BIOMASS POWER FOR RURAL DEVELOPMENT

TECHNICAL REPORT:
Cooperative Business Structure Report

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Cooperative Business Structure Report

Introduction

In order to commercially develop willow for bioenergy, the crop production and the market must be brought together. End users hesitate to commit to a product that is not readily available and producers hesitate to commit to producing a new crop with no assurance of a market. A willow grower's cooperative can address the many challenges of bringing a new crop to an energy market. The Salix Consortium's Willow Biomass Project has made tremendous progress in laying the foundation for a willow biomass enterprise. As of the fall of 2000, seven hundred established acres of willow are being managed in New York. New York State Electric and Gas installed a wood handling system to allow co-firing of wood with coal at their Greenidge Power Plant. Initial tests with willow identified some problems that can easily be addressed by adjusting the chipping process. AES, the new owners of the Greenidge plant, are currently co-firing waste wood with pulverized coal. The Niagara Mohawk Power Corporation Dunkirk Steam Station installed a wood handling system for one of their 100 MW boilers. Initial tests of the handling system were successfully conducted in the spring of 2000 with wood wastes from furniture manufacturing. Further tests of the handling system and combustion analysis of willow biomass are scheduled for April 2001. The Dunkirk Steam Station, now owned by NRG, has been identified as the target market for willow planted in western New York as part of the Willow Biomass Project. This project has been funded by the U.S. Departments of Energy and Agriculture's Biomass Power for Rural Development Initiative, New York State Energy Research and Development Authority and others.

Assuming that these final handling and combustion tests are successful, and NRG commits to regular use of willow biomass, several things need to happen. Mechanisms need to be put in place to maintain adequate production of willow biomass. Mutually satisfying fuel supply contracts must be developed. Mechanisms for processing, quality control and on-time delivery to the power plant must be developed. Willow biomass will need to compete with other wood residues that may be available at lower cost. Higher value markets in the area might also compete for the willow biomass supply.

The power generation company will prefer to contract with one entity, they will not be inclined to develop separate contracts with individual farmers for biomass supply. This single point of contact could be a cooperative or a private biomass broker. Initial estimates of the costs of production and the estimated price for delivered biomass indicate a narrow margin of profit. A biomass broker acting as a middleman between producers and the energy market would cut into the profits that would otherwise go to producers. The cooperative business structure provides an opportunity to distribute dividends to all producers while delivering biomass supplies to power generation companies at a price they are willing to pay. This can be accomplished by a cooperative through reductions in production costs and the costs of other services required for marketing and delivering biomass, and by increasing the value of the product.

Agricultural cooperatives have a long history of both success and failure. Recently new cooperative structures have been developed that address new markets and ways of reaching them. In particular, several groups of energy crop producers have formed or are on the verge of starting new cooperatives that will address production of agricultural crops and bring them to a new market for agriculture; electric generation. This paper will explain why a cooperative is a viable business structure for willow biomass producers, explore the many resources available for starting new agricultural cooperatives and describe the experiences and innovative solutions employed by other energy crop producer groups.

Cooperative Business Structure

Cooperatives have been operating since the Capper-Volstead Act of 1926 was enacted to exempt these businesses from anti-trust laws. (Torgerson,1999, p.37) A simple definition which captures the essence of cooperatives is “a user-owned and democratically controlled business in which benefits are received in proportion to use” (USDA CIR 5, p.9). Cooperatives are fundamentally different from other forms of business. First, they are user-owned; the customers are the owners. The next characteristic is democratic control. In most cooperatives, each member has one vote regardless of how much variation in use there is between members. In some cases, national or multi-national cooperatives have adopted voting proportional to use. Finally, benefits are distributed to members according to how much each member uses the cooperative. (USDA CIR 5, p.13) These characteristics are true to many types of cooperatives, whether they are agricultural, housing, electric or health food cooperatives. The following discussion focuses on agricultural cooperatives.

Most cooperatives are capitalized by membership fees and shares purchased. The members own the cooperative by purchasing these stocks and shares. When a cooperative is started the members can purchase stock in the cooperative. Generally one share of common stock is issued to each member which entitles them to one vote. Some cooperatives also issue preferred stock in order to secure additional funds. These preferred stocks do not entitle the owners to additional voting power. Federal law limits returns on these preferred stock investments to 8% annually. (USDA CIR 5, p. 13) The funds raised through sales of common stock, preferred stock and shares are used to manage the cooperative and purchase or build and operate the facilities or equipment. Cooperatives can also secure capital from non-member investors, loans from CoBank (part of the Farm Credit System), or through a variety of government programs.

A cooperative must be democratically controlled by the member-owners. If the cooperative allows members to vote on any basis other than vote per member, than member’s return on capital invested in the cooperative is limited by Federal law to a maximum of 8% per year. This rule emphasizes that ‘benefits proportional to use’ and keeping down the cost of goods and services provided, is more important than rewarding capital investors. (USDA CIR 5, p. 13) It also ensures that the cooperative is democratically controlled. New York State law limits returns to12% for cooperatives that operate by one-member one-vote. Cooperatives in New York that use weighted or other voting policies may be restricted to the Federal 8% limit. (Pestridge, personal communication, 2000.) Without this protection, and the one-member, one-vote policy, decisions could be made on the basis of profits for the biggest investors rather than the user-owners, and would than in effect no longer be a cooperative, but more of an investor owned corporation.

Agricultural cooperatives distribute benefits to member-owners according to the amount that each member uses the cooperative. How many shares any one member owns depends on their level of use. Shares can be purchased based on acres planted, bushels produced or the amount of fertilizer purchased, depending on the nature of the cooperative. For example, a share might give a producer the right and the obligation to deliver one ton of product per year to the cooperative. If the member expects to deliver 20 tons annually he/she would purchase 20 shares. A cooperative’s net income is returned to members as patronage refunds. The number of shares each member owns determines the proportion of the patronage refund they receive at

the end of the year. The dollar amount of the patronage refund depends on how much the cooperative's revenues exceeded expenses that year. Taxes on these earnings must be paid by either the individual members or by the cooperative. Any earnings from non-members are treated as corporate income and are taxed as such. (USDA CIR 5, pp.11-12)

Three Types of Cooperatives

Cooperatives are formed to provide goods or services to the members. This might be to market their crops, or to purchase goods, or to provide other services. Agricultural cooperatives can be either marketing, purchasing or service cooperatives. Often times a cooperative will fulfill several of these needs.

Marketing cooperatives are designed to help farmers bring their product to market. By pooling their product together farmers can guarantee regular delivery, they can reduce the costs of transportation and storage by owning the grain elevator or the trucks to haul their product. Members can have more control over the price that they can demand for their product.

Purchasing cooperatives are formed primarily to reduce the cost of inputs by purchasing in bulk. The cooperative can purchase large quantities of seed, fertilizer, feed, tools, equipment, fuel, etc. and pass the savings on to the members.

Service cooperatives are formed to provide services such as insurance, credit, electricity, plant and animal research, breeding services, crop or forest management or other services to the members. (USDA CIR 7, pp.3-4)

Bioenergy and Other Cooperatives

Several agricultural cooperatives have recently been formed by producers of bioenergy crops. Bioenergy crops are not new per se, but the market for them is just being developed. Initially bioenergy crops will be the feedstock fuel for co-firing with coal in electric power plants. Emerging technologies will also allow bioenergy feedstocks to provide combined heat and power, to be gasified for generation of electricity in a more thermally efficient process than combustion, or for conversion to liquid fuels or other bio-based products.

Prairie Lands Bio-Products Inc.

Prairie Lands Bio-Products, Inc. (PL) is a group of farmers who joined together to promote the development of various crops including legumes, grasses, forage, trees, shrubs and other plants. It is primarily a marketing endeavor. Of the 40 members, 30 are growing switchgrass. PL is working with Chariton Valley Resource Conservation and Development Council (CV RC&D), Iowa State University and E.L. Woolsey Associates and others, on the Chariton Valley Biomass Project. This project is researching the potential for switchgrass as a fuel supply to be co-fired with coal in electric power plants. (Downing, et al., 1998, p. 104)

PL incorporated as a 501-c-5 non-profit in 1997. At the time of incorporation the producers knew they needed a business structure that would allow them to produce, harvest and store switchgrass, and begin negotiations with power producers. However, at that time the group had

not reached a final decision about whether they wanted to operate as a cooperative or as a limited liability corporation. Incorporating as a 501-c-5 non-profit allowed them to begin the business of producing biomass while exploring the market possibilities, without fully committing to either business structure.

PL is currently in the process of negotiating a tolling agreement with Alliant Energy (AE). AE is investigating the effects of cofiring switchgrass with coal in their pulverized coal power plant. A test burn was conducted in December 2000. While this test burn was successful, AE will not make a long term commitment to use switchgrass until they have consistently cofired it and determined the long term effects on the boiler. The tolling agreement ensures that the switchgrass and the electricity it produces remain the property of PL. They will essentially "rent" 5% of the boiler from AE and use it to create a value-added product, kilowatt hours (kwh), from their crop. PL can sell their kwh to AE or market them elsewhere.

AE is on the verge of launching Second Nature, a green pricing program for renewable energy. Iowa consumers will be able to choose to pay an extra 2 cents per kwh for renewable energy. The tolling agreement will allow PL to share directly in the profits generated by this green energy premium. (Braster, personal communication, 2000.)

Chariton Valley Resource Conservation and Development (CV RC&D) has, and continues to support PL. CV RC&D provides project management for the Chariton Valley Biomass Project which is funded through the U.S. Department of Energy's Biomass Power for Rural Development Initiative. Any of the funds budgeted for planting, maintenance, harvesting or transport and storage of switchgrass are passed on to PL and then to its members. CV RC&D has also helped PL secure funding through USDA Rural Business -Cooperative Service's Cooperative Value Added Program to conduct a feasibility study for a cooperative. (Braster, 1998.) CV RC&D also provides administrative support to PL in the form of secretarial services, bookkeeping assistance, and meeting space. PL has a very active and dedicated Board of Directors and President, John Sellers. These PL officers coordinate harvest, transportation and storage of switchgrass and have been available at the power plant during test burns to assist in handling the switchgrass. Up to this point, a paid business manager has not been necessary or affordable.

With a tolling agreement on the horizon, PL has decided in the last months of 2000 to move forward with the formation of a cooperative. When PL incorporates as a cooperative they will very likely hire a full time manager and office space to manage all their activities. (Braster, personal communication, 2000.) CV RC&D will continue to assist PL as they go through the process of writing by-laws and incorporation papers. They will need to determine how much to charge for one share of common stock (one member, one share, one vote), how much to charge for shares and whether or not to issue preferred stocks to raise additional operating funds.

Minnesota Valley Alfalfa Producers

Minnesota Valley Alfalfa Producers (MnVAP) was incorporated as a cooperative in 1995. By 1997 there were 223 owner-members. The cooperative is primarily a marketing cooperative. The cooperative's processing facilities produced alfalfa pellets, alfalfa leaf meal and alfalfa stems. The pellets and leaf meal are marketed as animal feed. The stems would be marketed for energy. In 1998 MnVAP signed a power purchase agreement with Northern States Power. Minnesota Agri-Power is a joint development agreement between MnVAP and Northern States Power. The plan was to add 75 megawatts of capacity to the power station in Granite Falls, MN. A separate combined cycle gasifier was to be built on the grounds of the power plant to generate electricity from the alfalfa stems. (Downing, et al.,1998, p. 103)

Minnesota Agri-Power has not been able to convert alfalfa stems to energy. Support for the new gasifier had been secured through the U.S. Department of Energy's Biomass Power for Rural Development Initiative. This support was subsequently withdrawn. (Downing, personal communication, 2000.) Although MnVAP will not be producing electricity from alfalfa stems they still continue to function as a cooperative and produce alfalfa meal for the animal feed industry. This situation exemplifies the difficulty of developing new bioenergy enterprises and the importance of having multiple markets for the feedstock being grown by producers-members.

Minnesota Agro-Forestry Cooperative

Minnesota Agro-Forestry Cooperative (MAFC) is working with WesMin Resource Conservation and Development (RC&D) to market hybrid poplar for a variety of possible end-uses including electricity, pulp wood, lumber mills and oriented strand fiberboard. WesMin RC&D has assisted in the formation of the cooperative by acting as a business incubator, and by seeking funding from the Minnesota Department of Agriculture and other sources. Assistance has also been provided by the Cooperative Development Services in Madison, WI, the Agricultural Utilization Research Institute, and the Cooperative Development Initiative at the University of Wisconsin – River Falls. (Downing, et al., 1998, pp. 107-8)

The MAFC began with discussions among interested individuals and public agencies such as WesMin RC&D to explore the potential for short rotation hybrid poplar in Minnesota. The Minnesota Department of Natural Resources – Forestry (MN-DNR) had determined that the availability of native aspen in Minnesota would decline significantly between 2008-2020 when current harvest rates may cause a shortage of mature trees. Stumpage prices for aspen had increased from $6 per cord in 1990 to $17 per cord in 1995. This trend could lead to prices between $35 and $70 per cord for aspen between 2008-2020. Hybrid poplar is an acceptable substitute for aspen in oriented strand fiberboard, pulp and as internal frames for furniture. It can also be used for electric power or ethanol production. (See Appendix A)

Meetings held in the winter of 1995-96 led to the formation of an Interim Board to further research the formation of a cooperative. Feasibility studies concluded that a hybrid poplar marketing cooperative could be a viable business. Funding for the feasibility study was secured from the Cooperative Development Initiative, University of Wisconsin at River Falls and the W.K. Kellogg Foundation. The next step was to produce a business plan and write articles of incorporation and by-laws. MAFC filed their incorporation papers in February of 1997. A membership fee of $500 gives the member one voting right and the right to market 20 acres of hybrid poplar.

MAFC does not have a Cooperative Manager or any other permanent staff. The Board of Directors works with the WesMin RC&D and MN-DNR Forestry to provide technical and agronomic advice, referrals to qualified sub-contractors and planting crews, and education and new member recruitment. A new plan to provide a Producer Capitalization Program to members would help with annual cash flow until trees can be harvested 7-12 years after establishment. The Producer Capitalization Program would provide establishment costs and maintenance payments for the first three years to producers. Producers could also get advance payments on their projected harvest. The Cooperative would sell the harvested poplar, retain the costs and advance payments and a 5% administrative/fund growth deduction. The remaining revenues would then be available to the grower. This would also help the grower amortize the harvest gains and reduce the tax burden associated with a ten-year crop. Funding for the Producer Capitalization Program is currently being sought. (See Appendix A)

Cooperative Business Structure and Willow Crops

A willow cooperative could be structured to address the special requirements for willow production and reliably deliver a new fuel source to the energy market. A cooperative can manage and improve the willow biomass business every step of the way, from planting stock and field operations, to processing and delivery and conversion to energy.

The willow varieties that have been selectively bred at the State University of New York College of Environmental Science and Forestry (SUNY-ESF) are unique to the program and are not available on the commercial market. SUNY-ESF has been researching willow and poplar varieties since the 1980's. Funding from the U.S. Department of Energy's Bioenergy Feedstock Development Program has allowed them to expand their research into a full scale Willow Breeding Program. SUNY-ESF has carefully selected for and bred varieties that have strong rooting abilities, high biomass production, an upright growth pattern, do not spread by suckers, and which are resistant to pests and diseases. These characteristics have to be maintained through careful and verifiable cutting production techniques. The Willow Cooperative could provide cuttings by owning the nursery and hiring specially trained staff to work closely with SUNY-ESF to maintain clonal purity and further develop verification procedures. Cuttings could then be sold at cost to members and help keep production costs down. At a planting rate of 6,000 cuttings per acre, a decrease in price of $.01 per cutting could reduce planting costs by $60 per acre. The nursery could also provide specialized refrigeration for cutting storage and delivery.

Planting machinery for willow biomass crops is also specialized. The project has modified several Frobbesta planters and purchased a Step Planter, both imported from Sweden. The Frobbesta is a small two-seater that uses ten-inch cuttings and is somewhat similar to a standard tree planter. But it was built specifically for the double row pattern and spacing for willow planting. The Step Planter is a more complex and specialized piece of equipment which uses four to six foot long willow whips and cuts and plants a 7-10 inch cutting through a automatic feeding system. This planter is also designed for the double row system but plants two double rows per pass. The Step Planter costs approximately $63,000 (new) and is therefore cost prohibitive for most farmers to own, particularly since it could not be used for any other farming activity. While the Frobbesta, at about $5,000 (used) is more affordable, ownership of planting machinery would only be necessary for a short period of time. Because willow re-grows from the rootstock after it is coppice harvested, a planting can last for 20 years

or more. Planting machinery is only needed on any particular farm for three years to establish three rotations, or at most until the desired total acreage is achieved. The Step Planter needs to be run by well-trained staff. While an entrepreneurial farmer might choose to invest in the planting machinery and do custom planting in the area, a cooperative would be better able to own the equipment, train the operators and schedule the planting to coincide with site preparation and herbicide application. A cooperative would be able to provide a full package of well integrated services to producer-members.

Weed control is essential in the first two years while the willow crop is being established. Fall site preparation includes the timely application of contact herbicides. These herbicides need to be applied before perennial weeds become dormant, so that the herbicide provides a good kill. In the spring pre-emergent herbicides must be applied within 3 days of planting willow cuttings. This is necessary so that the herbicide cap is established before annual weed seeds begin to germinate. It is also necessary to apply these herbicides before the willow cuttings break bud because the herbicide can do some damage to the young willows. A willow cooperative could hire a crew to be dedicated to herbicide application. It has been the experience of the Salix Consortium that the use of custom herbicide applicators is problematic. Because they have many clients, some of whom have much larger acreage, it is difficult to insure that herbicide application occurs in the proper time frame. The Salix Consortium experienced a significant improvement in weed control when a staff person received his herbicide applicators certification and outside contractors were no longer used. This staff member was able to follow the planting schedule closely. A Willow Cooperative could hire and train this staff, improving weed control effectiveness and further reducing production costs by purchasing herbicides in bulk.

Harvesting machinery for willow bioenergy crops are specialized and expensive. The Salix Consortium purchased a Bender from Salix Maskiner in Sweden at a cost of approximately $114,000 delivered. This machine would be used to harvest willow in the winter months. Because of the expense and single use of the harvester, individual farmers would not purchase their own harvesters. They might use their own tractors, if these meet the specifications. The Bender can be mounted on a tractor with 100 horsepower power take-off. The Salix Consortium purchased a New Holland TV 140. This tractor is an articulated, bi-directional tractor with 105 horsepower power take-off. These features allow the tractor to be used for both pulling the Step Planter and pushing the Bender harvester while towing a chip wagon. Specially trained personnel are needed to operate this harvester. This combination of machinery and trained operators could be provided by a custom harvester company or by a willow cooperative. A cooperative would provide these services to producers at cost. The Salix Consortium plans to use the Bender harvester for the first time in the winter of 2000-2001.

In addition to the expense of the harvesting machinery is the issue of timing of harvest. Willow must be harvested in the winter when the plants are dormant and when fields are accessible. Harvesting must be coordinated with transportation, processing and storage or delivery directly to the power plant. A willow cooperative in charge of every aspect of production, harvesting, processing and delivery would be best suited to coordinate all of these activities in an effective manner, and in a way that is fair to all producers. Hired custom harvesters and trucking companies would be more difficult to coordinate. A custom harvester might not harvest different farmers fields in a sequence that is most beneficial to all farmers and to bringing in all of that years harvestable willow in a timely manner. A private company would be more concerned with keeping costs down and profits up for themselves, possibly at the expense of some individual farmers.

It is not absolutely certain whether the willow chips will need to be further processed before being delivered to the power plant. There is some concern that the willow chips from the field will be too wet and will not move efficiently through the power plants handling system with two hammer mills. If significant problems occur it will be necessary to partially dry the willow chips before they are delivered to the power plant or change to whole stem harvesting which allows the willow stems to dry somewhat before being chipped. In either case, if further processing or a second stage of transportation is required, this will create significant additional expense to the biomass fuel supplier, whether it be the willow producers, a cooperative or a biomass broker.

The first test of the handling system at the Dunkirk Steam Station was conducted in May of 2000. This test was completed with dry wood chips from a furniture manufacturing plant. The test did not include running the material through the second hammer mill because it is connected to the boiler feeders, and these were not ready for testing. Although the wood chips were dry, the pump in the storage pit had been inadvertently shut off and rainwater had collected in the pit before the wood was delivered. The wood going into the handling system was therefore wet from the water in the pit. In spite of the wet condition of the wood, the handling system and first hammer mill operated in an acceptable manner. This might indicate that delivery of wet willow is possible. Further tests with field fresh willow are necessary for an accurate analysis of the handling system. In the winter of 2000-2001 approximately 100 acres of willow will be harvested and available for a test of the full handling system, including both hammer mills and the combustion analysis.

A cooperative can add value to the biomass through quality control and by providing on-time delivery. Willow biomass harvested and chipped in the field can only be stored for about three months before it begins to decay. A cooperative can schedule and coordinate harvesting, processing and delivery. This can be done by owning processing machinery, providing a storage area, and coordinating delivery in either cooperative owned or contracted delivery trucks. Transportation of the willow biomass can be hired to trucking companies, particularly in the early years of the business. The Dunkirk Steam Station is set up to accept biomass from walking floor trucks, which are common and readily available for lease from trucking companies in the area. These trucks are not unique to the biomass system, as are the planting and harvesting equipment. In later years the cooperative could determine if the ownership of several trucks would provide additional cost savings.

A cooperative can also continue research efforts in collaboration with universities, train new willow producers, promote pro-biomass legislation and policies, explore other markets for willow, and integrate other sources of biomass into the fuel supply stream.

A cooperative will also need to address the issue of cash flow and annual payments for members. Because willow is harvested on a three-year rotation, producers might only have income in every third year. Individual producers might choose to plant willow on a staggered schedule to allow harvesting to occur every year and thus to create an annual income. This issue of annual income might also be addressed by the cooperative by either paying advance payments on the projected harvest, or by retaining a portion of the patronage refunds and paying them out over three years. This issue be addressed more easily in the case of willow which is harvested every three years, as opposed to poplar which is not harvested for 7- 12 years, and does not regrow after harvest. A long term contract with the power company would lock both the producers and the buyer in for a set number of years at a set price. This guarantee of annual activity would allow the cooperative to distribute income to the producers every year. This issue of cash flow and annual income to producers must be addressed as it will impact long term lending decisions.

A New Opportunity on the Horizon

On October 22,1999 Public Law 106-78 became effective. (See Appendix B) Section 769 of this law amended Section 1232(a)(7) of the Food Security Act of 1985. This amendment allows limited harvesting of biomass from Conservation Reserve Program (CRP) lands for energy production. The law states that the Secretary of Agriculture will select up to six pilot projects in the United States, not more than one in any state, for a total of up to 250,000 acres of CRP land nationwide.

On October 20, 2000 the Federal Register announced an opportunity to apply to be one of the six pilot projects. Applications were due to the Farm Service Agency State Office by December 19, 2000. The State Technical Committee and the Natural Resource Conservation Service are to review all timely filed applications and recommend approval or disapproval to DAFP in Washington, D.C. by January 18, 2001. It has not been announced when selections will be made or projects will start.

SoCNY RC&D, SUNY-ESF and Antares Group, Inc. filed an application to harvest willow from CRP land in New York. CV RC&D and PL filed an application to harvest switchgrass in Iowa. (Braster, personal communication, 2000) MAFC has teamed up with Whole Tree Systems as a new power partner to apply to harvest poplar in Minnesota. Several other applications have been filed from other states as well. (Downing, personal communication, 2000)

If any or all of these projects are chosen as pilot projects it will have a tremendously beneficial impact on production costs and producer interest in energy crops. As part of the CRP program, USDA would provide cost share for the establishment of these crops on new CRP sign-ups. Cost share is generally 50%. Furthermore, annual CRP payments to the landowner continue while the energy crop is growing. In the year of harvest the annual CRP payment is reduced by 25%.

This CRP payment reduction is not an issue in the case of willow where harvesting occurs every three to five years. The income from the harvest and the cost share for establishment far outweigh the 25% of the average $40 annual CRP payment in New York. The payment reduction would be even less of an issue in Minnesota where harvest occurs after 8-15 years. Annual CRP payments would help the producer with cash flow during the long growing period for polar, addressing some of the same issues that are addressed by the Producer Capitalization Program. (See page 5 in this paper) The project in Iowa has requested that this CRP payment reduction be waived. In Iowa they would harvest switchgrass every other year and the average CRP payment in that state is higher than in New York, so the payment reduction would have a more significant impact there. (Braster, personal communication, 2000)

Approval of any of these projects would improve the production economics for the particular energy crop, and provide income to producers in non-harvest years. This would increase the incentives for new producers to become involved and could possibly lead to increased membership in existing cooperatives or enhance interest in starting new cooperatives. These CRP pilot projects would increase the amount of energy crops being planted while significantly offsetting production costs and reducing the costs to individual growers. This would have the effect of providing energy markets with a larger and therefore more reliable fuel supply, while reducing the cost of the fuel. Improved production economics, more rapid scale up of energy crop acreage and increased interest from energy markets will make energy crop cooperatives more feasible and ultimately more successful business enterprises.

Steps for Forming a New Cooperative

The USDA Cooperative Information Report Number 5, titled "How to Start a Cooperative" lists a series of steps for forming a new cooperative. That list is as follows:

1) Hold meeting of producers to discuss an economic need that formation of a cooperative might fulfill.
2) Hold an exploratory producer meeting. Vote whether to continue. If affirmative, select a steering committee.
3) Conduct a producer survey as a basis for determining cooperative feasibility.
4) Hold second general meeting to discuss results of producer survey. Vote on whether to proceed.
5) Conduct a market or supply and cost analysis.
6) Hold third general meeting to discuss the results of the market or supply and cost analysis. Vote whether to proceed, this time by secret ballot.
7) Conduct a financial analysis and develop a business plan.
8) Hold fourth general meeting to hear results of the financial analysis. Vote again on whether to proceed. If affirmative, vote a second time on whether the steering committee should remain intact or changes should be made.
9) Draw up necessary legal papers and incorporate.
10) Call a meeting of charter members to adopt the bylaws. It's a good idea to invite all potential membership to ratify the bylaws. Elect a board of directors.
11) Call the first meeting of the board of directors and elect officers. Assign responsibilities to implement the business plan.
12) Conduct a membership drive.
13) Acquire capital, including developing a loan application package.
14) Hire the manager.
15) Acquire facilities.
16) Start up operations. (USDA CIR 5, p.7)

Resources Available for Starting a New Cooperative

There are many resources available including publications, agencies, staff people and funding sources that can help a group of producers complete the steps necessary to form a cooperative. The U.S. Department of Agriculture offers a wide range of programs, technical assistance, literature and funding to help in the development of new cooperatives.

USDA's Rural Business - Cooperative Service

"The goal of … USDA's Rural Business - Cooperative Service (USDA RBS) is to help rural residents form new cooperative businesses and improve the operations of existing ones" (USDA CIR 28, p. 2). Staff are available to assist with the initial feasibility study and the business plan. They can assist with securing capital for the startup of the cooperative by identifying resources for producers. USDA RBS also provides a wide range of educational materials.

Resource Conservation and Development

SoCNY RC&D could organize all of the meetings listed above and staff could be available to facilitate discussion and voting. The survey could be created with the assistance of USDA RBS and SoCNY RC&D could print and distribute it. The USDA RBS could provide guidance for the market analysis and the supply and cost analysis. Assistance in data collection could come from interested producers, SoCNY RC&D, SUNY-ESF, Antares Group and other partners of the Salix Consortium. With USDA RBS guidance, SoCNY RC&D staff could prepare for the feasibility study and reduce the cost of hiring an external consultant. SoCNY RC&D could also assist in developing the business plan or find qualified professional assistance for this process. USDA RBS and SoCNY RC&D could help draft the by-laws and identify several resources for legal assistance. Sources of capital and assistance with loan application can be provided by USDA RBS. SoCNY RC&D staff could act as a manager in the earliest stages of the cooperative. Office space and equipment could also be provided by SoCNY RC&D.

SoCNY RC&D staff will be available as an in-kind service to the cooperative for the life of the Salix Consortium's Willow Biomass Project. For any portion of the activities that fall beyond the culmination of the project, new funding will need to be secured for the RC&D staff time. SoCNY RC&D would actively pursue additional grant monies to continue these activities until the cooperative is fully operational.

Willow Economic Model

The Salix Consortium is currently developing an economic and business model of a commercial willow energy crop enterprise. (Lindsey & Volk, 1998.) This model is designed in a modular form so that individual aspects of a willow enterprise can be examined either in isolation or in context with any combination of aspects. For example, an interested individual could explore the economics of cutting production alone, or a group of producers could explore everything from cutting production to conversion to energy. The modules in the model are as follows: nursery production, site preparation, planting, site maintenance, harvesting, transportation and energy conversion.

This model could be very helpful in helping a group of producers explore which aspects of the willow enterprise the cooperative should be involved in and which could be left to existing agribusiness or other local businesses. As the cooperative begins operations it could assist in the collection of data and help the model designers keep the model up to date and accurate. As the willow enterprise grows, this model could be used as a tool to investigate strengths and weaknesses in the enterprise and identify key variables for improved production economics.

Publications

The USDA RBS office in Syracuse, NY has several tools available for use by groups considering the formation of a cooperative. A nine-video Training Series for Cooperative Directors, titled "The Leading Board" (produced by the University of Wisconsin Center for Cooperatives with USDA grant) is available for loan from the State Office. (Pestridge, personal communication, 2000.)

USDA has hundreds of publications available on all aspects of cooperatives. A list of publications which can be downloaded from the USDA website at: www.rurdev.usda.gov/rbs/pub/cooprpts.htm (See Appendix C)

Funding Sources

USDA's Business and Industry Program

USDA RBS has a Business and Industry Program (B&I) that helps cooperatives by partnering with commercial lending institutions and the Farm Credit System to provide financing for cooperatives, usually in the form of guaranteed loans. First, the cooperative must apply to the USDA RBS State Office for a Cooperative Stock Purchase Program. If the cooperative is determined to be eligible, capital can be borrowed by the cooperative for equipment or facilities, and individual producers can also apply for loans to purchase stock in the cooperative.

Once the State Office has determined that a cooperative is eligible the cooperative must find a lending institution that is interested in participating in the guaranteed loan program. The lending institution reviews the feasibility study (which must include evidence of the repayment ability of the producers) and the business plan and submits them to the Business and Industry Program. (See Appendix D)

CoBank

CoBank is a cooperatively owned bank that is part of the Farm Credit System. With $24 billion, CoBank makes loans exclusively to agriculture and rural areas. CoBank specializes in cooperative, agribusiness, rural communications and energy systems, and agricultural export financing. CoBank has 13 banking centers in the United States, with the national office in Denver, CO. The nearest agribusiness office of CoBank is in Springfield, Massachusetts. (www.cobank.com/findus/findmain.htm or www.cobank.com/abtcbnk/cobank.htm)

The Rural Economic Development Loan and Grant Program

The purpose of the Rural Electric Development Loan Program (REDL) is to provide zero interest loans to Rural Utilities Service financed telephone and electric utilities (RUS borrowers) to promote economic development and create jobs in rural areas. The RUS borrower can pass these monies on to projects for project feasibility studies, start-up costs, incubator projects or other purposes. (www.rurdev.usda.gov/rbs/busp/redl.htm)

The Rural Economic Development Grant Program provides grants to RUS utilities to set up revolving loans programs, fund feasibility studies, provide education and training or even medical care to rural residents. (www.rurdev.usda.gov/rbs/busp/redg.htm)

There are 31 of these RUS borrowers (4 electric and 27 telephone cooperatives) in New York State. Steuben Rural Electric Cooperative serves Steuben, Schuyler, Chautauqua and Cattaraugus counties. (See Appendix E) The Dunkirk Steam Station, the primary market for willow biomass, is in Chautauqua County, which neighbors Cattaraugus County. Historically utility cooperatives have been reluctant to pursue REDL loans. (Pestridge, personal communication, 2000.) However this is an option that the willow cooperative could explore.

Possible Structure for a Willow Cooperative

The Willow Cooperative will need to be structured to address the common issues of agricultural production, the more unique aspects of willow production and the complex issues of the production of energy from biomass. The Willow Cooperative must be able to guarantee a dependable supply of biomass to a power producer at a mutually agreeable price. This must be done in a manner that allows producers to retain patronage refunds and/or profit from the willow biomass they deliver to the cooperative.

It is estimated that the Dunkirk Steam Station will co-fire biomass at a rate of 10% by heat and that eventually, half of that will be willow biomass. This will require 23,000 dry tons of willow biomass per year. Approximately 1,300 acres will be needed to produce that, and because willow is harvested on a three-year cycle, a total of 3,900 acres of willow will be necessary to meet the demand at the Dunkirk Steam Station. (These calculations assume an average production rate of 18 dry tons/acre. The first harvest is expected to yield 15 dry tons/acre, later harvests could yield as much as 21 tons/acre.) If farmers in the area average 60 acres each, with 20 acres being harvested each year, there will be approximately 64 farmers involved in willow biomass production.

An in-depth feasibility study is necessary to project the costs of running the Willow Cooperative, purchasing and operating equipment, and transporting and if necessary, processing willow. A feasibility study could determine how much investment would be required from each member, and what funding and capitalization would be available to start the cooperative. By looking at the market side of the equation, a feasibility study could estimate if the cooperative's revenues would exceed expenses by a large enough margin to pay any patronage refunds to the members.

Members might deliver willow biomass to the cooperative and have the cost of the services they received deducted from the value of the delivered willow biomass. Or members might pay for services at the time rendered and receive payment for the biomass at the time delivered. These details would ultimately need to be determined by the cooperative board but a feasibility study would assist in indicating how this could effect cash flow for a new cooperative.

The Willow Cooperative will acquire the necessary equipment for planting and harvesting. They could purchase the first pieces of used equipment from the Salix Consortium, or lease them, if this were a less expensive option. The ultimate disposition of the equipment for the research and demonstration project has not yet been determined. It is important to note that the prices the Salix Consortium has paid for willow equipment are for equipment that is in the earliest stages of production. As equipment production increases, the cost is likely to decrease significantly, as it has in Europe over the last decade. (Volk, personal communication, 2000)

Decisions must be made about when to hire a Cooperative Manager, a Field Crew Leader or other staff, and what office or other facilities will be needed and when. A budget must be prepared to estimate the capitalization required, cash flow and rate of return to members. It must be determined what proportion of the cooperatives start-up costs should be covered by membership stocks and shares or if the sale of preferred stock will be desirable. A feasibility study would estimate the potential selling price of the willow biomass, the annual production rate and compare this to the costs of operating the cooperative.

Figure 1 is a sample budget for the Willow Cooperative. This budget does not estimate the actual costs of operating a cooperative. Rather, it illustrates how many costs need to be considered in a feasibility study. Nor does it include any consideration of production costs for growers. It only addresses cooperative management expenses.

	Year 1	Year 2	Year 3		Year 4		Year 5
Office Space Rent	RC&D In-Kind	RC&D In-Kind	3,000		3,000		
Office Equip	RC&D In-Kind	RC&D In-Kind	12,000		1,000		
Manager	RC&D In-Kind	RC&D In-Kind	20,000	Half Time	40,000	Full Time	
Assistant	RC&D In-Kind	RC&D In-Kind	10,000	Half Time	15,000	3/4 Time	
Willow Production							
Field Crew Leader	17,500	17,500	17,500	Half Time	35,000	Full Time	35,000
Field Crew - temporary							
Tractor	92,000						
Planter - Frobbesta-Used	5,000						
Planter - Frobbesta-Used		5,000					
Planter - Frobbesta-Used			5,000				
Planter - Step	63,000						
Herbicide Tank/Sprayer							
Bender Harvester	114,000						
Chip Wagon	Lease	Lease	Lease				
Chip Wagon	Lease	Lease	Lease				
Walking Floor Truck	Lease	Lease	Lease				
TOTAL	291500	22500	67,500		94,000		35000
MEMBERS							
64 Members @	$4,555 each						

* The cost of temporary field crew and leased equipment would be covered by charging members for services.

* Later year expences could be covered by revenues from services to non-members and by retaining any patronage refunds.

Thoughts of Some Current Willow Producers

Several of the current producers in the Willow Bioenergy Project were asked about their thoughts on the feasibility and the value of a Willow Cooperative. Until there is more known about the market for willow biomass, it is difficult for these producers to even decide whether they will keep the willow or have it removed at the end of the current research project. But assuming that the NRG Dunkirk Steam Station does commit to using willow biomass as part of its fuel supply, the producers agree that a cooperative would provide several advantages to the producers. They recognize the end users need to deal with one large supplier of biomass rather than several small farmers. One producer felt strongly that SoCNY RC&D and SUNY-ESF should continue to manage the willow biomass production for a transitional period beyond the current research project. With additional funding, SoCNY RC&D could provide many of the necessary services of managing, coordinating harvest and delivering the biomass without cutting into the revenues of the producers, and SUNY-ESF could continue to provide technical supervision and crop production advise. As the market is developed and a good price for the willow biomass is negotiated, field level improvements will simultaneously reduce production costs. Eventually this should lead to a profitable business for biomass producers, but in the early stages there will not be enough profit to go around unless the manager or biomass broker is a non-profit. Another producer saw enough potential for a cooperative to express interest in being on the steering committee to further explore cooperative formation. (Brown & Hopkins & Barmore & Conti, personal communication, 2000)

Some producers expressed concern over the intrinsic difficulties of organizing people to start something as significant as a cooperative with all the necessary legalities, policies and financial decisions. Producers would need to be very confident of a market for the willow biomass before they would even invest enough effort to consider the feasibility of a Willow Cooperative in any detail. The results of the test burns at the NRG Dunkirk Steam Station and NRG's subsequent assessment will determine the producer's interest in a cooperative within the next 6-12 months.

Results and Discussion

Willow producers will decide the best option for developing a new willow biomass enterprise. A cooperative is a very strong option. The Willow Cooperative could be a combination of a marketing, purchasing and service cooperative. The Willow Cooperative would give producers more control over the outcome of their new venture because it is member-owned and member-controlled. By working together in a cooperative structure, producers will be in a better position to negotiate a price for their product and reliably deliver it to their customer(s). They will have better control over various aspects of production and thereby improve the quality of their product and reduce the cost of producing it.

The marketing arm of the cooperative would collect willow biomass and deliver it to the power producing market on a dependable basis and at a price that is agreeable to both the cooperative and the power producer. This might be done on a fuel supply contract basis or the cooperative might pursue a tolling agreement as is being done in Iowa. (See p. 4) The Willow Cooperative could also investigate other markets for willow biomass such as district or institutional heating, combined heat and power, pellet fuels, or craft uses such as floral, basketry and rustic furniture. The value of the environmental benefits of energy crop production and co-firing must be assessed. Improvements to air and water quality, reduction of soil erosion and enhancement of wildlife habitat, and reduction of greenhouse gases with their associated impact on global

climate change, are all valuable outcomes of bioenergy crops and bioenergy production. The marketing cooperative could explore ways to secure the financial rewards of these environmental benefits and distribute them to producers.

The Willow Cooperative could also explore integration with an electric cooperative. There is a natural synergy between these two businesses. Electric cooperatives are historically linked to agriculture; they were originally formed for the very purpose of providing electricity to farms and rural areas. If the Willow Cooperative members are owners of the electric cooperative, and the electric cooperative members are also owners of the Willow Cooperative, than they will all have a vested interest in each other's success. How this integration might be managed should be further explored.

The purchasing arm of the cooperative could reduce production costs by buying herbicides and fertilizer in bulk. Cuttings could also be purchased in bulk or they might be produced by the service arm of the cooperative. This service arm of the cooperative could also provide rental equipment, with or without a crew. Willow biomass crops are new and therefore crop production advice is not yet available through cooperative extension or other traditional agricultural services. The Willow Cooperative will need to build upon the research and educational efforts of SUNY-ESF to continue to provide crop production advice to both their pioneering and new members.

A full assessment of the benefits and risks of forming a cooperative will require the completion of a feasibility study. Many resources are available for funding of feasibility studies and collection of the necessary information. If the feasibility study leads producers to a decision to form a cooperative, many financial and technical resources are available to assist in that process. SoCNY RC&D can help with the transition to an incorporated cooperative by providing administrative support up to and even following the date of incorporation. Producers might elect to form a transitional non-profit as was done by Prairie Lands Bio-Products Inc. This would allow them to conduct business while further assessing the market, without requiring the full effort and commitment of forming a new cooperative.

Agricultural cooperatives are not new. Energy markets are not new. However, marketing an agricultural commodity to the electric power industry is new. Willow producers can build upon the work done by the Salix Consortium, benefit from the experience and innovative ideas of other energy crop groups, and take advantage of the many cooperative development resources available to form the Willow Cooperative as a fully integrated and successful bioenergy business.

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Appendix A, B, C, D and E are available upon request.
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