 15

TREIA recommends that the Congress of the United States extend the Federal Renewable Energy & Conservation Tax Credits; that the Texas Legislature officially go on record in support of that extension; and that the Texas Congressional Delegation be encouraged to support it as well.

TREIA supports the extension of these credit as follows:

Residential

1977 - 1985	*40% up to $10,000*
1986	*35% up to $10,000 *(PV 40% up to $10,000)*
1987	*30% up to $10,000 *(PV 40% up to $10,000)*
1988	*25% up to $10,000 *(PV 40% up to $10,000)*
1989	*20% up to $10,000 *(PV 40% up to $10,000)*
1990	*15% up to $10,000 *(PV 40% up to $10,000)*

**Solar domestic water heating limited to $6,000*

Commercial

1977 - 1985	*15%*
1986	*15%*
1987	*15%*
1988	*10%*
1989	*10%*
1990	*5%*

These percentages would apply to all covered technologies, but should apply only to American manufactured products.

TREIA also supports wording to be inserted in the extension bill to allow the tax credit only on the net cost of the solar property eligible for the credit. This would exclude specifically the value of any products included in a "package deal" not subject to the tax credit by IRS rules, any rebates, customer referral allowances, yard signs, and other promotional schemes.

INCREASED UTILITY SUPPORT

Traditional regulatory practice has carefully restricted utilities to recovering their actual operating costs and return on actual plant in service. This policy seemed reasonable and responsive to conditions in the industry while marginal costs were declining and fuel supplies were abundant and economical. Those conditions have changed. It is becoming increasingly apparent that these policies have the effect of promoting continued construction and fuel use. Utility profitability is directly tied to the amount of plant owned and the sales of power. Our utilities operate under severe disincentives to search for alternatives to construction or to aggressively pursue efficient energy use. If they implement these policies, their revenues will automatically decline. Alternatives to large-scale construction and the promotion of consumption, as discussed throughout this report, can provide financial and social benefits to both a utility and its customers, and still meet energy needs for a growing economy.

Utilities currently maintain programs concerning conservation, load management and other alternatives as required by federal and state government, and in deference to informed public opinion and the attitude at the PUC. Although the PUC can penalize inefficiency through its rate-setting powers, energy efficiency issues are not incorporated in the regulatory structure in a positive and functional way, making efficiency profitable.

Recommendation Number 16

TREIA recommends that the Legislature direct and allow the PUC to provide incentives to electric utilities for improving efficiency and encouraging the use of renewable energy. The law should provide for a utility to keep (as profit) some of its ***proven*** *efficiency savings, and should provide a mechanism to accurately evaluate those savings.*

EDUCATION/TRAINING

Continuing education and training efforts by state government was consistently rated as a major need by the renewable energy leaders and experts involved in preparing this report. There is clearly a lack of knowledge about the various renewable energy resources in both the professional community and the public at large. Despite positive ongoing effort by state agencies and state-supported colleges and universities, a massive task still remains.

Representatives of all the renewable energy technologies named education of and by the media as primary for reaching the public. Due perhaps in part to a lack of information or perspective, coverage by the media of a disaster or failure is much more likely than coverage of successful renewables projects. In Texas there continues to be a general lack of "renewables" knowledge on the part of the media, which therefore lacks credibility in the field.

The number one priority for long-term, lasting impact on the energy situation lies in the schools. The older secondary students are only a few short years from being heads of households and future consumers of renewable energy technologies. The younger ones are perhaps more fertile fields, which could yield a broad population with a new energy ethic when the current energy "glut" is ancient history. Significant curriculum development is necessary if students are to be prepared for the energy circumstances they are likely to face.

The second priority should be to reach today's consumers through adult education programs of schools, and through the efforts of state agencies. Greater awareness of the existing outreach programs on the part of the public (i.e. more publicity for toll-free numbers for energy information) could stimulate continued and increased interest in energy efficiency and renewables.

Through the last few years a great deal of effort has been put into the education and training of professionals associated with the building design, construction and sales industry, and related regulatory agency personnel. Based on the current level of apparent knowledge and interest, a tremendous need still exists. TREIA members active in such industries rated education of professionals through state-sponsored seminars as third priority. They further prioritized groups of professionals to reach. Of primary importance were appraisers, realtors, developers, architects and engineers.

Recommendation Number 17

TREIA recommends that the education/training effort relating to energy efficiency and renewable energy be intensified by the PUC, Texas universities and appropriate agencies with particular attention paid to education of and by the media. TREIA plans to work with and assist media organizations, state agencies and educational institutions to achieve a higher quantity and quality of coverage.

STUDIES

The policy documents which were referenced at the beginning of this report are all in need of updating: *Report of the Solar Advisory Committee to TENRAC; Report of the Advisory Committee on Agriculturally Derived Fuels to TENRAC;* and *State Buildings and Texas Communities.* A greater emphasis on economic and market issues in such an updating effort would be helpful for government decision makers and industry representatives as well.

Recommendation Number 18

TREIA recommends that the Legislature direct the appropriate state agencies to undertake preparation of reports which update information found in ***Report of the Solar Advisory Committee to TENRAC, Report of the Advisory Committee on Agriculturally Derived Fuels to TENRAC,*** *and* ***State Buildings and Texas Communities: Final Report of the Senate State-Municipal Planning Study Committee,*** *and that the reports expand research and evaluation in the area of related economic and marketing issues.*

TEXAS RENEWABLE ENERGY INDUSTRIES ASSOCIATION
MEMBERSHIP APPLICATION

Please type or print.

Check applicable membership/dues category. Your voluntary category selection will be reviewed by the TREIA Board of Directors.

Voting Member (Company) — CIRCLE AMOUNT

CATEGORY A: ☐ Sustaining Member ☐ Power Producer of 1 MW or more.....$ 1000

CATEGORY B: ☐ Manufacturer ☐ Wholesaler ☐ Power Producer of 100 KW but less than 1 MW.....$ 500

CATEGORY C: ☐ Dealer ☐ Marketing Company ☐ Installer/Service Company ☐ Architectural Firm ☐ Engineering Firm ☐ Building Design and/or Construction ☐ Power Producer of less than 100 KW.....$ 250

CATEGORY D: ☐ Individual Architect ☐ Individual Engineer ☐ Other Professional _____ (please specify).....$ 100

Nonvoting Member (Individual)

☐ Associate (employee of member company other than voting representative, individual not involved in renewable energy as a business).....$ 50

☐ Student (must provide proof of student status).....$ 25

COMPANY NAME _____

VOTING REPRESENTATIVE _____ CEO _____ (if other than voting rep)

STREET ADDRESS _____ CITY _____ STATE _____ ZIP _____

MAILING ADDRESS _____ (if other than street address) CITY _____ STATE _____ ZIP _____

BUSINESS TELEPHONE ( ) _____

Please provide a brief description of your renewable energy business involvement:

_____

_____

Make checks payable to TREIA at 3724 Jefferson, #115, Austin, TX 78731; 512/450-1477.

☐ Total dues enclosed. ☐ Invoice for full dues. **☐ Invoice in installments.

** Category D, Associate & Student dues are payable in full. Category A, B or C may pay in full or in monthly installments as follows: Category A -- 5 monthly payments of $200; Category B -- 4 monthly payments of $125; Category C -- 2 monthly payments of $125.

Date _____ Signature _____