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MASTER

Southern Tier Central Region, New York

ENERGY CONSERVATION AND DEVELOPMENT PLAN

prepared by

Southern Tier Central Regional Planning and Development Board
53-1/2 Bridge Street, Corning, New York

under subcontract number ORNL/Sub-7594

for Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

operated by Union Carbide Corporation
for the United States Department of Energy

Contract No. W-7405-eng-26
July 1979

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ABSTRACT

The *Energy Conservation and Development Plan: Southern Tier Central Region, New York* is a summary of the work of forty volunteers over a six-month period. The volunteers worked with regional planners to imagine, assess and prescribe for the development of local energy resources (wind, solar, biomass and water) and for conservation of all forms of energy. The plan contains a brief summary of the process the citizens followed in formulating the plan, the plans themselves, and appendices which contain more detailed comments by citizens on the possible consequences of the development of each resource.

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PREFACE

Background

During the winter of 1976-7, the Southern Tier Central Region of New York (Chemung, Steuben and Schuyler Counties) experienced severe natural gas curtailments. In 1976, the Economic Development Policy Committee of the Southern Tier Central Regional Planning and Development Board (STC) asked the Board's economic development staff to investigate ways the Board could work to improve the region's energy situation and to thereby reduce its vulnerability to shifts in national or regional energy supply.

The staff found that virtually all decisions on fossil fuel or electrical energy supply for the region are made by foreign countries, state and federal government agencies and energy producing and transporting industries such as the oil companies, the electric and gas utilities, and the gas pipeline companies. Accordingly, energy policy that affects the people of the Region is made to suit the needs or demands of these concerns. The staff and the STC Board agreed that increasing the use of locally produced energy resources would increase individual and community control over the *policy* surrounding the use of such energy.

At the time the staff studied regional energy problems, there were already signs that a trend toward local energy development was underway. Individuals and entrepreneurs in the region were using or selling wood stoves, methane generators, solar heating and hot water systems and other small-scale energy technologies. The Board, the local entrepreneurs and the staff believe that these technologies hold considerable promise for the future — both for improving local energy supply and for creating new local industry, commerce and employment.

The Board therefore directed its attention to local energy development. It asked the staff to work toward improving the region's energy situation by encouraging energy conservation and the development of local energy supply. The staff identified the following basic local energy supply options: wind, solar, plant materials including wood (biomass), and water (ground and surface). They chose to investigate these resources because they are renewable, that is, their supply is indefinitely sustainable, they exist in the region, the technology to take advan-

tage of them is proven and available, they can be developed with local capital and expertise and they can be owned and operated by individuals, local businesses, community groups and municipalities.

To build a sound, effectual policy for developing these resources within the region and to make use of the expertise and knowledge of local citizens, the Southern Tier Central Board asked the staff to set up a framework for citizens to create, assess and prescribe for the implementation of a local energy development policy. The staff designed and since has joined with volunteers and public officials from throughout the region to carry out such a process.

The contents of this book summarize the process and the conclusions of the citizens' work. Although the citizens know their plans are neither comprehensive nor exhaustive, they view this report as a starting place. The regional and county sketch plans that follow show what actions people in the region can take individually and collectively to improve their local energy supply prospects.

THE REGIONAL ENERGY SITUATION — WHY WORRY?

Although past natural gas curtailments and present gasoline shortages are reminders of our dependence on these fuels, these happenings only provide glimpses of our overall regional energy situation. How dependent are we, really, on outside sources? What was our energy use in the past and how has it changed? Why should we conserve and what could it mean? The following energy profile is an outline of the answers to these questions.

Since 1960, the overall consumption of energy has risen steadily in New York State. Overall personal energy consumption (energy consumed in the home and by private automobiles) has risen 32.5 percent *per capita* between 1960 and 1977. Although no figures exist tracing this trend locally, it is probable that consumption in the STC Region has run parallel to this course.

Today, personal energy consumption in the Southern Tier Central Region is an average of about 15 percent higher than the New York State average. In 1976 (the year for which county energy consumption statistics are available) personal energy consumption was 11 percent higher than state average in Chemung County, 14 percent in Steuben, and 19 percent higher in Schuyler County. The difference between the region as a whole and the

state is attributable to higher consumption of gasoline and a greater than average *per capita* consumption of space heating fuel. The differences in personal consumption between the three counties, however, are almost solely due to differing quantities of gasoline use on a *per capita* basis, which is likely due to tourist and commuter demand.

Higher *per capita* consumption of energy also means that the percentage of income spent on energy is higher in the Southern Tier Central Region than the New York State average. Although the figures used here are rough estimates, they are accurate enough to confirm the existence of a recent consumer trend reported by the U.S. Department of Energy: significantly greater *portions* of family income are being spent on energy. In some instances, the energy expenditure portion of the family budget may be nearly 25 percent of the total annual income. This portion has increased for several years.

The increasing proportional burden of energy expenditures exists because energy prices during the last five years have increased at an annual rate higher than that of inflation or personal income. In some instances, the percentage rise in energy prices — gasoline, for example — is nearly three times the overall inflation rate.

As a greater percentage of the family budget goes towards the purchase of needed energy, the consumer has less money to spend on other consumer products. If current energy prices are applied to 1976 energy consumption figures, the resulting estimate of personal energy expenditures in the region totals over \$128 million annually, slightly more than 10 percent of total personal income in the Southern Tier Central region. Of this \$128 million, between 80 and 90 percent, \$103 to \$115 million, leaves the region for the purchase of fuels (oil, natural gas, coal), the repayment of debts and services, or refining. If this trend continues — and there is no evidence to suggest that it won't — then the drain of dollars out of the region will continue and will therefore contribute to the decline of the local economy.

The factors described above — extreme regional dependence on imported fuels, the marked vulnerability of all sectors within the region to the uncertainties of energy supply, the exponentially rising costs of energy both in actual price and as a percent of total consumer expenditures — are significant threats to the economic and social health of the region. For this reason, citizens, the STC Board and the STC staff believe that the development and use of energy resources and technology indigenous to Chemung, Steuben and Schuyler counties will be beneficial to the region.

What Citizens, Public Officials and STC did — The Process

On January 27, 1979, forty citizens from Chemung, Schuyler and Steuben Counties met at Corning Community College to begin work on a regional energy conservation and development policy.

The group was divided into four "interest" groups:

1. Educational, Legal, Medical, Religious, Disadvantaged — they renamed themselves the "Humanists";
2. Environment, Agriculture, Natural Resources;
3. Industry, Commerce, Utilities, Finance, Labor — they renamed themselves "the Military-Industrial Complex";
4. Building, Transportation, Planning.

The people who made up these groups volunteered in response to media advertising about the program.

The goals of each of these groups were:

1. To make a sketch plan for developing renewable resources in the three-county region.
2. To assess the possible short - and long - term consequences of such development.
3. To present and discuss their findings to public officials and, ultimately, with the general public.

In carrying out their work, the groups relied on background material* supplied by the staff of the regional planning board as well as on their own knowledge and research.

The groups started by working on the following questions: How much fuel is available locally? What is an extreme case of the possible as far as regional energy development is concerned? In the case of an energy emergency, what could we do?

*Three background books include, *Renewable Energy Resource Inventory*; *Renewable Energy Technology Handbook*; *Energy Technology Assessment Workbook*.

Below is a transcript of the video-taped broadcast the groups used as a hypothetical framework to begin work on answering these questions:

You were chosen to hear this broadcast because we as a nation are entering a period of national emergency. You have agreed to help visualize and carry out plans for action on energy problems in Chemung, Schuylers and Steuben Counties.

For national security reasons, it is necessary that we as a nation severely curtail our use of energy, for a period beginning now and continuing indefinitely. The curtailment will mean the following to the three counties:

*20 percent of the fuel you now use will no longer be available, immediately.
20 percent of the electric power you use will no longer be available, immediately.*

Your energy imports to the region must be decreased by five percent during each year after 1979, until they reach 50 percent of their current rate.

The following conditions will apply to the distribution and use of fuel in your region.

Imported fuel and electricity that is replaced through the development of local energy resources can be designated for other local purposes, and will not be "lost" to the community.

The energy systems you are directed to emphasize in your plan are distributed or decentralized energy systems that use renewable energy resources. These are defined as systems that can be built and operated with local capital and expertise, that are built at or near the site the energy is consumed, and that can be fueled indefinitely by a locally-produced fuel source.

Using this hypothetical case as a starting point, the groups produced "scenarios" consisting of lists of actions which they felt must take place to arrive at the stated goals for the reduction of energy use.

After completing each scenario, the group analysed it by asking, "what might the side effects of some of these actions be?" and "what constraints or incentives could we recommend that would help make local energy development proceed in a manner which is best for all?" This was the technology assessment component of the process, in which the citizens reviewed their plans in relationship to local social and environmental conditions. After this review, they could revise their lists of actions, and thus their scenarios, in response to the good or bad side effects they identified. By making these changes the groups came up with "planned" cases for development of renewable resources in the region.

At this point, the participants reorganized into groups formed by county of residence. After some preliminary meetings at which the citizens synthesized a sketch county plan, each group met with local public officials and community leaders to get advice on how some of their ideas might be put into action. The regional plan and the three county plans that follow are the result of hard work by citizens and officials, and, we hope, the beginning of local energy conservation and development action in the Southern Tier Central Region.

THE REGIONAL VIEW OF LOCAL ENERGY DEVELOPMENT

Below is a rough estimate of the energy mix the groups determined could be available to the region in ten years with an all-out effort for local energy conservation and production.

Such a goal could be reached through actions agreed upon by a majority of each group. These actions are as follows*:

Conservation

- Insulate and weatherize all buildings; control temperature and light in same;
- Control lighting on highways and in urban areas;
- Educate the public to a variety of energy-saving habits;
- Increase the efficiency of transportation technology and systems;
- Remove institutional and financial disincentives to conservation;
- Promote recycling.

Production

- Develop wood resources in region; use waste and non-saw timber for space heating and boiler fuel; control timber harvesting;
- Produce alcohol from appropriate local crops for use as a transportation fuel;
- Produce methane gas from organic waste;
- Use passive solar space heating on all new construction and active solar hot water heating on all buildings;
- Develop surface and ground water energy resources;
- Develop small and large wind turbines at appropriate sites in the region.

Projected Energy Replaceable by Conservation and Local Sources — Southern Tier Central Region, New York (all fuels except transportation)

Projected Energy Replaceable by Conservation and Local Sources — Southern Tier Central Region, New York (transportation fuels)

* Details of these actions are contained under the County Plans pp. 11-41.

WHAT DIFFERENCE WOULD LOCAL ENERGY DEVELOPMENT MAKE?

In order to test the desirability of following through on the actions summarized above, one group made a chart which compared estimates of future conditions — in this case selected items in 1983 — as they might exist with and without the plan.

1979	Item	Future (1983)	
		w/Plan	w/o Plan
22c/100 ft ³	● Price of natural gas	45-50c	45-50c
5c/Kwh	● Price of electricity	10c/Kwh	10c/Kwh
90c/gallon	● Price of gasoline	1.50 - \$2.00/gal.	\$2.25/gallon
1.5 cars/ household	● Transportation, private Transportation, public Airline service	1 car more less	1 car ? less
	● Tourism	same-more	less
	● Leisure time	same, slightly less mobility	same, less mobility
92%	● Percent of population employed	same or higher	lower
	● Crime rate	same as 1979	greater than 1979
	● Manufacturing jobs or service-oriented jobs	both increase	more service- oriented
	● Business activity Tax base	greater than 1979	less than 1979

1979

Item

Future (1983)

w/Plan

w/o Plan

● Opportunity potential	greater than 1979	less than or equal to 1979
● Agricultural activity	greater	?
Family food costs	somewhat greater	much greater
Exports	?	?
Land use competition	a great deal	very little or none
● New construction, building	much greater	none
● Government spending	greater — investment	greater — welfare and relief
● Tax rate	somewhat greater than 1979	greater than 1979
● Population	stable or growing	declining

WHAT WAS THE RATIONALE BEHIND THESE ESTIMATES?

The groups agreed that whether conservation and renewable energy development action is taken or not, the price of fossil fuels and electricity will be higher to the consumer. The development of renewables may lessen the *effects* of these continuing price increases on the consumer, however, because the consumer's dependence on current energy producers will be reduced.

Similarly, whether or not the region's residents take the actions outlined above, the average number of cars per family will decrease, since with lower gas supplies, owning more than one family car will be less worthwhile. This being the case, the groups found that a concerted effort to develop public transportation in the region would enable local residents to travel freely to work and shopping and would help maintain tourism, which plays a major role in the region's economy. Without it, both residents and tourists will face higher costs of transportation and limited mobility. The groups felt that reduced fuel availability would most likely reduce airline service to the region.

With respect to employment, the groups anticipate that the actions outlined above will generate a similar or higher rate of employment. Therefore,

the "tax base" will increase in size. This increase will result from the combined effects of greater local resource production and use including an increased number of dollars spent locally, a subsequent increase in local economic multipliers*, and a firmer local supply of certain kinds of energy. Without these actions, the groups anticipate that the rate of employment will decline, the local tax base will shrink, and possibly the crime rate will rise. The group found that the potential for individual and entrepreneurial opportunity with attendant positive economic effects would also follow energy conservation and local energy development actions.

Government spending will increase whether the local energy development actions listed above are carried out or not. However, in the former case, the spending will take the form of investment in new ventures and economic stimulation; in the latter, the increased government spending would be used to cover increasing welfare, unemployment and other hardship burdens.

Construction will increase with local energy conservation and development activities because local contractors will do more work in energy conservation improvements to homes and in the

building of renewable energy systems. Without the actions noted above, there will be little or no such construction.

Agricultural activity will increase with local energy development as markets open up for waste crops for alcohol, wood products, and food produced close to urban markets. There will be increased competition for all viable land for fiber and food production. Farmers will cultivate more land. In general, agriculture will increase in importance as a sector of the local economy. Without action to develop renewables, farmers and dairymen will face increasing production costs and uncertain or unavailable transportation for their products. Farmers, agricultural production and many local residents will suffer.

Two major points of agreement were contained in all the groups' conclusions:

- **The people of the three-county region will suffer from the impacts of national energy shortages a great deal more in the future if they do not take steps now toward local energy conservation and development; and**
- **The more and sooner we act to save and produce energy and to develop local energy businesses, the greater the payoff will be in the long run.**

* **Economic multiplier:** an increase in private investment will produce increases in jobs and income throughout the economy which are greater in value than the amount originally invested. The multiplier is the number by which the original amount invested must be multiplied to give the total income produced.

WHO CARRIES OUT THESE ACTIONS AND HOW?

Although the group members agreed to a large extent on the broad activities that should comprise a local energy conservation and development program, the group members had many differing ideas on who should carry out the activities and how. These differences centered around familiar themes: will government intervention or unassisted free enterprise work best to accomplish change in energy use patterns? Will individual action toward energy self-sufficiency or community projects for local energy development be more beneficial locally? Below are some quotations from the written and verbal work of the groups that express some of their thoughts on the pros and cons of various approaches.

* * * * *

Everybody's in the same boat . . . everybody's going to want to do this; and we can't count on Uncle Sugar any more.

Do you have any idea what the price tag would be if we had to set people up with alternative energy or transportation in a real crisis? I seriously doubt if anyone will have the money — banks or anyone. People will be making withdrawals to buy things — bicycles, whatever — that will make their lives possible, money will get scarcer, and prices will just keep going up. When the gas pumps are empty, no one is going to be able to buy a bicycle.

If there were money to buy the equipment, pretty much all the things we're talking about would get done by private enterprise.

There's something about just saying, 'we can let this thing go to free enterprise, even though it may take a little longer.' The problem is that you can envision a situation of negative feedback, where energy gets scarce, and not too much development happens, so you really have to cut back; and so industry has to cut back; which means that it lops some peoples' jobs off; which means there's less money to spend and the area becomes more and more economically depressed and we lose our critical mass of getting everyone to work together. You go below that and you're really in trouble. So you might have to subsidize implementation.

* * * * *

The government already subsidizes the use of other forms of energy like oil, gas and nuclear through various policies. To make them start on the same footing, they should either subsidize renewables to the same extent or get rid of all the special subsidies for everything.

Government bureaucracy tends to foster a certain sort of scientific obsequy in researchers which ultimately dilutes the quality of the final product.

The government should pass laws and set up programs to protect resources — like timber — from being used up so fast, and also enable people to use renewables without being financially penalized.

* * * * *

Centralized generating stations produce most of our electric power. Such plants may be ideal for providing the necessary energy for heavy industry. But in the case of individual residences, it is an unnecessary concentration of resources. It reduces residential self-sufficiency and insulates the residential consumer from responsibility and respect for the source of the energy.

Let's say everyone in Elmira had a wood stove. Couldn't there be air pollution? If we used that wood in a bigger, centralized boiler — say an industrial boiler or to heat city hall — it could be more efficient and you could control pollution.

* * * * *

Look, I wouldn't even have solar panels on my house, and I'll tell you why. I'm going to live in an underground house, because when the energy crisis really hits, people are going to be violent and will be running around smashing solar panels. I have to take care of myself.

* * * * *

Our group voted that cooperation and helping neighbors would be the most important local values in energy shortages.

CONSENSUS

The questions and concerns raised above as well as many others expressed during the course of the groups' work cannot be thoroughly answered. Yet the groups expressed the conviction that the plurality of approaches and the diversity of participants possible in local energy conservation and development activity was in itself healthy for a democratic, socially responsive, creative and enterprising way of life. The groups thought that a thorough consensus on questions like those noted above would not be necessary in order to take action. Each county in the region can take actions appropriate to its character and powers, as can each municipal subdivision and each individual. The types of actions on local energy conservation and development taken by each would depend on the resources and needs of each.

The actions identified by the groups which they felt would be most appropri-

ate for the STC Regional Planning and Development Board are:

- **To help provide capital to entrepreneurs, local governments and others for renewable energy development and demonstration projects throughout the three-county region.**
- **To serve as a source of information and technical assistance for conservation and renewable energy development throughout the three counties.**
- **To foster and insure a continuing citizen-based planning function for local energy conservation and development projects.**

In the sections that follow, the three county groups have outlined more detailed work plans for the first year of a local energy program, and broader conceptual plans for future action on energy supply and demand that each county can take

WHAT WE CAN DO

**CHEMUNG COUNTY
SCHUYLER COUNTY
STEUBEN COUNTY**

CHEMUNG COUNTY ENERGY PROFILE

Chemung County is the most urban of the three counties. The *per capita* energy consumption in Chemung County is the lowest in the Southern Tier Central Region but is still 11 percent higher than the New York State average. As is the case with Steuben and Schuyler Counties, the higher *per capita* energy consumption results from harsher than average winters and greater than average automobile use. However, the *per capita* gasoline use is much lower in Chemung County than in Schuyler County, following a common pattern of lower *per capita* energy use in the more urban areas of New York State. This is probably because Chemung County is more urbanized than Schuyler, because it has more public transportation, and possibly because it may have lower tourist gasoline sales *per capita* than Schuyler. Because the bulk of the county population is clustered into one area, distances between home, shopping, and work are minimized.

A little over 9 percent of total personal income in Chemung County is spent on direct energy consumption in the residential sector. The concentrated areas of settlement are served primarily by natural gas for home heating, which is a relatively less expensive (by price controls) form of home heating than electricity or oil. Some of the major industries throughout the county also rely on natural gas for their industrial processes.

Because of its dependence on natural gas, the County has in the last several winters been faced with actual or threatened natural gas curtailments. Current energy allocation formulas direct the gas utilities to interrupt gas service to industrial establishments in times of shortages. This process sometimes results in factory worker lay offs until normal service can be resumed. The County's heavy reliance on natural gas makes it very susceptible to the bad effects of shortages of this fuel. In the past, these shortages have occur-

red during the cold winter months when residential heating demand is added to industrial demand.

The close relationship between residential and industrial sector energy use is reflected in the Chemung County Energy Profile. Therefore, the members of the Chemung County group set out to recommend joint programs involving the business community in the planning and implementation of energy conservation and development strategies.

CHEMUNG COUNTY PLAN

The Chemung County group found that a lack of public awareness about energy issues was at the root of the confusion over our current energy problems. In order to raise the level of public awareness about energy issues, the Chemung group recommends an education program which will reach the widest possible audience — business, consumers, politicians, and students. The education program stresses both conservation and the use of renewable energy as ways by which County residents and businesses can fulfill their own needs for energy. The goals of the Chemung County program include: 1) to expose the public to the issues affecting the use of renewable energy technologies; 2) to educate the community about the local alternatives to fossil fuel use; and 3) to provide the community with working demonstrations of renewable energy technologies.

To achieve these goals the Chemung County group proposes the County sponsor energy fairs, speakers, seminars and demonstrations. An Energy Education Coordinator, employed by the County, will oversee these activities. These activities could take place as follows:

- The Energy Fairs, presented at home improvement shows, schools etc. will include exhibits which show how different renewable energy systems operate and demonstrations by product representatives from companies

selling and installing conservation and renewable energy equipment.

- A list of speakers from the local area will be maintained by the Energy Education Coordinator. The list will be made available to any individual or group interested in sponsoring a renewable energy program. The Coordinator will also administer county sponsorship or co-sponsorship of energy seminars involving local and national speakers to address/debate conservation and renewable energy issues.

- The Coordinator will arrange tours of renewable energy installations and production facilities located throughout the region. In addition, the Energy Education Office will coordinate the construction of renewable energy demonstration projects, such as a wind turbine on the County fair grounds, or a solar hot water system on a county office building.

Conservation

The Chemung County group strongly endorses the existing conservation programs already active in Chemung County as well as the energy program outlined by the Regional Housing Council. The group has also found that the existing conservation programs can be augmented by the following County and municipal government actions:

County and municipal government requirements that new equipment purchases be made on the basis of life-cycle cost.

County-sponsored energy audits.

A study of a possible phased merger of the existing public and school bus transportation systems.

County pick-up of recyclable materials

The Energy Education Office would be responsible for coordinating County government conservation programs. This would include: educating department heads about life-cycle costing and ways to conserve energy in public buildings. The coordinator would also sponsor Energy Audit Training sessions. These sessions would be designed to expand the number of organizations capable of performing energy audits.

The County Department of Public Works would be in charge of the recycling program with assistance from the Energy Education Coordinator.

The Chemung County group found that public transportation should be expanded in the County and the Region

in order to save energy for transportation. The group proposes that the County Transportation Planner determine the feasibility of merging the County transportation program with school bussing programs in the local school districts, thus economizing on investment and expanding routes for all. In addition, the group recommends the establishment of inter-city bus service with other communities in the region, revived passenger rail services, and that an expanded van pooling system be developed by local industries as well as by government agencies.

To encourage the use of carpooling the group proposes:

A centralized computer listing (at BOCES) of people's names, addresses, and place of work so that car pools and riders can be matched.

Local industry cooperation by providing the closest parking (most choice) to car pools.

Renewable Energy Resources

The Chemung County group found that acquiring adequate, reliable technology would not be the greatest impediment to the use of renewable energy resources. The group agreed instead that barriers to the use of renewable energy exist because of improper management or protection of the resources, the lack of financing for renewable energy hardware, and the absence of performance standards for renewable energy equipment. The benefits of removing these barriers would include: 1) alleviating the fears of financial institutions, the public and the business community over the long-term prospects for renewable energy; 2) protecting the buyer and seller of renewable energy hardware from faulty designs; 3) protecting the supply of renewable resources for future users; 4) reducing energy consumption in the county; and 5) creating jobs locally.

To remove the barriers the Chemung County Group proposes:

Incentives to encourage the use of renewable energy technology;

Minimum performance standards for renewable energy systems; and

Individual programs to promote the use of solar, wind and wood.

Local taxing districts should adopt the New York State enabling legislation which exempts property from an increase in assessment due to the installation of a renewable energy system.

Towns, with the assistance of the County Planning Board, should adopt performance building codes and minimum performance standards to guide consumers, builders, engineers, and architects involved in installing and designing renewable energy systems.

Solar

Each town that uses the zoning power should adopt a zoning ordinance which protects the individual's access to the direct rays of the sun. The towns would be assisted by the County Planning Office and the model legislation available in the STC offices.

The minimum *performance* standards mentioned earlier would apply to passive and active solar homes. For example, the building codes should require that a structure can support a certain weight on a roof before solar panels can be mounted.

The Chemung County group recommends that the county use its existing land use planning mechanism, the County Planning Board, to identify and label the best solar sites for the production of solar energy. Within these solar zones existing land-use control techniques (building height, site plan, etc. . .) should be used to assure that the zone and the structures within receive the optimal amount of direct sunshine.

Only structures with a solar design can be built in new subdivisions located in a solar zoning district. Municipalities with zoning powers and the New York

State Department of Environmental Conservation would have the authority to enforce this provision.

The Chemung County group also recommends that the County sponsor a solar hot water demonstration installation on one of the county office buildings.

Wind

To increase public exposure to the benefits of wind, the Chemung County group recommends that a demonstration turbine be erected on the County Fair Grounds and that the energy captured by the turbine be used to heat, light and cool the building which is now home of the County License Bureau.

For individuals interested in erecting their own turbine a variance of municipal ordinances — especially the tower ordinance — may be necessary, but only after the proposed turbine meets predetermined safety and building codes. For example, the turbine should

be able to withstand 100 mph winds.

Wood

The Chemung County group has found that the rapid expansion of the use of wood as an energy resource may create problems in the areas of health, safety and resource management. To minimize the bad side-effects of wood use in the County, the group recommends several actions:

—The Energy Education Coordinator include programs about health and safety in the education program outlined earlier.

—The Coordinator cosponsor with existing service organizations instructional training in the proper use of chain saws, chimney cleaning, fire maintenance, wood stove safety inspection and wood lot management.

—The County Environmental Management Council assist the towns in adopting wood harvesting ordinances which promote sustained yields.

SCHUYLER COUNTY

STATEMENT OF VALUES

Many of us feel that there is something seriously wrong with a way of life that allows the squandering of natural resources. Some of us are changing to more meaningful and equitable life-styles. Some are going back to the land and/or homesteading. Some are interested in the political forces and some are concerned about the effect of the energy crisis on such far-ranging things as international relations, education and even religion.

The current energy situation has caused many of us to pause and reappraise our values. The majority of us feel there must come an end to growth for the sake of progress. We must rather turn our attention to stewardship of what we have and we will find that we thereby find greater satisfaction and enjoyment in life in the present while automatically providing for a better future.

Many in our society are oriented in most of their thinking towards profit. But profit in its present day sense implies the consumption of scarce resources and the destruction of our ability to sustain ourselves. Instead of profit we should think of permanence and consider those things to be good which contribute to the continuing quality of lives. Considered another way, profit is evil if thereby we bring about a loss to others but it is good if it is the result of a person's work or contribution to others.

Every day we read in the papers of people's rights. Some of this is good but when the awareness of one's rights far overshadows the responsibilities which one should have toward society, then that society is headed toward collapse. A society based on rights tends to evolve in times of growth whereas a society based on love, trust and cooperation tends to evolve in the more stable kind of society which most of us seek.

Present society tends to institutionalize and professionalize many areas which

should be our personal responsibility. We have lost much of our potential to fully develop as human beings and to interact with our ecology and with fellow human beings because of this — the union can give job security while killing our ability to contribute better ideas.

Many of us on the energy committee would like to measure the quality of goods rather than the quantity. We want just enough to live happily — not more of everything, which in the long run does not contribute to happiness but leads to drudgery. As Tom Bender puts it in New Values, "The fewer our wants, the greater our freedom from having to serve them."

We believe in localization not centralization be it in government or energy production. We are against increased urbanization in Schuyler County which leads to energy slavery and the destruction of traditional means of livelihood. Urban systems are unaffordably costly.

We stand for the idea that work is good because it nourishes and enlivens us and lets us produce the best of which we are capable. Work is essential to our well-being. Everyone should have the right to do meaningful work.

We believe in the use of tools not machines. A tool allows the personality of the craftsman to show in the final product whereas the high technology machine does the job automatically.

We believe in independence, for the master becomes dependent upon the abilities of the slave. Yet as we become capable of self-sufficiency we remain clearly aware that we have the ability to contribute our special skills to society.

And finally, we believe that a certain sense of austerity will promote personal happiness and in the end lead to a better world.

SCHUYLER COUNTY ENERGY PROFILE

As noted in the introduction, the *per capita* energy consumption in Schuyler County is 19 percent higher than the New York State average, and 8 percent higher than in Chemung County and 4 percent higher than in Steuben County. Therefore, the residents of Schuyler County are more vulnerable to interruptions of supply and higher energy prices than the residents of the other two counties. This vulnerability is most acute in the residential and commercial sectors.

The Schuyler County economy is anchored by manufacturing, agriculture and tourism. It is probable that tourist gasoline consumption adds to the county's total *per capita* consumption substantially. Tourism, especially, could be adversely affected by gasoline shortages. If gasoline shortages prevail for more than one season many of the county's tourism related businesses may have to close. This would raise the level of unemployment and take much needed capital out of the county economy.

Potential gasoline shortages in Schuyler County will more directly affect residents who commute out of the county to work. More than 2500 Schuyler residents travelled out of the county to work in 1970, and that number is probably greater now. If there is no gasoline, or if the price of gasoline continues to escalate, these people will be adversely affected.

Finally, a large percentage (much larger than elsewhere in the region) of homes in Schuyler County are heated with fuel oil — the energy resource which is least in supply, highest in price and guaranteed to get more expensive if not scarcer in the future.

Higher costs and decreased supply of fuel oil and gasoline will have their most severe negative impact on low income groups. Schuyler County residents have the highest *per capita* energy consumption in the region, as well as the lowest *per capita* income in the region and one of the lowest in the State of New York. The County also has the highest percentage of residents on fixed incomes — social security, disability, and public assistance. These people are least able to cope with price increases of any kind.

The best current estimates indicate that nearly 14 percent of personal income in Schuyler County is spent on

direct energy consumption. This figure is significantly higher than the percentage spent in either Chemung or Steuben Counties. Thus, a sharp rise in the price of fuel oil and other petroleum products may further erode the purchasing power of Schuyler County residents.

These combined factors — higher prices, decreased supply, and low income — may both limit and sap the economy of Schuyler County in the near future. They also indicate that the effects of increasing energy scarcity will hit Schuyler County very hard.

Although Schuyler County has limited financial resources, many existing county-wide programs are staffed by CETA workers who are assisted in program implementation by volunteers. This philosophy of volunteerism and self-help dominates the Schuyler County energy plan.

SCHUYLER COUNTY ENERGY PROGRAM

The County Energy Coordinator

The Schuyler County Group agreed that Schuyler County needs to take action on energy now, and that there should be a single person or office with responsibility for energy concerns and activities. If necessary, this function could be served by a person already employed by the County, so as to economize on money and "bureaucracy". The County Energy Coordinator should know or should be willing to teach himself or herself the basic information necessary to carry out the programs outlined below.

Conservation

ENERGY EDUCATION

Top priority for energy action in Schuyler County is public education: in order for people to start to understand and act on energy problems, solutions to them have to be explained at the local and personal level.

A variety of community groups will work to educate the public by: 1) showing people how they can save money by investing in energy-saving measures, 2) showing people the long-term benefits in local energy development and energy conservation, and 3) providing hands-on demonstrations of energy conservation improvements and 4) educating lending institutions, government officials and others about

the desirability of using conservation, solar and other renewable energy resources locally.

The County Energy Coordinator will carry out specialized energy education programs as needed. The Coordinator will work in cooperation with the Cooperative Extension, the schools, the Youth Bureau, the 4-H, the Boy and Girl Scouts, industry, local fire departments and building inspectors, the League of Women Voters, retirees, service clubs, and other community groups.

The County Energy Coordinator and the groups listed above will distribute educational material. Methods might include leaflets in grocery, home improvement and building supply stores; a weekly energy column in the newspaper; hands-on workshops; and radio talk shows. Content might include examples of local home and business energy conservation projects.

ENERGY AUDITS/WEATHERIZATION

The County Energy Coordinator will train individuals and volunteer groups to perform energy audits and make recommendations for basic energy-saving improvements to residential, small commercial and public buildings. The goal is to perform as many energy audits and to weatherize as many homes as is practicable in the shortest period of time.

ENERGY CONSCIOUS BUILDING AND SITING OF BUILDINGS

The goal of this action is to save energy in new buildings by siting them to take ad-

vantage of the natural heating and cooling properties of the sun, the earth, vegetation, etc.;

To encourage the sheltering of existing buildings through the use of shelterbelt planting of trees, earth berms and similar landscape improvements; and

To protect an individual's access to the sun's rays.

The County Energy Coordinator will work through educational programs aimed at the public, private commerce, industry, and state, county and local governments to accomplish these goals. The implementing mechanisms will be: the state government, through necessary enabling legislation, the state sanitary code and building codes; the county government through certain kinds of subdivision controls and the enforcement of state codes, the municipal governments, through zoning and subdivision regulations; and in the private sector, individuals and businesses through voluntary action.

BENEFITS OF THESE PROGRAMS

The energy conservation programs will be useful to the people of Schuyler County because:

They will help people save energy in their homes and thus save money;

They will help initiate specific, practical actions by local individuals, governments and others to conserve energy;

They will help stimulate business in the building and building supply trades.

OTHER CONSERVATION MEASURES

Other conservation actions that the group recommended include:

Investigate tax incentives and disincentives the county could impose or limit to encourage energy conservation, to increase the use of renewable energy sources and to reduce the use of non-replenishable energy sources. The units of government involved include municipalities (special district taxes, school taxes); counties (special district, sales and property taxes); state (property, sales, income taxes and various licenses) and federal income tax.

Recycle used products by reducing the amount of waste, burning waste as a fuel, recycling materials for use in manufacturing, creating recycling centers and selling scrap.

Public Transportation

The Schuyler County Legislature perceived a need for Public Transportation in Schuyler County nearly two years ago, and its Transportation Advisory Group has worked to make a sketch plan for filling this need since then. Below are the preliminary objectives set out in that plan:

"1. Schuyler County's transit system should increase the mobility of the elderly and handicapped, low income, commuters and the general public. Serving tourist/recreational travel, youth and relieving congestion and parking problems will be given a lower priority.

2. Schuyler County's transit system should definitely provide for trips to public/private agencies (including doctor's offices and hospitals), work (commuter) trips, and possibly provide for shopping trips within the county. The system will not primarily seek to serve social/recreational, school and tourist/recreational trips.

*Schuyler County's transit system should provide service to the major centers of the county five days a week. Commuter service should also be provided five days a week. The more rural areas of the county should be served at least three times per week or on a demand responsive basis."**

Renewable Energy Development

First year priorities for renewable energy resource development are solar and wood.

SOLAR

The goal of the solar energy program this year and in the future is to encourage the maximum use of solar energy for heating and hot water in Schuyler County. First year actions include:

The County Energy Coordinator will organize demonstrations of do-it-yourself solar heating systems and institution of a solar home/solar installation tour in Schuyler County.

The towns will allow property tax exemption for solar installations on homes.*

The County Energy Coordinator, with volunteer groups, will make a solar hot water demonstration installation on a public building in Schuyler County.

WOOD

The group agreed that the widespread use of wood in Schuyler County is proceeding without outside incentive, but that two areas related to wood use would be of concern in the near future:

1) the management of wood harvesting in the county; and

*For more detailed information, refer to Schuyler County Transportation Study

2) wood stove safety.

To address these concerns the group recommended:

- Legislators should work to encourage their constituent municipalities to pass wood harvesting laws in the near future.

- Legislators and citizens should encourage the revitalization, through increased staffing and resources, of the New York State Woodlot Management Program.

- The County Energy Coordinator should join the efforts of the Cooperative Extension, 4-H, Scouts and the Volunteer Fire Companies in educating wood stove users about safety in installing, using and maintaining wood stoves.

Longer-Range Renewable Energy Development

The Group agreed that the following actions should be pursued by the County Energy Coordinator, Legislators, municipalities and individuals in Schuyler County within the next five years:

WIND

The goal of the wind energy program is to make maximum use of wind resources in Schuyler County.

The County Energy Coordinator will work with school groups and other interested volunteers to evaluate and collect site-specific data in prime wind areas such as the east side of Seneca Lake (Hector); parts of the towns of Montour and Catherine; the east side of Waneta Lake (Bailey Hill Area); and several others.

The County will investigate the establishment of wind safety zone regulations and tax incentives to encourage the use of wind.

WATER

Make an inventory of all potential hydropower sites in the county; determine where such hydropower could help farmers and residences. Encourage industrial use of hydropower.

Evaluate areas where ground water heat pumps could be used.

Remove barriers to the use of waterless, composting toilets.

SOLAR

Retrofit solar hot water on all county buildings where possible

Retrofit passive solar space heating on county buildings where practical using such methods as trombe walls and heat grabber devices.

BIOMASS - (Plant Materials, including Manure)

Form a cooperative venture among farmers for alcohol production

Evaluate landfills for possible recycling of materials and biogas generation

Encourage farmers to use manure to generate methane.

Steuben County Energy Profile

Per capita energy consumption of Steuben County residents falls in between the *per capita* consumption of residents in Chemung County — the lowest in the region — and in Schuyler County — the highest in the region. Residential energy use is about the same as in the other counties while gasoline consumption falls in between. This is due in part to the mixed rural/urban nature of the county. Although many residents live in or near the major cities and industrial areas of the county (Corning, Bath, Hornell), a sizeable portion of the population must drive a considerable distance to work and shopping.

Over 10 percent of total personal income in Steuben County is spent on direct energy consumption by individuals. The most recent figures indicate that over \$100 million was spent in Steuben County last year on direct energy consumption by *all* sectors — residential, commercial/industrial, and transportation. Between 80 and 90 percent of this money — \$80 to \$90 million — left the county.

Steuben County is served by three electric utilities: New York State Electric and Gas, Bath Municipal, and Rural Electric. Similarly, there are three natural gas utilities — Corning Natural Gas, Bath Municipal and Columbia Natural Gas.

The largest single energy consumer in the region is also the largest employer: the Corning Glass Works, which is lo-

cated in Steuben County. In the past, the Glass Works has relied on natural gas as the primary fuel for its melting units. However, in the last few years the company has started converting these units from natural gas to electricity and pursuing a vigorous energy conservation program. Other county industries, such as Ingersoll-Rand and Gun Ocke Chair Company have also worked to conserve energy, and thereby save money and make their operations more efficient.

The most immediate energy problems facing most people in Steuben County

are in the areas of gasoline and fuel oil. Since there is no public bus or passenger rail service in the County, many residents depend on private transportation. Additionally, many homes located outside the urbanized areas of the county rely on fuel oil for home heating. Higher prices and spot shortages of gasoline are putting a burden on county residents and the businesses that rely on a mobile work force. The Steuben County Energy Group has assessed these problems and the way renewable fuels may provide relief.

STEUBEN COUNTY PLAN

The Steuben County group believes residents of the county will receive considerable benefits from conservation and the development of the energy potential in the County's sunshine plant materials, wind and water. Steuben County entrepreneurs already produce and sell energy technology that uses these renewable energy resources, and several individuals in the county use such energy technologies in their homes. Therefore, the evidence that these products will become increasingly important in the County's economy and everyday life is familiar to many residents of Steuben County. The group recommends that all sectors of the County work toward the following broad goals:

- to reduce energy consumption in the county;
- to achieve maximum local energy independence;
- to attain optimal development of renewable resources;
- to achieve the efficient use of energy in the County.

Beyond the broad areas of agreement on goals, the Steuben County group focused its program into two major categories: 1) a commercialization project and 2) an education/advocacy project. The group members will continue to meet on a regular basis to report on their activities, and will use the resources of the STC Energy Staff for information and support.

Part 1: Commercialization

Several group members thought that rapid commercialization of renewable energy technologies would be the most expedient development path to follow. They favored "zeroing in" on the commercialization aspects of one particular type of technology, and following through in working toward its commercialization. They anticipate following through on more than one project. The first project they will work on is alcohol production.

The group members will investigate the possibility of a commercial venture to build and operate a still to produce alcohol from waste crops and other plant materials in the county. They will answer the following questions:

- Would alcohol production be a worthwhile business in Steuben County?
- What condition would make it worthwhile?
- If it is feasible how can we make it happen?

If the project looks feasible, the group will work to "make it happen".

Part 2: Education/Advocacy

Several group members will form a network to advocate the use of renewable energy resources and strict energy conservation standards in new public building projects, planning regulations, among lending institutions, the building community and individuals throughout the county.

In addition, the group will advocate local actions to lessen the bad effects of such development. Examples include timber management, solar rights, and so on.

Group members will investigate the possibility of working with Corning Community College or Public Access Television to present a half-hour TV show on local renewable energy opportunities for the general public.

Group members will advocate local and county government leadership on conservation and renewable energy use. These public agencies can provide leadership by:

- weatherizing and saving energy in public buildings;
- using renewable energy systems where possible in public buildings;
- enacting legislation to encourage the development of renewable energy sources;
- putting pressure on other government agencies to enact enabling and incentive legislation for conservation and renewable energy development.

General

Although the Steuben County group has focused its current activities on the areas mentioned above, the group also recommends the following:

- the expansion of the existing woodlot management program;
- solar retrofit of county, municipal and town buildings;
- incorporation of passive and active solar into the new county office building;
- establishment of mass transit in the county and the region;
- energy audits of all public buildings;
- building codes and subdivision ordinances which require energy-efficient siting of all buildings;
- the encouragement of producing methane from manure on dairy and poultry farms;
- encouragement of wind generators to produce heat and electricity;
- development of local hydropower resources.

DETAILED RESOURCE INFORMATION TECHNOLOGY ASSESSMENT

"The greatest opportunity to achieve the goal set before us lies in conservation. More than one-half the current U.S. energy budget is waste. In 1975, Americans wasted more fossil fuel than was used by two-thirds of the world's population . . . we could lead lives as rich, happy and fulfilling — with as much comfort and more employment — using less than half the energy we now use."

CONSERVATION

All the groups agreed that conservation is our greatest short-term energy resource. People can conserve energy by decreasing the amount of energy and other resources they consume and by using energy and other resources more efficiently. The group members found the following concepts useful when working to accomplish these goals:

1. Everything is Energy (just about)

Gas and oil are familiar forms of energy. Consumer goods are also in a sense, energy, since it takes energy to make them, and if we waste them we are also wasting energy. Planned obsolescence of automobiles, for example, makes the average life of a present-day car three years. After that, the car is often junked, and the energy that was used to make it is, in effect, thrown away. The factory produces another car that lasts three years, and the cycle continues. The total amount of transportation that the three cars provide is not actually increased, only the number of cars necessary to provide it. The same transportation could be provided by one car lasting nine years,

and the "energy cost" of the vehicles themselves would be reduced. Similarly, a small car saves on energy in two ways: in the energy it takes to run it and on the energy it takes to make it.

2. Don't Cut Butter with a Chainsaw

It is important to match the quality of energy and the energy-using technologies to the job they do. Otherwise, the difference in energy consumption between the tool used for the job and the tool required for the job is wasted energy. For example, it is often inefficient to use energy from a thermal power plant operating at several thousand degrees Fahrenheit (F), to produce steam, to turn a turbine, to create an electric current, to run through transmission lines to a household, to heat an element, to heat domestic hot water to a temperature of 140°F, when a solar hot water heater operating at 170°F can accomplish the same task in a single, self-contained system.

3. Don't Buy Now and Pay Later — Figure Life-Cycle Costs

The cost of an appliance or other piece of technology is not what you buy it for. It is really a combination of the initial price, the cost of operating and main-

taining the technology, and the cost (or return) of disposing of it. Sometimes the initial cost of installing a given technology is higher than a similar model, but has energy-saving features that make it so much less expensive to operate that it ends up being "cheaper" than the less expensive model when used over a period of time. An uninsulated home, for example, might have a lower buying price than a comparable insulated one, but the costs of paying the heating bills might be so great or it that the added operating expense wipes out the initial savings. "Life-cycle costing" is a way of emphasizing the importance of considering long-term resource economics of an everyday expenditure rather than simply the short-term market economics we generally use.

The group named hundreds of ways we could use energy more efficiently. The specific suggestions they thought of — outside of those mentioned in the county plans — are too numerous to mention here. Below are selected categories of energy conservation actions the groups found are available to the individuals and communities of the Southern Tier Central Region as well as some suggestions for projects.

"It is doubtful that these energy plans can be activated by an appeal to patriotism or good future for our children. To be successful, the plans must have incentives to save money or, better yet, make a profit."

Political Actions

Political actions for energy conservation depend on government or organized community influence for their accomplishment. The government can act to make energy conservation a national, state or local goal by passing legislation that encourages energy conservation and discourages energy waste. The group thought that many existing laws do just the opposite. Among the recommendations for legislative reform for energy conservation on the local, state and federal level were:

Local

Mandate energy-efficient siting of new buildings through subdivision and zoning ordinances.

Provide pickup for recycling efforts; require that homeowners separate their garbage for garbage pickup.

Change purchasing regulations in public agencies to require life-cycle costing

State

Enable the creation of local property tax incentives for the installation of renewable energy equipment.

Encourage merging of school bus systems and municipal mass transit systems.

Federal

Prohibit "declining block" utility rates whereby big users pay lower rates per unit of energy.

Mandate a phased reduction of line voltage in the future on a national scale.

Use Federal Highway Trust funds to upgrade railroads

Mandate minimum mileage standards for each new car.

The group also suggested that communities could organize to provide themselves with incentives for energy conservation: cooperative ventures by neighborhoods to buy insulation; organize carpooling or assign recycling pickup on a revolving basis are some examples.

"The Federal Government financed and directed the improvement and extension of the Interstate Highway System; which has downgraded a once-active railway system . . . Financing the energy programs can cause both beneficial and detrimental results, such as misuse of funds, shifts in population and decrease in other financed programs."

"Electricity prices have been designed so that the largest users pay the lowest rates. While this once seemed reasonable (in terms of cost of service) such rate schedules have outlived their rationale and now serve largely to perpetuate inefficiency."

"Public utilities base their profitability upon the sale of power as offset by capital costs plus fuel expenses. If sales of power decline because of increased conservation or self-sufficiency through other means, a risk arises that sales will drop below the combined cost of fuel and capital expenditures. This could cause a rate increase for all remaining customers on the utility."

Technical Actions

Technical actions are individual and community actions that would cut energy use, minimize waste and increase efficiency of operation through a change in technology or in the maintenance of technology. Such actions can be as simple as using 40 or 60-watt lightbulbs in place of 100-watt bulbs, or as complicated as installing machinery to recapture and use once wasted heat from an industrial process.

Examples of types of technical conservation actions individuals can take include:

Focused projects, such as weatherizing one's home; using more fuel efficient cars, keeping the car tuned; using energy efficient appliances; lowering thermostats to 68 degrees during the day and 60 degrees at night; and so on.

Examples of actions a community or municipality might take include: 1) larger-scale versions of individual actions: requiring that public administrators consider the life-cycle costs of equipment when making purchases or weatherizing buildings; and 2) actions that improve systems' energy efficiency: setting traffic lights to minimize congestion, upgrading or initiating a public transportation system and investigating district heating of urban buildings.

"If conservation construction is labor intensive, does the possibility of a labor shortage exist? What would be the effect of such a shortage on local industry and wages?"

"In recycling and wood there will be more transportation of materials and more collection and storage centers needed."

"From what other areas might capital be diverted if investing in local energy production promises a greater return — i.e., roads, sewers, other business and industry?"

"Increased local investment: there should be positive effects when money previously exported from the area to pay for energy imports is invested and spent here."

"Some obvious ways of domestic conservation of fossil fuels would definitely conflict with social patterns now widely accepted. The Southern Tier is not about to say, 'Wear dirty clothes; demonstrate you're saving laundry fuel!' The good housewife, whether or not she is also employed outside the home, is bound to use her washing machine. But the air drying of laundry requires outdoor lines or spacious indoor areas, plus larger blocks of the housewife's time and energy than is required by gas or electric appliances. Pleasant though the occupation may be in sunny summer months, it must be recognized as a hardship in sub-freezing weather that prevails at other seasons."

"Some advantages of insulation are that it adds value to the home, saves on heating and cooling costs and prevents pipes from freezing in winter. There should be a substantial reduction in air conditioning, too."

"If your wood stove uses inside air it might not draw right in a really 'tight' house. So you better install it to use outside air."

"More insulation could mean greater danger of suffocating from toxic fumes inside a house."

"One disadvantage to the foam-type insulation is that for certain types, in a fire the fumes might be lethal."

Social Actions

Social actions for energy conservation try to influence people's behavior so that their habits and lifestyle are less wasteful of energy. Such actions include educational programs and "research" -- where community members look into how we could (or have) changed our lifestyles to accomplish energy conservation goals.

Suggested projects include:

Energy conservation education at school, in the workplace and on the media.

Examination of what kinds of energy conservation methods were used in the 19th and early 20th centuries in the Southern Tier which might be resumed advantageously today.

"People's reactions to car pools are usually quite negative. They're difficult to establish because of individuals' changing schedules and needs."

"The more conservation, the less its going to cost to conserve."

"Because of improvements and greater assessed valuations on some houses, mortgages may have to increase."

"There are some negative aspects to the recycling program. First of all, we must get the citizen aware of what to collect and provide them with storage. If you've already got solar storage and wood storage in your house, recycling storage is really going to mount up."

"The organization of the 'people' elements of the entire program are critical to its survival and success."

"Will a black market for energy arise and if so, what effect will it have on demand and price?"

SOLAR ENERGY

The groups found that solar energy is an important energy resource in the STC region and will become more important in the future. This future includes both solar photovoltaics and solar thermal systems, but the latter are now more readily available for general use. Therefore, the groups concentrated their efforts on such systems. One group member noted three major misconceptions about solar energy that are common in the region:

"Solar energy technology is in its infancy, unproven. Better wait."

"Solar is fine for Arizona, but not for New York State."

"It doesn't 'pay back'."

Answers to these misconceptions:

Solar energy technology is proven, it is available and it works. It is not a new technology, but has a long history of use both in this country and abroad. Like any technology it has to be installed and maintained properly in order for it to operate well.

Solar energy is *easier* to use in Arizona than in New York State because there is more sun; but sun and solar heat are therefore more *valuable* in New York State, where there is more heating demand and traditional fuels often are more costly.

Solar systems have payback periods that vary from months to years, and are dependent on many factors. It is

misleading to make a blanket statement about payback period for all solar energy systems. Payback period depends at a minimum on the following factors:

- Cost of system installation
- Cost of energy replaced
- Escalation cost of traditional energy replaced
- User need for energy for heating and hot water
- Financing and tax incentives for system
- Maintenance costs
- Storage available

Every group recommended that local individuals, business and government take steps to increase the use of solar energy locally. They recommended the use of both passive and active solar systems matched to jobs for which each is suitable. Below is a sampling of applications the group thought various sectors might undertake to help them take advantage of solar energy.

Residences

Solar hot water heating

Passive or active solar heating on new construction

Passive or active solar improvements on existing structures, including trombe walls, heat grabbers, thermal curtains and solar greenhouses.

Solar improvements to mobile homes, such as reorientation to get full benefit of a southern exposure; solar "skirts" and solar heat grabbers.

"There may be financing problems, and since money is generally tight, solar may be on the bottom of the list."

"Will utilities (gas, electric co.) stand behind purchase of solar heating system?"

"Will a system that performs well in this area also be unobtrusive as to environmental quality? The systems should also not infringe on a neighbor's or a community's aesthetic or environmental quality."

"Conservation habits would have to be learned and practiced to make solar work — and solar systems would therefore make people conserve. They'd have an investment in conservation."

"The economics and reliability of solar systems will affect people differently from different income brackets: wealthier people can afford the "risk"; poorer ones may need the systems more."

Solar systems would create employment with manufacturing, installation and service.

Schools and Public Buildings

Public buildings of all kinds can benefit from solar space and hot water heating.

Large public spaces that are often unused, like public halls in armories, sport arenas and churches would benefit from passive solar "retrofit" for heating.

Schools and public buildings with large, south facing walls could use "sun wall" systems for passive solar heating.

Solar collectors on roof areas of schools and public buildings can preheat incoming air, thereby reducing energy demand for space heating.

Solar cooling of buildings is also possible although technically more complicated than heating.

Some schools have already started building solar greenhouses. Solar water heaters would be well suited to school hot water use, especially in swimming pools.

Most government office buildings and other public buildings can use solar to heat their hot water.

Commercial Buildings

Businesses, warehouses and recreational facilities that do not require high grade heating at all times could get 100 percent of their heat from solar energy.

Large commercial and apartment

buildings with more than one story are often ideal for solar hot water systems. New ones are equally well suited for solar design for space heating and cooling.

Certain kinds of commercial enterprises can benefit from solar hot water heating. Car washes, laundromats and swimming pools in hotels and motels are among the kinds of businesses that could benefit most from solar heating.

Industry

Some industrial applications of solar energy technology are the same as those for the commercial sector. These include space heating and cooling and the heating of water. There are also specialized uses of solar energy which may have industrial or agricultural applications. Such applications include heating or preheating water for sterilization; drying of crops; drying of chemicals, such as salt; and the heating or preheating of water for low-grade steam.

The groups found that there may be some barriers to solar development. One is a lack of legal protection of "sun rights". Such legislation would protect a solar home owner from having the sun on his collectors blocked by larger buildings or trees. If municipalities are to pass such legislation locally, its passage must be enabled by the state.

"The best sun spaces may often coincide with good farm land."

"Aesthetics and ease of installation must be considered in order for public acceptance to grow — even in an emergency situation."

"Solar technicians and HVAC Contractors who are certified installers should install and maintain solar equipment. Although government technicians may be as qualified, their involvement in the process would produce difficulties in individual freedoms."

Solar applications would result in increased valuation.

Home insurance rates could be affected with solar application.

Bank loans would increase due to solar systems.

Buildings equipped for solar would be more adaptable for other renewable energy forms.

Government bureaucracy would be affected due to required zoning, insurance and tax changes.

Solar systems would increase individual freedom from utility dependence.

"The same increased equity that favors rural stability in terms of present ownership may escalate land costs beyond the resources of the next generation of potential rural landowners; that development would amount to a de-stabilizing influence. Improved employment prospects resulting from increased harvest activity will also expose a large number of people to the possibility of logging accidents in remote areas.

"Small rural landholdings may be purchased as recreation land by outsiders who may have no interest in participating in the development of the resource base under their control."

"Remote owners would be less concerned with maintaining the quality of life and the quality of the environment, both of which would be threatened by over-exploitation of the region's woodlands."

WOOD

In the county plans, each group emphasized the importance of developing the abundant wood resources of the STC region. Below are many of the specific ideas implied (e.g. wood management) in each of the county plans:

Wood Greenbelts

All the groups found that wood is an inexpensive, widely-used home heating fuel. However, the economics of using wood strongly favor users who own or have access to a woodlot. These users withdraw wood at little expense other than their own labor. One of the groups developed the idea of publicly owned wood greenbelts, which would supply wood for users who do not own a woodlot or have no other guaranteed supply of wood at their disposal.

Cities, villages and towns could purchase woodlots or manage their own lands for wood, and thus form a "greenbelt" around or within their boundaries. (See Appendix, p. 54 for legislative authority.) Wood from these greenbelts could supply the urban wood fuel user. The greenbelts would be managed by the municipalities to provide a sustained yield of wood. The municipality would recover all or part of the cost of maintaining and purchasing the greenbelt through the sale of cordwood to these urban wood users. This system would assure the urban wood user of a supply of fire wood. Greenbelt land could be used for recreation and erosion control as well as for wood production.

Wood Lot Management

The groups identified the perpetual replenishment of wood resources as the key to the use of wood as a fuel. The groups agreed that landowners should adopt the comprehensive woodlot management program. The goal of a woodlot management program would be to ensure the long-term productivity, quality and existence, of the region's wood resources. The New York State legislature has passed a law to encourage woodlot owners to participate in a management program by linking reductions in property assessment to participation in a D.E.C. woodlot management program. To guarantee that woodlot owners follow these sound management practices, the legislature has made the property assessment reductions contingent on participation in the program. Representatives of the U.S. Agriculture Stabilization and Conservation Service will assist landowners with the replanting of harvested or fallow tracts of land.

Careful forest management will be of the utmost importance if we are to avoid an ecological disaster. New trees must be planted to replace mature trees that are harvested, to assure a continuous supply of fuel."

Wood Cooperatives

The groups found that one of the major impediments to the use of wood as a fuel, especially in the commer-

cial/industrial sector, was the imbalance between wood supply and demand. Potential wood users are reticent to invest in a wood burning system without guarantees of adequate supply of wood. Similarly, potential suppliers are unwilling to commit their wood resources as fuel unless there is a market for their product. To resolve this dilemma, the groups proposed the concept of wood cooperatives.

To get started, the cooperative would contract with consumers to guarantee the consumers an adequate supply of wood at a set price. The cooperative would then fulfill demand through a combination of the following:

- 1) The cooperative would contract with private landowners for a specified level of production;
- 2) The cooperative would employ harvest teams and lease the harvest rights to private woodlots.

To serve wood chip users, the cooperative would maintain a fleet of portable chippers to process the wood on site. This process would ease the handling and distribution of the wood product.

The cooperative would also handle ash disposal. For example, the truck used to make fuel wood deliveries could be used to haul away ash. This would make best use of the vehicle and provide a fertilizer which could be spread on wood lots. Finally, the cooperative would certify compliance with the woodlot management program outlined earlier.

"If wood harvesting activity is allowed to greatly exceed demand, the price for wood fuel will drop and many producers may withdraw from the system. An extremely rapid pace of conversion might create a demand exceeding the region's sustained productive capacity. However, it is more likely that rapid conversion would create a level of demand well within the region's ultimate productivity, but above the short-term capacity of the active harvesters. In both cases, wood fuel prices could skyrocket, resulting in a strong incentive for the producers to over-exploit their holdings. The consequences of this development would be a decline in productivity of the resource base."

Whenever purchase of a new system is required for a back up source of heating, the choice will often be electric resistance heating because of its relatively low initial cost. Herein lies a need for additional reserve electric capacity to cover peak loads; electric rates could rise."

"Cutting, processing, and moving the trees will entail additional demands on the supply of liquid fuel."

Theft — of lawn trees, orchards, other people's woodlots.

Accidents — with chainsaws, etc.

Fires — more houses will probably burn, due to carelessness.

Time-consuming — heating with wood requires time and effort.

Space-consuming — Wood requires a lot of storage space. Garages can be used, special wood sheds can be built, or wood can be piled and a tarp by the back door . . ."

"Lower wood stove efficiency means that the poor homeowner must make a greater investment in time and/or money to supply his needs; his fuel handling/processing and ash disposal problems will be aggravated. When all these factors are taken into consideration, it appears that wood conversion may be least attractive to the very people who need it most."

"There is no greater immediate threat facing the nation, state and Steuben County than the present shortage of transportation fuels. Certainly there are probably few things which so adversely affect the American temperament as the shortage of gasoline, diesel fuel and the resultant long lines and escalating prices occurring at the neighborhood gasoline station."

ALCOHOL

In prescribing for reducing fuel use in the region the citizens had to reduce the use of all forms of fossil fuel. Included in this reduction was gasoline. Since cars need a concentrated, transportable fuel, many alternatives like solar panels were not suitable as substitutes for gasoline. The group members proposed the development of ethanol and methanol from the resources indigenous to the STC region. The groups envision that the alcohol would be distilled by a plant built within the region. This alcohol would be mixed with gasoline to make Gasahol or used alone as a substitute for fossil fuels.

Gasahol is a cleaner and cooler fuel than gasoline and yields slightly better mileage. Automobiles can use up to 15 percent alcohol mixture with gasoline without adjustment to the engine. When mixed with gasoline, alcohol must be water free and therefore requires a more complicated distillation process than alcohol containing small amounts of water. Alcohol can also be burned alone as an automotive fuel. This process requires some minor adjustments to the engine. When the alcohol is burned alone, however, redistillation is necessary, since a small amount of water improves engine performance due to extra power derived from the steam by-product.

Ethanol

Ethanol — 99.5 percent alcohol — can be produced from the distillation of almost any organic compound including most crops, vegetation and household garbage. After analyzing the various plant materials grown in the three-county, one group proposed that only unmarketable potato culls and feed corn (which produces a high protein, non-alcoholic mash after distillation) be used for the production of ethanol. Another group recommended that the unused portions of grapes be used as well as waste from the A & P food processing plant. One group imagined an alcohol production economy fueled by apples. The trees would grow on hillsides where little cultivation would be needed and few other crops could be grown; the apple blossoms would create a tourist attraction and a potential honey industry, and, when harvest time came, the apples would roll down the hills to be collected!

Methanol

Methanol is derived from the distillation of wood. The end product is 100 percent alcohol. Wood for local methanol production can come from the region's forests, wood processing wastes or garbage. Methanol as a fuel is superior to ethanol because of its higher energy value. The drawback to methanol, however, is that it takes much more energy to produce than ethanol.

"Production of ethanol on a large scale could have many possible consequences outside of the energy situation. One of the most likely and important would be the effect it has on agricultural prices. If growing fuel crops became more profitable than growing human food or animal feed it could result in more land being diverted to fuel crops until food/feed prices rose enough to compensate."

"It might act in a positive manner instead. Fuel crops could stabilize agricultural prices, eliminating the need for subsidies."

"If there were alcohol stills the fumes from them could affect people on certain drugs adversely."

"What Alcohol Production Would Mean to The STC Region"

- 1) Enhance development of both agriculture and industrial segments of our economy.*
- 2) Create broader employment opportunities.*
- 3) Provide eventual increased tax revenues due to a more intensive use of industrial and agricultural property and increased employment.*
- 4) Contribute to a decreased dependence upon foreign oil imports.*
- 5) Provide visible evidence that local government is making an effort to alleviate the transportation problems of its citizens."*

"Ethanol mixed with gasoline could have unforeseeable effects on gasoline engines."

"It would create a whole area of expertise for people before considered outlaws — the moonshiners. This could affect law and order somewhat."

"There would be stepped-up land competition, farm land taxes would rise and that might hit the farmer wrong just as he needs a lot more capital investment."

"People might drink it — which could be good or bad depending on how you look at it."

METHANE

One of the region's most abundant and continually replenished resources is human and animal waste. The groups found that the animal waste generated on a 40 to 60 cow dairy farm is enough to provide a significant percentage of that farm's energy needs. Through a process known as anaerobic decomposition, the animal waste is converted to methane gas — the principal ingredient of natural gas. Farmers and others can use this methane gas to heat water for sterilization, run generators which produce electricity and, with some modification, to run farm tractors. The groups recommended that dairy or beef farmers with herds of over 40 head investigate the possibility of building a methane generator on their farms.

One group recommended that the feasibility of cooperative digestors be explored further. The group's idea is that the farmer-owned cooperative would work as follows: member farmers would transport their manure to the digester for processing; gas produced would then be redistributed to the farmer based on the quantity of the manure the farmer provides, or the gas could be sold to a natural gas utility with the proceeds returned to the farmer by a similar formula; the farmer would receive a like portion of the slurry by-product which he could use for fertilizer.

The other significant source of methane gas is human waste. One group found that by using the following process for sewage treatment, the

amount of available methane from human waste could be greatly increased. The organic components of sewage would be mixed with sludge, water and nutrients to bring the mix up to optimum conditions for digestion. Some of the solids contained in this mix would be allowed to settle out and the liquid drawn off the top. The solids would then be digested to produce methane, while the liquid would be piped to enclosed lagoons.

A greenhouse type structure consisting of layers of glass and plastic covering would be constructed over the lagoons. Each lagoon would be mechanically aerated to encourage plant and animal life. The plants would be water hyacinths and duckweed which grow rapidly and absorb a large amount of nitrogen, phosphorus, phenol and toxic trace minerals. The animal life would consist of fresh-water invertebrates, bacteria, diatoms and algae. The plants and animals in this ecosystem would metabolize the sludge and produce harvestable plants. The plants, after harvesting, can be digested for methane.

The effluent left after the harvest would continue to advanced treatment lagoons, which would be replanted. The plants harvested from these could be used to produce additional methane and a useable soil conditioner. After advanced treatment, the effluent passes through a sand filter, and then to an ozone contact where the water is disinfected. The resulting water can be used for irrigation, industry, or ground-water recharge.

"This might increase the chance of explosions on farms."

"If there's containment of manure, new pathogens could breed and it might hurt the animals and humans."

"This can fit in with the DEC water quality requirements to impound manure."

"More soil conditioning fertilizer, like manure, means less manufactured chemical fertilizers. This will cut down costs more for farmers."

"The anaerobic process kills weed seeds and insect eggs. This can be a benefit, but it could also upset some unknown ecology."

"More machinery on farms will mean more potential for operating problems, more debt, and more maintenance."

"Herds would become less able to take new foods or drugs because it might upset the anaerobic digestion process."

"In a cooperative digester, many different kinds of cattle feed might produce problems in manure digestion."

"This may make manure production a characteristic which is bred into cattle."

"This could increase dairy farming since milk cows produce more manure than beef cattle."

"It would decrease the smell of manure at spreading time, and this would please some neighbors."

WIND

The groups found that wind is an important resource of the STC region, concentrating on the eastern shores of the lakes, hilltops and valleys. Group research revealed that one of the most difficult forms of energy to replace is electricity generated by fossil fuel powered generating plants. Wind power a mechanical or as electrical energy can replace any conventional fuel used in space heating, water heating or in the generation of electrical energy itself. The groups also found that wind energy fits the regional demand pattern because it increases in availability with the increased energy demand of winter months.

In some instances, owners of wind turbines find it desirable to store the wind's energy for windless periods. The groups recommend two storage methods:

1. Water can be heated during windy periods and kept in a well-insulated tank. It will stay hot for several days.
2. For small wind turbines, batteries can be used to store electricity.

The groups found, however, that wind energy is more economically feasible if no storage system is used. Power from wind turbines during windy periods can be used to displace conventional energy with wind energy. When the wind dies down, the wind-displaced conventional energy would be reinstated. Below are the groups' recommendations for various size wind turbine systems.

Residential

The groups recommend that as many homeowners as is practicable construct small wind turbines. These wind turbines would be rated at approximately 2.5 kw and would act as the primary electrical energy source for the home.

Schools

A larger (1000 kw to 2000 kw) wind turbine should be erected on a school site. In many cases, school grounds are ideally located for wind energy applications. The energy captured by the wind turbine would be used to provide for the energy needs of the school. During the summer months, when the schools are not being used, the school district would sell electrical energy generated by the wind turbine to a local electric utility. This would provide a source of income for the schools and help to pay for the wind turbine system.

Industry

Large scale wind turbines (2 MW) should be constructed for industrial applications. Each turbine would be used for pumped storage of water. That is, the energy captured by the turbine would be used to pump river, lake or ground water to an elevated storage pond. The water would be systematically released from the pond and pass through a hydro-turbine which would generate electricity for industrial purposes. The groups recommend that large power consumers aided by the local tax incentives, construct the turbines for their own use.

Utilities

The groups recommend that the electric utilities construct large wind turbines — 1.5 to 3.0 MW — throughout the region. The electricity generated by the wind turbines would be fed directly into the existing electric grid.

Neighbors may object to the looks of a wind turbine. Maybe the turbines should be painted pleasing colors.

There is a hazard in case of blade failure or breakage. Large areas of land may be needed for protection.

TV and radio reception may be affected by moving blades. However, people may read more and get culture or there may be increased business for the cable TV companies.

There might be a flood threat: large impoundment on hills. On the other hand, the flood threat may be reduced because impoundment sites would catch runoff during storms.

Recreational uses possible: boating, swimming.

Evaporation might create a microclimate. Fog may present hazards for aircraft. If fog is remotely possible nothing will be taking off anyway in the Chemung Valley.

Provisions may have to be taken to prevent the ponds from freezing.

The ponds could be used as a source of water for drinking or agriculture.

The presence of the pond raises the water table nearby. This could cause wet cellars.

There is also a moral issue here: the ponds will be taking away productive agricultural land, converting potential food production to energy production.

Some people may find large wind turbines on the skyline unattractive.

PROPOSED EMERGENCY ENERGY CONSERVATION PLAN

This plan is a compilation of two group members' preliminary recommendations for an emergency energy conservation plan which could be enforced and administered at the local level. It is meant for use by citizens and public officials in cooperation with the local private and public utilities in *case of a national or state energy emergency*.

The group believes that by having such a plan available for its communities, citizens, public officials and the energy utilities in the nation can reduce panic, provide for the health and welfare of their own community in an emergency situation and can reach greater energy savings — and more equitably — than by a system of curtailment by user class or similar system.

The following plan is quoted or paraphrased directly from the text of the emergency plan written by the two citizens.

Goals of Emergency Energy Conservation Plan

- To produce an immediate cutback of 20% on local energy use
- To continue an annual cutback until as much as a 50% cutback is reached

Immediate Action

"Non-Transportation Fuels: Consumers of electricity and natural gas will be required to reduce their monthly consumption immediately by an average of 20 percent of their year-ago consumption. This will be enforced by the utilities who have the records to determine monthly allotments. Customers who do not comply will be financially penalized on the amount of energy consumed over their allotted amount. Continued violation will result in a complete shut-off of service.

"Consumers of fuel oil, coal and propane will receive an average of 80 percent of their year-ago deliveries of fuel starting immediately. This will be controlled and enforced by the fuel dealers who have the data to determine customer allotments.

"It is assumed that the utilities and fuel dealers serving the three-county area will experience a reduction of 20 percent in the energy they receive from their suppliers.

"Consumers who can prove hardship such as energy required for life-supporting equipment (lung machine, etc.), reasons of health, age or infirmity may apply for a waiver in meeting the full 20 percent reduction requirement. Also, those who can show they had previously taken conservation measures to the extent that a further 20 percent reduction would result in extreme hardship could receive some relief upon presentation of evidence that such steps had been taken. Compliance with the New York State Public

Service Commission "Minimum Insulation Standards" or the "New York State Energy Conservation Energy Construction Code" would provide the required evidence. Additionally, the utilities presently have such records of compliance on some of their customers.

"Industrial and commercial consumers may also obtain waivers where it could be shown the imposed allotments would be detrimental to area health and welfare or interfere with the area's effort to develop renewable energy resources.

"Establishment of a 3-County Energy Coordination Agency (ECA) with the participation and under the guidance of the existing County Energy Coordinators (civil defense) would be initiated immediately to coordinate the short-term energy conservation measures with the longer-term local development of renewable energy resources. This organization would serve as a supporting agency to the utilities and fuel dealers in establishing equitable energy distribution. It will also serve as a lead agency in regards to informing, instructing and assisting residential and corporate citizens on the needed conservation steps to be taken and the funding available for this purpose.

"The agency would take the following steps in serving these needs:

"1. Train teams of inspectors and advisors in the three consumer areas of residential, commercial, and industrial to survey buildings for wasted energy.

"2. Set up public information meetings to detail the measures of conservation for those who are able and willing to conserve for themselves.

"3. Set implementing goals for reduction of energy use with attention to what type of user must effect what quantity of savings to attain overall reduction goals and why. (i.e, required savings might be met by shutting down all industry — but this also stops all income for area residents and must be rejected. Some balances must be established.)

"4. Consult utility records to determine the highest users of energy in the three customer type categories, and concentrate efforts after initial 20 percent cutback on reduction in these users. Use the trained inspectors in No. 1 above to do energy audits on those large users first, then schedule audits for others. Specific attention to be paid to the condition or lack of caulking and weatherstripping of doors and windows, insulation amount and quality in ceiling, attics, walls and floors, storm windows and doors, the use and size of unused heated spaces, and the size and type of windows.

"5. Develop record systems to compile and analyze the survey data and recommendations for reductions in energy use for each dwelling inspected.

"6. Develop a follow up inspection schedule to evaluate what has been accomplished to conserve energy.

"7. Provide assistance for obtaining supplies to effect conservation measures as recommended.

"8. Train teams to check equipment efficiency and to make adjustments where needed.

"9. Develop guidelines for the need and use of devices such as clock thermostats, load management equipment, duct insulation, pipe insulation, etc."

"10. Develop teams to make modifications for people who cannot afford to hire the work to be done, who are unable to do the work for themselves, and for public buildings.

"11. An enlarged program to financially assist and instruct the aged, infirm and economically depressed families should be provided by those organizations presently engaged in these activities (e.g., SCEOP) and supported by the ECA.

"Transportation Fuels: Gas station operators will be required to immediately limit their gasoline and diesel fuel sales to an average of 80 percent of their year-ago sales. This will be enforced by the station operators themselves who will in turn be restricted by a 20 percent reduction in deliveries they receive from their suppliers.

"All residents in the three-county area will be requested to immediately reduce their consumption of these

fuels to permit as equitable a distribution of available supplies as possible. They will also be requested to utilize car pools and/or mass transportation wherever possible. Station operators will be requested to limit amount of fuel sold to vehicles registered outside of the three-county area and restrict operating hours when necessary to stretch out supplies.

"The ECA would be responsible for setting up procedures to ration consumer use according to need and provide equitable distribution of available fuels in the face of the immediate 20 percent reduction.

"Through this agency, the dwindling supply of fuel could be distributed according to priorities designed to protect the 3-County public welfare. Fuel use for vehicles involved with the protection of the public health and welfare (ambulance, police, fire equipment, utilities) would receive a high priority while recreation vehicles and other large energy consuming vehicles would receive a low priority. This would in turn encourage increased use of fuel efficient vehicles.

"Federal, state and local government agencies could provide incentives including subsidizing mass transportation to providing tax breaks for purchase of energy efficient vehicles, lowered tax on sales of gasahol which would be at least partially offset by increased taxes placed upon energy inefficient vehicles, gasoline and diesel fuel.

"Local governments would develop bus systems and would restrict single passenger car travel.

Time Line for Reduction of Energy Through Conservation

1. Post information on goals that have been set, how they are to be met, and how the progress toward the goals will be displayed.

2. Effect those steps that do not require that any physical work be done, such as reduced thermostat settings shutting off or reduction in lighting levels, and limitation on car usage.

3. Effect energy delivery reductions.

"Four Weeks

1. Effect training of survey teams.

2. Start public training and seminars for distributing information and instructing those who can do their own maintenance and installation work.

3. Post information about the availability of contractors, other laborers, and materials for conservation.

4. Post bus schedules.

5. Effect reduction in street lighting.

"Eight Weeks

1. Start follow up inspections of original energy inspections.

2. Assess progress toward goals — adjust as necessary.

3. Start realizing effect of equipment changes, and modifications from the installation of new equipment or changes in commercial and industrial users.

4. Start installing load management equipment where it will benefit.

"Experience during the oil embargo of 1973-74 and natural gas curtailments in early 1977 has shown that people will voluntarily conserve when they are convinced a genuine energy shortage exists.

"Lowered energy consumption would undoubtedly result in some unemployment among the utility and fuel dealer employees, accompanied by increased costs of energy available. The unemployment would, however, be more than made up by increased employment required in the development of alternate energy sources which would be further encouraged by the increasing costs of fossil fueled energy sources. Also the financing of costly changes, or changes that users were not prepared to pay for now, would require solutions."

Existing Legislation	Level of Government Responsible for Enforcement			
	State	County	Town/City Village	Utilities
General Provisions				
CONSERVATION				
<i>NYS Energy Law 5-107</i> Public education programs promoting the conservation of energy and energy resources throughout the state. The State will advise municipalities on energy related matters.	X			
<i>NYS Energy Law 11-103</i> Adoption of American Society of Heating, Refrigeration and Air Conditioning Engineer standards for energy conservation in the construction of new buildings.	X			
<i>NYS Energy Law 11-104</i> Energy conserving construction practices and building materials should be used.			X	
<i>NYS Energy Law 11-106 (1,2)</i> If the State grants a variance, based on hardship design plans for the building must show that conservation techniques are employed to the greatest extent possible.	X			
<i>NYS Energy Law 5-108</i> Establishment and enforcement of efficiency standards for residential and commercial hot water heaters.	X			
<i>NYS Energy Law 8</i> Establishment and enforcement of lighting efficiency standards for existing public buildings.	X			
<i>NYS Energy Law 9-101</i> Establishment and enforcement of efficiency regulations for room air conditioners.	X			
<i>NYS Real Property Tax Law 478-a</i> Insulation, and certain other forms of energy conservation home improvements, are exempt from increases in real property tax assessment and special ad valorem levies to the extent of any increase in value caused by the installation. These exemptions are valid for 15 years.			X	
<i>NYS Public Service Law, Article 1-A</i>				
135-C The Public Service Commission is called to establish home energy conservation plans to be carried out by utilities companies.				X
135-D These plans designed to help customers conserve home energy, must be publicized and made available to customers. The utility may be required to finance the customer's investment, at an interest rate set by the commission.				X

Existing Legislation

Level of Government Responsible for Enforcement

	State	County	Town/City Village	Utilities
<p><i>135 (D) (E) (F)</i> All plans must include provisions for (1) energy audits (the utility may charge up to \$10 for this service) and (2) estimating the energy conservation measures needed to comply with minimum criteria (ASHRAE standards from <i>Energy Conservation Standards in Existing Buildings — Low Rise Residential</i>; published March 16, 1977). The estimates must be provided along with an explanation of available options, costs, payback periods, potential savings, and the difference between customer and contractor installations.</p> <p><i>135-H</i> Customer may chose a "do-it-yourself" option if they receive commission approval. The utility must provide a "do-it-yourself" manual. Other options for the customer are: use of utility services; use of utility-contracted services; use of customer-contracted services; or use of services obtained through a utility maintained list.</p> <p><i>135-M</i> Retroactive financing is to be provided for eligible customers who installed energy conservation measures subsequent to the effective date of the act, but prior to the adoption of home conservation plans.</p>				X
<p><i>NYS Town Law 272</i> The comprehensive plan, in considering the population's safety and general welfare, may call for energy conservation. Conservation may be implemented by incorporating into the zoning ordinance.</p>			X	
<p><i>NYS General City Law, 30a; Town Law, 274a; Village Law 7-725</i> Site Review; If energy conservation is an aspect of the comprehensive plan, the planning board can require energy conserving site designs (e.g. regarding placement of structures on the site, wind buffers, etc.).</p>			X	
<p><i>General Municipal Law 239</i> County Planning Boards — County Planning Boards may also develop comprehensive plans, but they cannot enact zoning legislation. Once a county plan has been approved by the county legislators, it becomes legally binding on all county departments. This means all expenditures of public funds (except for federal or state projects) for the acquisition or improvement of public land must be made in accordance with the plan.</p>		X		
<p><i>NYS Energy Law 3-105</i> Municipalities are required by the State to review their charters, policies, practices, rules and regulations to determine whether they are consistent with state energy policy (i.e. encourage energy conservation and development of renewable energy sources). If any charter, etc., is not consistent, it should be revised.</p>			X	

Existing Legislation	Level of Government Responsible for Enforcement			
	State	County	Town/City Village	Utilities
WOOD				
<i>NYS Environmental Conservation Law — Art 9 Title 3</i>				
9-0303: (1) No person shall cut, remove, injure or destroy any trees or timber in state forest, with following exceptions:	X			
9-0505: (1) The commissioner may sell products, trees, etc. if such sales are in the best interest of the State;	X			
(2) All products must be sold at the local fair market price;				
(3) Sales of products valued over \$1,000 must be publically noted, and sold to the highest bidder;				
(4) (b) The State regulates the manner in which they are removed;				
9-0507: (1) Land may be leased for oil or gas exploration with consent of state geologist.	X			
<i>NYS Environmental Conservation Law 3-0301; 15; 19-0301; 19-030</i> Department of Conservation may establish and enforce air quality standards, including acceptable levels of opacity, particulates, and carbon diox de, for any air contaminant sources.	X			
<i>NYS Real Property Law 480 (a)</i> An owner of fifty acres or more of woodlands can join a forest management program and receive a lower assessment in the value of the acreage. The land owner must initially join the program for ten years. Withdrawal from the program will result in retroactive tax penalties. The owner must abide by the DEC management plan prepared for the forestland. Even if the property changes owners, the land is still in the management program.	X		X	
<i>NYS General Municipal Law Art 5 72-a:</i> A county, town, or village "... may acquire by purchase, gift, lease, or condemnation..." forest land. The main purposes of the acquisition are (1) to provide municipal revenue through the sale of forest products, and (2) to protect the municipality's water supply by protecting the watershed.			X	
<i>Forest Practice Act</i> The Department of Environmental Conservation has a voluntary program aimed at encouraging good forest management practices by private land-owners. Participants must sign a cooperative agreement with DEC in return for technical assistance.	X			
(To encourage more careful logging activities in the Southern Tier Central Region, the STC office is preparing a model town ordinance which would require all logging operations with over a certain output, to have a DEC approved logging plan. A timber harvesting permit is already required in the Town of Big Flats.)				

Existing Legislation	Level of Government Responsible for Enforcement			
	State	County	Town/City Village	Utilities
<i>NYS Environmental Conservation Law Art 9, Title 7</i> Any municipality may have a community forest.			X	
0717 The Department of Environmental Conservation will supply technical assistance and trees, without charge, to any municipality which will follow the management recommendations of D.E.C.	X		X	
<i>NYS General Municipal Law Art 5 96-b:</i> The power of a local municipality to protect and conserve trees is specifically granted, above and beyond any zoning planning power of the municipality. Removing trees, reforestation projects, specifying the types of trees to be replanted and requiring performance bonds are legitimate powers of the municipality.			X	
BIOMASS/METHANE GENERATION				
<i>NYS Environmental Conservation Law 3-0301; 19-0301; 19-030</i> The D.E.C. may set standards for the composition of fuels offered for sale or the use of fuels or energy source of any type which may contaminate the air.	X			
<i>NYS Environmental Conservation Law 51-0707, Title 9</i> The State encourages municipalities to seek funding for solid waste recovery and management programs. The area served may be a part of a county or entire county, more than one county, or a combination of the above.		X	X	
<i>NYS Public Health Law 225</i> All nuisances which may affect health are to be investigated by the local health officer. The officer must inspect the site and file a report, calling for abatement if necessary.		X		
<i>NYS Health Regulations, Title 10, Chapter 1 21.18 (b):</i> Every dwelling unit must be equipped with a flush water closet.			X	

Existing Legislation	Level of Government Responsible for Enforcement			
	State	County	Town/City Village	Utilities
WATER				
<i>Environmental Conservation Law 15-0701, Title 7</i> Any alteration in the ... "natural flow, quantity, quality, or condition of a natural watercourse or like ... on or below the surface of the earth" is "reasonable and lawful" unless it will cause harm to any person or corporation with private rights and privileges to those waters. By "harm", the statute means causing interference with present use or enjoyment, or a decrease in the market value of the property. This legislation does not negate the State's (or municipalities) power to prohibit an alteration when necessary.	X		X	
<i>Unconsolidated Laws 1307 (12)</i> Land use on flood plains is limited. State D.E.C. regulations prevent any improvement, excavation, or use of vehicles without a D.E.C. permit.	X			
SOLAR/WIND				
<i>Real Property Tax Law 487</i> The State grants exemptions from property taxation for certain solar or wind energy systems both passive and active. Eligible systems include collectors, controls, storage units, heat pumps, heat exchangers, windmills, or any other hardware using solar radiation or wind to harness energy. Any real property which has an approved system is exempt from taxation on the increased value of property which resulted from the system's installation. This exemption is in effect for each property for 15 years.			X	
<i>Energy Law 11-104</i> The State Energy Conservation building code calls for the use, to the greatest extent possible, of practical solar energy designs.			X	
<i>Energy Law 12</i> The State requires certain information to be stated clearly in contracts for solar thermal systems. This information is to include the minimum projected thermal performance characteristics of the system under mean radiation and ambient temperature. If the product is not under warranty this must be clearly stated on the product.	X			

ANALYSIS OF LEGISLATION
PERTAINING TO LOCAL
DEVELOPMENT OF RENEWABLE
ENERGY RESOURCES IN THE
SOUTHERN TIER CENTRAL REGION,
N.Y.

Legislation that may affect the development and use of renewable energy resources in the Southern Tier Central Region falls into two major categories. The first category includes laws and regulations which govern the development of land and natural resources in general and which protect environmental quality. The second category includes legislative incentives which encourage the use of renewable energy resources.

In many cases, the distinction between such regulations and incentives is fuzzy. For instance, on the federal level, deregulation of natural gas might prove an incentive for conversion to other energy sources, such as solar; or, on the local level, "solar zoning" might prove a disincentive to the clustering of buildings for energy conservation.

Because of the double-edged nature of some of this legislation, both the opportunities and disadvantages it presents must be considered when examining its effects on local communities.

Legislation that affects the development and use of local renewable energy resources is made at the federal, state, and local level. It would

be necessary to make a legislative search at all levels to realize a complete picture of the local situation. Unfortunately, an analysis of each piece of pertinent federal, state and local legislation in terms of its effects on local renewable energy resource development is a mammoth task, and unworkable here. Therefore, the Southern Tier Central staff concentrated its efforts on an analysis of local laws and ordinances. The staff listed, with comments, pertinent state and federal legislation, but did not attempt an exhaustive analysis. In addition, the staff listed some possible local legislation which is available for future action by municipal governments in the Southern Tier Central Region, as well as state and federal laws that may affect local communities in the future.

Local Land Use Legislation

To measure the potential impact of local land use laws on the development of renewable energy resources in the Southern Tier Central Region, it is important to catalogue the extent of these laws and to evaluate their content in relationship to likely renewable resource development situations.

The kinds of renewable energy resources that were examined by the STC staff include: wood; biomass-produced gas; wind; water; solar space and hot water heating; and ground-water. Conservation is included as well, since the staff felt that conservation measures were very often prerequisite to the successful application of renewable energy technologies. The staff limited its examinations to

relatively small-scale, decentralized applications of these technologies, since such applications would be most likely to come directly and uniquely under the purview of local land use laws. Large-scale applications — for example, an array of wind turbines that could be hooked into utility grid — fall subject to a variety of federal, state and local regulations, and are thus not covered in depth here.

The Southern Tier Central Planning Board staff inventoried planning boards, master plans, zoning ordinances, Zoning Boards of Appeals, subdivision regulations, mobile home ordinances, building/housing codes and the flood insurance program status of 77 towns, villages and cities in the three-county region. Forty of these municipalities have zoning ordinances — a little over one-half — and the existence of such land use controls follows closely the degree to which these communities are urbanized.

Zoning

The content of most of the zoning ordinances was similar, but there were three types: 1) urban (cities or incorporated villages); 2) towns, primarily rural, which have experienced some urbanizing influences over a long period; and 3) towns, rapidly suburbanizing, that have passed more recent "growth control" style land use ordinances.

The sections and provisions in the zoning laws of each municipality that might pertain to the local development of renewable energy resources are

fairly consistent. Therefore, staff examined local zoning laws section by section to find such provisions. Below is a listing of sections examined, with references to pertinent provisions in specific municipal zoning laws.

Zoning: Section I — Title & Purpose of New York State Municipal Zoning Laws

Section I of most of the municipal zoning laws of New York State sets out the law's general purpose and cites the municipality's authority, given to it by the state, to control "nuisances" associated with the use of land within its jurisdiction.

The stated purpose of a zoning law is important when analyzing its effect on local energy resource development, because additions to or changes in the law must serve the law's original purposes. The stated purpose of virtually all the zoning laws of the Southern Tier Central Region reads something like this:

I. GRANT OF POWER: Title & Purpose

AN ORDINANCE to promote the health, safety, morals and general welfare of the Village of South Corning; regulating and restricting the height, number of stories, and size of buildings and other structures, the percentage of lot that may be occupied, the size of yards, courts, and other open spaces, the density of population, and the location and use of buildings, structures and

land for trade, industry, residence, or other purposes; creating districts for these purposes; and establishing their boundaries; establishing a Board of Appeals to determine and vary the application of such regulations and restriction in harmony with their general purposes and intent, and in accordance with general and specific rules contained in this ordinance; and providing for the enforcement of such ordinance.

IN PURSUANCE of authority conferred by article 6-A of the Village Law of the State of New York, and in accordance with a comprehensive plan designed to lessen congestion in the streets and highways, to secure safety from fire, flood, panic and other dangers; to promote health and general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of population; to facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements, with reasonable consideration, among other things, of the character of each district and its peculiar suitability for particular uses, and with a view to conserving the value of property, and encouraging the most appropriate use of the land throughout the Village."

Future land-use laws that may encourage the development of local, renewable energy resources, and that may enable energy-saving land-use patterns, will doubtless fit the broad definition of promoting the "health, safety, morals or general welfare" of the communities of the Southern Tier

Central Region. In addition, provision to promote economy and to keep down the cost of public services (Town of Erwin, Village of Hammondsport) will enable homeowners to defend the installation of certain kinds of energy-producing equipment like solar panels or windmills, which might be questioned under height, lot-area coverage or other nuisance provisions.

The local use and development of solar energy might be aided by provisions, "to regulate building densities in order to assure *adequate access of light* (emphasis added) and circulation of air ..." (Town of Elmira, City of Elmira, Town of Erwin, Town of Avoca and others). Inclusion of "adequate light" in the purpose section of the ordinance paves the way for specifications which would protect each landowner's solar access (cf. District Definitions, Residential). Solar specifications could produce some conflicts, however, since the greater densities of housing and house screening which might produce solar access difficulties might also prove beneficial for energy conservation.²

The City of Elmira's zoning ordinance has, as a defined purpose, "to protect and conserve places, buildings, and structures ... having a special historic or aesthetic interest or value ..." ³ Although this provision appears in only one of the zoning laws reviewed, it affects all of the structures in the Elmira city limits.

Very specific historic and aesthetic zoning provisions like those prescribed

for some districts might mean that building or landscape alternations necessary to accommodate the use of some forms of renewable energy would be prohibited. Modifications for the use of solar panels, wind energy or certain kinds of energy conservation measures might be severely limited on buildings protected by historic district provisions. Timber development and small-scale use of water are activities that would likewise be limited in aesthetic districts.

Historic or aesthetic district regulations which provide for the preservation of the character of a building, neighborhood or scenic area rather than the preservation of their exact details would be more flexible. They would allow for careful modifications to the landscape or buildings without changing their essential character.

In the Elmira zoning law, the goals of aesthetic and historic zoning and those of local energy development seem compatible, as long as structural or landscape changes are made with attention to preservation of the character and unique features of an area. (cf, p. 130 for New York zoning case on solar aesthetics.)

Zoning: Section II — Definitions of Districts in Local Zoning Ordinances

Section II of most municipal zoning laws usually enumerates districts, and describes uses permitted within them. Definitions of zoning districts and the uses permitted in each are fairly

uniform among villages, cities and towns throughout the STC region. Each district definition contains in it set-back, density, height, minimum lot width and area, and maximum lot coverage provisions. The following is a list of districts included in most Southern Tier Central ordinances, and the opportunities or problems for local renewable energy development which may be associated with each.

Nuisance Provisions

In all zoning districts, uses of land which violate the "General Purpose" (Section A) of the ordinance are prohibited. In most ordinances, the spirit of this section is addressed by the specific prohibition of any,

*"use that is noxious or offensive by reason of the emission of odor, dust, smoke, toxic or noisome fumes, radiation, gas, noise, vibration or excessive light, or any combination of the above, which is dangerous and prejudicial to the public health, safety and general welfare . . ."*⁴

Other local ordinances contain provisions which set additional standards:

*No offensive . . . glare shall be noticeable beyond the property line . . .
No activity shall create a hazard by reason of explosion . . .*

*No storage of any material . . . in such a manner that it facilitates the breeding of vermin, or endangers health in any way."*⁵

Certain activities surrounding the use and development of renewable energy resources may be questioned under the broad nuisance provisions: odor might be cited in certain biomass conversion processes; smoke in cases of inefficient wood combustion; noise with respect to wood cutting, especially using a chain saw; and vibration in use of windmills, especially larger ones. Glare from solar installations might be found objectionable; and methane production would probably be considered "hazardous by reason of . . . explosion . . ." and, in certain districts, an endangerment to health.

None of these activities, however, is expressly prohibited, and if a property owner complied with the spirit of the nuisance clause by mitigating any bad effects these uses might have on the zoning districts in which they are located, there would probably be less trouble with them in most areas of the STC region.

Certain activities are nearly always listed in the zoning law as expressly prohibited under the nuisance clause, however, and such prohibitions affect certain types of renewable fuel use. These include:

- Wood-fired blast furnaces
- Distillation of wood (gasohol production from wood)
- Fertilizer manufacture (might be considered a part of anaerobic production of methane from manure)⁶

All district specifications set height limits. For planned residential areas where larger apartment buildings are allowed, and in industrial zones, the height limits reach 65'. In Elmira, 75' office and apartment buildings are allowed. In most other districts, however, maximum height is 35'.⁷ This height limitation might pose some problems with solar panels on rooftops and it would undoubtedly limit uses of windmills on residences and commercial properties. However, virtually all zoning laws in the STC region contain the following exception clause:

*"the height limitations contained herein do not apply to spires, belfries, cupolas, antennas, water tanks, ventilators, chimneys, or other appurtenances usually required to be placed above the roof level and not intended for human occupancy."*⁸

This most likely will be interpreted by most boards of zoning appeals to include solar panels on roofs. Windmills are likely to be a more complicated problem, however, since they might be considered a potential hazard or a definite aesthetic detriment by many citizens.

Specific zoning district definitions pose problems and opportunities for the development of renewable energy resources. Municipal laws and ordinances listed below illustrate extremes within the region, even though the range of extremes among the municipalities is quite narrow.

Individual District Definitions

1) Agricultural — No important problems.

2) Agricultural/Residential — Large lots; Town of Lindley: Art. vii 701.1-5: "no storage of manure or odor or dust-producing substance shall be permitted within one hundred (100) feet of an adjoining lot line or 100' of any residence structure located on an adjoining roadway." Provision may limit some biomass development, but since provision is nuisance ordinance against dust and odor, contained anaerobic digesters should pose no problem.

3) Waterfront Residential — (Avoca only) Provisions for bringing house elevations up to grade: "All structures shall be set back 25' from average annual water line and have site elevation of not more than 1,653 feet on Loucks Pond and 1,621 feet on Smith Pond." May limit underground solar storage tank use, but not significantly. Most structures are for summer use anyway.

4-6) Residential Residence	(City of Elmira)
AAA (Town of Elmira)	AA
AA (Town of Elmira)	A
A (Most municipalities in Region)	B C

Minimum lot area, lot coverage and height provisions have important effects on the use of solar panels on

rooftops, house skirts and at basement windows. Unfortunately, American law traditionally has not recognized the right of property owners to access to the sun. In fact, New York was the first state (in 1838) to reject the English common law which granted property owners the right to light and air if they had previous access to it for a specified period of time. This law was considered to be incompatible with the rapid urban growth that was taking place in the country.

Today, however, access to the sun is an important issue. Many legal authorities have expressed the opinion that it is within the zoning powers granted to local governments to guarantee this right.

There have been some attempts at creating zoning ordinances which protect the "sun rights" of those with solar collectors on their roofs but there is little that provides for protection of the basement storage collector.

Because the calculations surrounding the protection of a "solar window"⁹ for the homeowner are quite complex and involve the consideration of many variables — sun angle, sun azimuth, latitude, time of year, time of day, elevation and topography of site, lot coverage, primary building height, neighboring building height, etc. — zoning ordinance provisions to protect this "window" are not easily adaptable to some local zoning situations. A series of lot overlays or physical plans may help local builders, but these

could not anticipate site to site variations of topography or vegetation. Although on large lots in rural-residential areas, solar rights will probably not be a serious problem, difficulties with shading can be anticipated if there is solar development in more urban neighborhoods and in denser developments in the region.

Maximum lot coverage provisions could affect the addition of certain renewable energy-related equipment or structures to the house. House-skirt solar collectors; covered porches or wood sheds for wood storage; and gas tanks associated with biomass gas might extend lot-area coverage beyond the maximum limit. The local Zoning Boards of Appeals would make the decisions on whether such uses could be exempt. Some STC zoning laws already exempt similar uses from maximum lot coverage consideration; some expressly include them.

7) Planned Residential Districts

Many municipalities, especially suburbanizing communities, have provisions for Planned Residential Districts in their zoning ordinances. These encourage:

*"the development of well-planned, high density, residential neighborhoods or groups of residences on sites larger than normal building lots. To give the site planner maximum freedom, more intensive use of land may be permitted, and the coverage, height, setback and other requirements may be varied ..."*¹⁰

Such provisions are ideal for solar development as well as for innovative developments which use a combination of renewable energy sources for self-sufficiency.¹¹ Increased density and proper site planning of homes for conservation or district heating could also be a result of innovative techniques encouraged under this kind of provision.

The following municipalities have such a provision as part of their zoning ordinances:

- Town of Avoca
- Town of Corning
- Town of Erwin
- Town of Horseheads
- Town of Elmira
- City of Elmira
- Village of Painted Post

8) Flood Plain Overlay District

Nearly all the communities in the Southern Tier Central Region take part in the federal flood insurance program, and therefore have "Flood Plain Overlay" or "Flood Plain Protection" District Provisions in their zoning ordinances.

Under these provisions, use of land in the 100-year flood plain is strictly limited or prohibited, except by special permit. Such special permit uses include agriculture, recreation, sand and gravel extraction, marinas, temporary circuses and carnivals, and so on.

It is clear that much of the flood plain is already permanently settled. Both

Corning's and Elmira's city limits lie within the area of the 100-year flood plain. Thus, most of the "Flood Plain Overlay" provisions limit or set standards for new development.

All new construction on the flood plain must meet established flood control specifications. In some of the region's municipalities' flood plain provisions, (Village of Horseheads § VI-E(1)b) residential construction is prohibited completely. In others, (Town of Avoca) builders are required to build residential basements *above* the 100-year flood plain. This might limit use of the basements for energy storage, since the underground insulating factor is lost. It would obviously preclude building underground or partially buried houses for energy conservation. However, energy considerations aside, development on flood plains should be discouraged.

Utility lines constructed on flood plains must meet special safety provisions. Therefore, use of windmills to generate electricity would require special transmission equipment and might be more costly. Utilities are more likely to object to windmill hookups if there are special safety requirements.

It is doubtful that any of the rivers or streams in the 100-year flood plain could be used for small-scale hydro power development — even if they were suitable — since a common provision for Flood Plain districts is:

*(Village of Horseheads, § VI-E(1)a)
"No structure ... shall be permitted,*

which, acting along (sic) or with other uses adversely affect the efficiency or capacity of the floodway, the natural flow, the characteristic ecology, or in any degree increases flood water heights."

9) Conservation Districts — (City of Elmira)

This is a form of the Flood Plain District Ordinance, but extends "development-limiting" provisions to cover:

"natural water basins and steep land abutting limited access highways where uncontrollable development would be adverse to community values . . ."

Under this provision, "any agricultural use, in accordance with practices recommended by the County Soil and Water Conservation District . . ." and other non-commercial, non-industrial and non-residential uses are permitted in the Conservation Districts.

Therefore, uses in these districts would be subject to regulation by the County Soil Conservation District. Such regulation might include, for example, mandatory tree-cutting practices and reforestation requirements for erosion control on slopes.

10) Neighborhood Business and Highway Commercial

This district's land uses include business usually associated with residential areas. Such business may not generate a lot of traffic, nighttime noise or other "nuisances" which would be incompatible with nearby residences.

Businesses under the Highway Commercial category are oriented to car or truck travel and include establishments generating a large amount of traffic, such as truck depots, transportation operations, drive-in movies, car washes, and so on.

Neither of the business zones described above prohibit activities which would preclude the use of renewable energy resources. The business districts share with the residential zones explicit regulations for density, setback and lot area coverage which could cause some problems for solar energy use, but these provisions are not seen as a major obstacle to solar use. However, this could be a problem in business zones as it is in residential. (See General Provisions, section C.)

11) Industrial

Both light and heavy industrial district zoning in the Southern Tier Central Region provide few problems for renewable energy source use and development. The uses prohibited generally under the "Purpose" section of most zoning ordinances apply here, although sometimes selected "heavy" industries are allowed to locate by special permit. In Industrial Districts in the Town of Lindley, the storage of fuel is prohibited, and in the Town of Hornellsville, storage of flammable gas requires a permit from the fire chief. These provisions may limit the production of methane for any but immediate, on-site use in these areas.

In the Village of Horseheads, § 1103 prohibits the use of industrial land for

"all types of dwellings, including mobile homes", thus reserving land zoned industrial for industry. This might limit some district heating or other energy conservation plans which require the clustering of varied use buildings.

In general, the strict separation of uses under standard zoning practice leads to energy waste, since an open development pattern and separation of uses leads to more travel. The layout of the City of Corning exemplifies an efficient diversified mix of varied land uses in a relatively small space.

General Provisions/Supplemental Regulations

The "general provisions" or "supplemental regulations" section of land use laws contains miscellaneous regulations which don't fit elsewhere, or are added to the ordinance as amendments. Some of these provisions in STC area laws have considerable bearing on the way renewable energy resources might be developed or used in the region.

The Town of Avoca's Supplemental Regulations under Article IV contain provisions to require:

§ 401 — that "grading, filling and tree-cutting shall be minimized . . ."

§ 401 (a) — that "no structure shall be built within fifty (50) feet of the bed of a stream bank containing water an average of six (6) months of the year."

§ 408 — "Open structures such as porches, patios, balconies . . . shall be considered part of the building to which they are attached and shall not project into required minimum front, side or rear yards . . ."

The Town of Corning's Supplemental Regulations exempt any building built or used for public purposes from the Town's zoning provisions, thus clearing any municipal buildings for renewable energy resource use.

The Town of Elmira provides under its General and Special Provisions that:

Art. 12:§ 9:

"The removal of sod, timber, soil . . . shall be permitted only on special approval of the Town Board." and

Art. 13:§ 17:

"Commercial excavation of sand & gravel or other natural deposits and commercial tree cutting in Agricultural-Residential and in Manufacturing districts:

1. Must be authorized by Town Board and is subject to special permit renewal yearly. No renewal shall be given if operation provisions and reuse plan are not followed.
2. Such activity shall include effective plans and provisions for continuous restoration of excavation or cutting area to a usable state.

3. Detailed operation and reuse plans shall be submitted.

4. Performance bond shall be posted for reuse . . ."

The City of Elmira provides, in its Supplementary District Regulations, that (§ 413) "No fence, hedge or wall shall exceed seven (7) feet in height . . ." This limits windbreak plantings in the City of Elmira, since the specified height for such plantings is usually at least 10 feet.¹²

The City of Elmira also has a special provision which requires the approval of architectural design near parks. This would bring questions of aesthetics to bear on any retrofitting of such buildings with solar or other equipment.

SUBDIVISION REGULATIONS

Authority for controlling the design and improvement of new subdivisions is granted the municipalities under the same police power provisions that give municipalities the power to zone. Under subdivision regulations, municipal planning boards can renew and approve subdivision. Nineteen of the 77 municipal subdivisions of the Southern Tier Central Region have some form of subdivision ordinance. The remaining 58 are covered by State Department of Health and Department of Environmental Conservation regulations on realty subdivision (subdivision larger than 5 acres).

Local subdivision ordinances have significant potential for facilitating local renewable energy resource development. The subdivision regulations are discretionary, and depend to a large degree on how the community views its own character. The New York State Office of Planning Services Manual states:

"Desirable development standards vary from community to community. It is consequently necessary to study and evaluate local condition and needs in advance of the establishment of such standards, thus assuring that they are tailored to the community. The accepted standards will ultimately appear in the subdivision regulations as minimum criteria for development. (emphasis added)"

"The general determinants of subdivision design include the following: The guidelines for community development as set forth in its comprehensive plan; the influence of existing peripheral development and the effect of physical characteristics of the site."¹³

Under subdivision regulations, siting specifications could conceivably require that buildings have south-facing roof surfaces; that wind-resistant plantings or earth berms be sited on the northern and western sides of a house; or that new construction not shade the sun from existing dwellings. In addition, the flexibility of subdivision regulations, especially when used in larger-scale planned unit developments, can provide for a more energy-efficient transportation network, orien-

tation of roads for wind control, local cogeneration of power or steam by an industry and the community. Use of these regulations in a planned unit development could also enable PUD communities to have their own woodlot, managed by the community or the developer; large wind energy systems or biomass conversion units to supplement residential energy use; or steam production for district heating supplemented by burning of local solid waste.

BUILDING CODES

Thirty STC communities currently have a building and/or a housing code. Fourteen of these jurisdictions use the uniform (1973) New York State building code, the rest have their own. Dates of original code passage range from 1930 to 1977. The newer codes are performance — style, the others are generally prescriptive, and set exact specifications for building materials and methods.

Although the inconsistencies and prescriptive nature of some of these codes might have caused problems for certain solar and renewable energy installations, New York State adopted a new uniform energy conservation building code as of January 1, 1979, in response to Federal Energy Conservation Guidelines. Adoption of the code is mandatory for all municipalities. This code will approximate the ASHRAE standards and will be compatible with new solar installations.

Southern Tier Central communities will naturally be affected by the new code.

The main problem seen in adopting the new code locally is (1) there will be no one to enforce it in most local communities and (2) the standards tend to address large-scale urban developers rather than rural home builders and may be inappropriate and/or excessively expensive for the latter.

The mandate of a state-wide building code will most likely facilitate the installation of solar equipment in homes and buildings in urban areas. Urban areas are set up to enforce such codes and builders in these areas tend to have a formal, technical approach to building that makes them more adaptable to building codes than builders in rural areas.

Building codes adapted from ASHRAE standards may not consider the ramifications of a wood heating system, wind-powered electrical generation or heating, or household use of methane. Not only could this put obstacles in the path of the use of such energy resources but it could mean that installations made without standards could create safety hazards.

OFFICIAL MAP

The "official map" provision of local land use laws can stipulate the location of drainage and sewerage systems, streets, public structures, open spaces, and playgrounds. The map has legal status similar to that of the zoning ordinance. This provision has been little used in recent years, since it has been so subject to variance or change.

However, it is quite possible that this or a similar mechanism could be used to stipulate siting of roads and even lot-by-lot protection of solar access to facilitate the use of solar energy and energy conservation.

TOWN FOREST PROVISION

The Town forest provision is simply a section in the municipal law that states that municipalities can use local funds to start a town forest, and can hire people to manage it. Such a forest might be used for firewood by a very small town; or for wood to heat its public buildings or power a small generator. The only problems associated with wood heat are safety problems, which have made firemen and insurers edgy. A system to insure safe installation, inspection and regular cleaning would improve this.

PROPERTY TAXES

The New York State Legislature has passed and the governor has signed two laws involving renewable resources and property taxes. The first law allows an owner of fifty acres or more of contiguous woodlands to participate in a DEC forest management program. In return for the owners participation in the program the State Legislature has authorized a deduction in the assessed value of the woodland. The participating owner must agree to manage the woodland for at least ten years following each year the owner

accepts the lowered assessed value of the acreage. The law requires that a penalty of five years' back taxes be paid on the higher assessed value as soon as the owner of the woodland withdraws from the program. The same conditions apply even if the owner of the land changes.

The State Legislature has also authorized the exemption from real property taxes of solar and wind energy systems, both passive and active. Any real property which has the approved system is exempt from taxation on the increased value of property which may result from the solar or wind system installation. This exemption is in effect for each property for fifteen years.

FEDERAL LAWS AND INCENTIVES

There currently exist myriad federal laws and incentives which could relate to renewable energy resource development in the Central Southern Tier Region. U.S. Department of Agriculture silvicultural and soil restoration programs might boost wood and methane production (methane production from manure has a soil-conditioning fertilizer as a by-product); the Environmental Protection Agency air quality standards could affect projects in wood gasification; the HUD/DOE Solar Demonstration program could apply to buildings planned for the near future; and so on. Due to the current flux in federal jurisdictions over energy development, however, many of these may change. The Energy Tax Act of 1979 includes provisions which will

have an impact in our area. These provisions would have an effect on local development of renewable resources in the Southern Tier Central Region as follows:

1. Home-insulation energy conservation tax credit: 15% of energy con-

servation expenditures. A maximum of \$2,000 may be taken for credit.

2. A tax credit for business similar to (1) of 10%; credit includes investment for solar installations

3. Residential tax credit of 30% on first \$2,000 and 20% on next \$8,000.

¹Village of Painted Post, Zoning Law. As amended, 1975.

²See New York State Cooperative Extension, Energy Facts No. 18, "Landscape to Save Energy", Institute for Research on Land and Water Resources Newsletter, "Save Energy with Shelterbelt Planting", v. 8, No. 2, 9/77.

³City of Elmira, New York Zoning Ordinance, p.1.

⁴Village of Painted Post, New York Zoning Ordinance. § III-E.

⁵Town of Erwin, New York Zoning Law. § VII-A.

⁶This use is already present in some towns in the region and has not been subject to Board of Zoning Appeals action.

⁷Town of Lindley exempts all agricultural uses from height limitations.

⁸Town of Avoca, New York Zoning Law § 8410.

⁹**SOLAR WINDOW** — Imagine the sky as a transparent dome with its center as the solar collector of a house. The path of the sun can be the outline of surrounding houses and trees. The morning and afternoon limits of useful solar collection (roughly 9 A.M. and 3 P.M.) and the sun's path between those hours throughout the year scribes a "solar window" on the dome. Almost all of the useful sun that reaches the collector must come through this window except for the added effect of diffuse radiation. If any of the surrounding houses, trees, etc., intrude into this "solar window", the intrusion will cast a shadow on the collector. The solar window changes at different latitudes." From: Solar Energy Industries Association. *Solar Industry Index*. (Washington, D.C.: SETA) 1977. Page 320. See Also STCRP & DP *Resource Inventory*, 1978, p 43.

¹⁰Zoning Ordinance, Village of Painted Post, Section IV, Pt. A, 1975 Village Law No. 3

¹¹The design of such an integrated community, in this case executed by a design class at the University of Minnesota, is described in "Winona: The New Vision", *The Futurist*, April 1977, p. 7-8

¹²New York State Cooperative Extension; "Save Energy, Save Dollars" *Energy Facts* No. 18.

¹³New York State. Office of Planning Services. *Control of Land Subdivision*. Albany, OPS, 1973. Page 10.