# New Generation Cooperatives: *Case Studies*

## *Sunrise Energy Cooperative*

*by Rodney J. Fink*

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Financial support for this project came from the Value Project To Improve Farm Income and Rural Communities through Specialty Farm Products and also the Rural Development Opportunities (RDO) Project identifying rural development opportunities in Illinois funded through the Rural Community Development Strategic Research Initiative entitled Illinois Farming Alternative and Rural Revitalization Methods (I-FAARM). These projects are funded by a grant from the Illinois Council for Food and Agricultural research (C-FAR).

Published by Illinois Institute for Rural Affairs
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Western Illinois University
1 University Circle
Macomb, IL 61455-1390
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www.IIRA.org

This publication is available from IIRA in print and on the IIRA web page with links enabled.



First Printing: January 2001

 Printed on recycled paper

# Sunrise Energy Cooperative

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*Abstract: Sunshine Energy Cooperative (SEC) is a farmer-owned co-op formed to add value to its members' commodities. The planned plant capacity is six million gallons of ethanol prepared from the purchase of approximately two million bushels of corn. Total by-products produced at maximum capacity are 40,000 tons of stillage and 5,000 tons of carbon dioxide (SEC 2000). The co-op was formed on May 30, 1995 (date of incorporation) and started operation on November 25, 1999. Operations through August 31, 1999, consisted primarily of raising capital, obtaining additional debt and grant financing, designing and constructing the ethanol grain processing facility, and performing administrative functions. The co-ops voting membership is 228, and approximately 600 producers have corn delivery rights to the plant.*

## Background Information

Sunrise Energy Cooperative (SEC) (2000a) is located in Benton County in east-central Iowa, south of Blairstown, a community of approximately 672 people and approximately 290 families. Blairstown is west of Cedar Rapids, in a productive farming region close to the Amana Colonies and 84 miles east of the Iowa state capital of Des Moines. The parent organization for SEC is the Iowa Beef Cooperative. The original plan for the co-op was to operate an integrated business that included the ethanol plant and a beef feedlot, which would use the stillage by-product of the ethanol plant. Because of complications with the regulations regarding co-ops, two separate co-ops were formed, including the SEC (ethanol plant) and the Sunrise Benton Eastern Iowa Farm Feeders (BEIFF). Both co-ops are adjacent to each other and share office space, scales, and other facilities.

SEC contracted with the Iowa Department of Natural Resources to develop an economic feasibility study, computer model, and business plan for a hypothetical energy-producing farm. The information was designed to be a transferable resource for other producers and is available from the Iowa Department of Natural Resources (*Iowa Value-Added Resource Manual* 2000). The hypothetical integrated energy farm comprises a variety of farming components that complement and sustain each other.

An ethanol plant is the hub of the integrated energy farm, and it produces ethanol, heat, carbon dioxide, and animal feed. The heat is to be used in an aquaculture facility for raising commercial fish such as Tilapia. The carbon dioxide could be furnished to a commercial greenhouse, and the high protein feed is fed to cattle. Methane could be captured from the anaerobic digestion of cattle manure and used as a supplemental source of energy for ethanol

The author would like to acknowledge the assistance of Greg Behounek (accountant), Steve Thompson (shareholder), and other SEC employees. Their assistance is gratefully appreciated.

production. Digested manure can be sold or used on site to fertilize corn or cellulose feedstock for ethanol production.

The integrated energy farm analysis model produced by SEC is a decisionmaking tool that allows users to input financial data regarding corn to ethanol production, cattle feedlot operation, manure digestion and methane recovery, and aquaculture and greenhouse ventures. The model is a Microsoft Excel file called "Analysis Model for an Ethanol Plant" and is available on the Iowa Department of Natural Resources Web site or as part of the *Iowa Value-Added Resource Manual* (2000). A model for a 40-million gallons per year plant is also available.

SEC currently has an ethanol plant, corn production (by member-owners), and a cattle feedlot (a separate facility owned and operated by BEIFF). They plan to implement the aquaculture module within the next three years. The aquaculture facility, constructed at the site, may use waste heat captured from the ethanol plant to maintain the incoming water temperature at a level sufficient for fish production. Wastewater from fish production has a potential planned use for greenhouse plants.

The plan for the ethanol plant is to take delivery of most of the corn needed for the year at harvest time. High moisture corn is delivered and stored in a large bunker for use as needed throughout the year. By buying most of the grain at harvest time, farmers can sell their corn without the expense of drying and on-farm storage. Most grain comes from local growers, which minimizes transportation costs. Corn used in ethanol production may contain up to 32 percent moisture and could save producers up to $40 per acre in drying costs. The high moisture corn is stored in a large bunker adjacent to the ethanol plant and is loaded for processing as needed. The ethanol is sold through Heartland Fuel and Grain of Aberdeen, South Dakota. Stillage is sold wet to the adjoining feedlot (BEIFF) and to other feeders in the region. Carbon dioxide, another by-product of an ethanol plant, is not utilized at this time as the output from a plant of this size is usually not sufficient to justify processing.

## Ethanol Industry Overview

Currently there are 57 producing ethanol production facilities in the United States with several others under construction (*Iowa Value-Added Resource Manual* 2000). Total production is slightly more than 1.8 billion gallons per year and total direct employment is more than 4,000 full-time employees, plus thousands of indirect jobs which are created by the ethanol industry. The production capacity of plants varies from fewer than one million gallons per year to more than 100 million gallons per year. The SEC plant capacity of less than six million gallons per year places it in the category of a small plant.

The primary uses of ethanol is as an octane extender for gasoline, as a clean air additive in the form of an oxygenate, and as an aid in the reduction of America's dependence on imported oil (*Iowa Value-Added Resource Manual* 2000). To accomplish and encourage the use of ethanol by the petroleum industry, Congress established an incentive in the form of a tax credit during the mid-1970s. The tax incentive continues today and was recently extended to 2007. The $0.054 per gallon tax credit is an exemption from the Federal Gasoline Excise Tax paid by gasoline

marketers. This allows them to provide a cleaner burning gasoline with a higher octane to customers and to reduce their tax liability in the process.

As clean air standards continue to tighten, ethanol gains a greater market share of the gasoline market. Ethanol's primary competitor is Methyl Tertiary Butyl Ether (MTBE), and recent discoveries of groundwater contamination from MTBE have spurred greater interest in ethanol blends. Ethanol is a fully biodegradable product and stands ready to fill the void left when, and if, MTBE is banned. Congress recognized the economic value of ethanol when blended at a 10 percent level with gasoline. Ten percent ethanol-blending boosts the octane rating of gasoline by an average of three points. Ethanol, a renewable energy, is energy efficient. Every 100 BTU of energy used to produce ethanol (energy use includes planting, cultivating, harvesting, and processing) returns 135 BTU of ethanol. By comparison, for every 100 BTU of energy used to produce a gallon of gasoline returns only 85 BTU of gasoline or 55 BTU of MTBE . Ethanol lowers harmful carbon monoxide emissions by 30 percent and reduces carbon dioxide emissions by 27 percent. The Environmental Protection Agency credits reformulated gasoline containing ethanol with the reduction and control of hazardous emissions which threaten air quality in many cities (Balderson 1999).

In 1990, Congress adopted regulations that would increase the manufacture and use of alternatively fueled vehicles. Through the use of these low-emission vehicles, ethanol has an opportunity to meet the demands of these cars for fuel. Ford and Chrysler produced several hundred E85 vehicles in 1999, which can use 85 percent ethanol and 15 percent gasoline. The challenge for the ethanol industry is to provide sufficient refueling sites to accommodate these cars, which require very little modification from the standard vehicle (so little that there is no price increase for the E85 vehicle).

Other uses are beginning to evolve for ethanol and the coproducts associated with its production. Stationary and mobile fuel cells powered by ethanol are beginning to emerge, and ethanol is gaining popularity as a road and power-line deicer.

## Corn for Ethanol Production

Corn components can be found in thousands of products—adhesives, cosmetics, food, and paper, to name just a few. Approximately 61 percent of 1998 corn use was for livestock feed (*Missouri Farm Facts, Corn* n.d.), 18 percent for export, and 6 percent each for ethanol and high fructose products (all other uses were 9 percent). Ethanol, which is produced from corn, is a clean burning, domestic renewable fuel that reduces demand for foreign oil and provides a market for more than 600 million bushels of corn annually. For every 100 million bushels of corn used for production of ethanol, corn prices may increase from four to eight cents per bushel (*Missouri Farm Facts*, n.d.; NCGA 1999). According to the National Corn Growers Association (NCGA) (1999), corn-based ethanol results in a 50 to 60 percent reduction in fossil energy use and a 35 to 46 percent reduction in greenhouse gases. They credit ethanol with reducing the demand for foreign oil by 100,000 barrels a day.

Corn varieties differ in amount and types of starch, and the local Pioneer Hybrid (Pioneer and DuPont Specialty Grains) representatives have helped some farmer-members select high-

yielding hybrids with high amounts of extractable starch. In addition, the stockpile of wet corn at SEC is treated with an inoculant to help control the heat and the pH so that the starch content is not lost ("With a Little Help from Some Friends" 1999). With better quality grain going into the plant, the amount of ethanol produced per bushel of corn may be higher.

One bushel of corn (56 pounds) will produce about 2.7 gallons of ethanol and 16 pounds of distillers dried grains with solubles (DDGS). The residual product of distillation is whole stillage, a mixture containing 10 percent solids from the grain and 90 percent water. For every 5,000 bushels of grain ground, approximately 192,000 gallons of whole stillage is produced. Although whole stillage is an excellent cattle feed, most plants (including SEC) further process the stillage to an easier-to-manage product. DDGS is produced when the condensed distillers solubles (CDS) are returned to the centrifuge to be mixed with the distillers wet grains (DDG). This is the most common and highest volume form of feed derived from a dry mill ethanol facility.

Although SEC is a dry mill operation, they market their stillage as distillers wet grains (DWG) and as a thin stillage called CDS. DWG leaves the centrifuge at 55 to 65 percent moisture and makes excellent cattle feed (drying DWG may slightly damage the protein of the feed) (*Iowa Value-Added Resource Manual* 2000). SEC leaves a higher level of moisture in the DWG and sells a product with about 75 percent moisture (NCGA 1999). Thin stillage, or CDS, contains 2 to 5 percent dry matter as "fines" that escape screening or centrifuging. The composition of CDS varies according to the process technology of the plant, but usually contains between 5 and 10 percent proteins, fiber, fats, and oils. CDS may be sold to nearby livestock and dairy farmers, and once farmers become educated about the nutritional value and convenient handling, it often becomes the feed supplement of choice.

BEIFF currently has about 2,600 cattle on feed and uses about 10 percent of the plant's DDGs. The feedlot is being enlarged to house 5,000 cattle and will use about 20 percent of the DDGs produced by the plant. The remainders of the DDGs are sold within a 60-mile radius to livestock producers (members have first priority on DDGs' sales). Directly east of the plant site, a private company is developing a large dairy cow complex (reportedly for 2,600 dairy cows), which potentially will be a good source for marketing DDGs.

## Plant History and Management

The idea for the integrated ethanol plant came from a videotape of an integrated operation in Garden City, Kansas. Members of the original task force visited Reeves Agri-Energy in Garden City and were impressed with the integrated ethanol plant, aquaculture (Tilapia production unit), and feedlot. The Reeve's ethanol plant produces 10 million gallons per year output and has served as a model for the unit planned in Blairstown.

The Iowa Beef Cooperative is the parent organization, and the general manager of the co-op spent much of his time from 1982 until the present working to develop and promote the project. The first shares were sold to farmer-members in December 1995 when the first of approximately 100 informational meetings was held for potential shareholders. To purchase shares, one had to be a member of the Iowa Beef Cooperative or the Iowa Producers Cooperative (grain co-op).

Until late 1998, the general manager of the Beef Cooperative directed the activities of the co-op and remains firmly committed and involved at present. SEC hired a manager in December 1998 who directed the operation through July 2000. A new manager is being hired at the present time. The co-op has entered into an agreement with a local community college for the reimbursement of certain employee training costs (2000a).

SEC was originally designed as an integrated co-op (ethanol plant, feedlot, aquaculture, etc.); however, in order to receive a USDA loan guarantee, the operations had to stand alone. Therefore, a separate general manager was employed for each entity (ethanol plant and feedlot), and each operation is independent. The general manager of the Sunrise Energy Feedlot also manages the Iowa Beef Cooperative. The two co-ops (Sunrise Energy Ethanol and Sunrise Energy Beef) work together and share an office and other common space. The original general contractor for the plant and the co-op had differences during the construction phase which delayed the plant completion.

On October 27, 1999, the co-op received a Demand for Arbitration from the general contractor responsible for the construction of the ethanol facility, alleging that the co-op failed to timely and completely pay the general contractor for work performed on the facility (SEC 2000a). The Demand for distribution called for more than $900,000 for work performed, or to have been performed, on the facility. The co-op alleges that the general contractor did not complete the facility in a timely manner and believes that the co-op is owed liquidated damages due to delay on the completion of the facility. In June 2000, a court awarded a judgment of $675,000 plus interest to the general contractor.

The issue of contract management of an ethanol plant has often been a prerequisite to some Process Design Companies (PDCs) who take equity interest positions in new ethanol facilities. By taking an equity position, the PDC is often able to interject needed capital into the project to help make it a reality. In addition, financial institutions often have a greater comfort level with the financing of the project if the company building the plant is also an investor (this is often true with USDA guaranteed loans). Typically, the PDC will want a management contract for an extended period of up to three to five years, and they are usually renewed automatically unless a written objection from the board is received at least one year prior to the sunset of the contract. Some boards do not like this arrangement, and others feel it helps ensure a profitable operation. Some boards are forced to accept such arrangements because of funding shortfalls.

When a PDC becomes a part of the operation, it is often necessary to create a Limited Liability Company (LLC) with the co-op as the majority shareholder. In Iowa and some other states, financing from a co-op bank cannot be obtained unless farmer ownership is at least 80 percent.

SEC didn’t choose to employ a PDC for management as they felt they had the expertise to manage the plant properly without the added expense. The ideal position for a co-op such as SEC is as follows (*Iowa Value-Added Resource Manual* 2000):

- Most or all of the equity is raised, and the farmer-members provide the crop.
- Co-op members do not commit a "risky" percentage of the crops they are capable of raising.
- Farmer-members hold a large majority of the voting stock and control the board.
- Board members are skilled and committed to their role of serving the interests of the farmer-members.
- The board does not try to manage the plant but, rather, hires a manager who, in most cases, has ethanol experience and then gives him or her authority to do the job, while having him or her remain accountable to the board.
- Fiscal and financial matters, including profitability, investment, and distribution of dividends, are under the oversight and control of the board.

The SEC board has eight members who meet frequently to make decisions on managing the plant. They often meet every other week but hope to only have to meet monthly soon. Board members have donated much time, effort, and expertise to the operation and currently receive no pay for their efforts. The operation of the ethanol plant is coordinated with the needs of the Sunrise BEIFF co-op in meeting BEIFF's needs for stillage.

## Stock Categories and Ownership

Several share categories exist within SEC. The share categories were designed to meet different categories of people participating in the co-op, including several farm organizations and promoters:

- *Class A Shares of Preferred Stock* – Sold initially for a par value of $5,000, these shares gave a producer the right to deliver 4,500 bushels of high-moisture corn to the co-op. Some Class A Shares are not owned by farmers but, instead, are owned by other investors who sell delivery rights to farmers. According to the auditors' report, 551.5 shares have been sold, with a value of $2,757,500. These are nondividend bearing shares and provide delivery rights for grain to the ethanol plant (SEC 2000a). Delivery rights may be sold, and a person can own Class A Shares without being a voting member. Currently, about 600 people own delivery rights at an average value of approximately $5,000 each.
- *Class B Voting Stock* – To own voting stock, one must be a member of the Iowa Beef Cooperative or the Iowa Producers Cooperative. The Class B Voting Stock has a par value of $1 and is designed to keep the voting of the co-op in the hands of the farmer-members.
- *Class C Preferred Stock* – The stock ($250,000) is held by the Iowa Farm Bureau and should receive dividends at the annual rate of 7 percent of the par value, payable annually on the 31st day of March. The Iowa Farm Bureau has been supportive throughout the life of SEC.

- *Class D Preferred Stock* – Heartland Grain Fuels of Aberdeen, South Dakota holds a $200,000 share value of Class D Preferred Stock (Heartland Grain and Fuels have a 2.5 year marketing agreement with SEC) and accrues annual cash dividends at the rate of 7 percent of the par value, payable on the 31st day of March.
- *Class E Shares* – Class E Shares are issued when the SEC cannot pay farmers for grain and when the farmers who delivered the grain desire payment. In this situation, Class E Shares are issued, which are a pledge for payment to a farmer and the Iowa Farm Bureau. Farmers issued Class E Shares may borrow money from the Iowa Farm Bureau at 7.5 percent interest until the SEC makes payment for the grain. This category of stock was issued when the company was ordered to stop accepting loads of corn by the Iowa Grain Licensing Bureau (Shareholders Resolve Dispute at Ethanol Plant 1999). State statutes require grain dealers to store grain whole until the debt is paid. SEC had offered its producers contracts calling for a deferred payment of their grain and had started to crack corn before some of the contracts were signed (SEC 2000). The seller of grain can elect to make a deferred sale and select a later pricing and payment date, or corn can be priced on delivery at the previous days Chicago Board of Trade (CBOT) futures closing price. Dividends are not ordinarily paid on any Class E Shares issued, although some dividend paying Class E Shares may be provided to organizations such as the Iowa Farm Bureau who may help finance the recent indebtedness from the arbitration judgment.

## Patronage Distributions

The patronage distribution plan is for the board of directors to allocate the co-op's cash savings at the end of each fiscal year among the following items: (1) a reasonable reserve for depreciation, bad debts, contingent losses, and contingent expenses; (2) retained savings to the extent deemed necessary by the board of directors based on an evaluation of the future needs of the co-op and the competitive position of the co-op, as defined in the co-op's bylaws; and (3) distributions to the farmer-members in proportion to the amount of corn the co-op has purchased from the farmer-member, up to the amount specified in the respective farmer-member's letter of marketing intent. Distribution to farmer-members will be issued in the form of either cash or Class B Voting Stock. Any issuance of Class B Voting Stock will conform with the requirements of the Internal Revenue Code, section 1388(d), as a nonqualified written notice of allocation.

## Financing Activities

The SEC is financed by farmer-members' share funds, a loan, grants, and TIFF funds. A breakout of the financing activities from the audit report through August 31, 1999 follows (SEC 2000a).

**Table 1. Cash Flows from Financing Activities**

| | |
|---|---|
| Borrowing on long-term debt | $5,706,000 |
| Issuance of Class A Preferred Stock | $2,773,723 |
| Issuance of Class C Preferred Stock | $250,000 |
| Issuance of Class D Preferred Stock | $200,000 |
| Receipt of state grants for property, plant, and equipment | $279,000 |
| **Net cash flows from financing activities** | **$9,208,723** |

*Source: Iowa Value-Added Resource Manual* 2000.

According to the audit report (SEC 2000a), as of January 31, 2000, the co-op had incurred a net loss of more than $600,000 (unaudited) and the co-op's liabilities exceeded current assets by almost $900,000. Also, as of January 31, 2000, the co-op had drawn all amounts available under the revolving loan payable and long-term debt. The above calculations do not include the judgement from arbitration with the general contractor that awarded the general contractor $675,000 plus interest in June 2000. The co-op depends on generating sufficient cash flows to meet its obligations, and it plans to accomplish these objectives in the following ways (but not limited to these):

- Renegotiate the existing revolving loan payable and term loan payable which would enable the co-op to lower its monthly debt payment requirements and obtain an increase in the availability allowed under the revolving loan payable.
- Obtain additional financing from the Iowa Department of Economic Development.
- Obtain additional production efficiencies. The co-op has hired an additional employee with more than 20 years of ethanol production experience to generate additional production from the inputs used and current operational design.

The co-op has succeeded in getting financial assistance in the past. It received a grant from the Iowa Department of Natural Resources for $50,000 to prepare a business plan. The Iowa Department of Economic Development provided funding of $900,000 of which $180,000 was a grant and the remaining $720,000 was a no-interest loan. In addition, in November 1999, a loan of $1 million was obtained from the Iowa Department of Economic Development to cover operating costs to pay for delivered corn.

The second loan is to be repaid beginning in September 2000 at the rate of $.08 per bushel processed. If the co-op cannot make the payment, the loan may be deferred. The delay in construction caused by the conflict between the SEC and the general contractor protracted the construction phase and necessitated downsizing the plant and raising additional equity. The recent judgment of $675,000 plus interest is another financial concern of the co-op and the board is currently working to find solutions for this problem. The major expense in ethanol production is the purchase of corn for fermentation, and the major source of profit is from the sale of ethanol. The current and projected price of corn is low, and ethanol is currently selling at levels

above projections. July 2000 prices of approximately $1.40 per gallon of ethanol combined with current projected corn prices should produce a positive cash flow for the co-op.

## Site Characteristics

Factors to consider in selecting a site for an ethanol plant are similar to those for other industrial plants. *Good location* criteria encompass factors such as good drainage, sufficient road and rail access, utility availability, and adequate on-site space to allow ease in movement of trucks and equipment. Expansion possibilities must also be considered, along with road access, rail access, and acreage requirements. The SEC site is not close to a major highway or rail line; however, due to the design capacity of approximately six million gallons, the site may be adequate for the plant and to truck the ethanol to the delivery points. If the plant had a larger capacity (say 15,000,000 gallons per year or more), the presence of a rail line and spur would have been very important. Much of the stillage is used on-site or locally. Also, the ethanol is trucked to users through a brokering arrangement with Heartland Fuel and Grain, and the arrangement seems to work well.

*Water supply* is important to the operation of an ethanol plant because about seven gallons are required to process a bushel of corn. Much of the water required in an ethanol plant is recycled back into the process; however, there are certain areas where fresh water is needed (probably around 12,500,000 gallons or more per year). Wastewater treatment is important; however, since much of the water can be recycled back into the process, the effluent is minimized. This has the long-term effect of lowering wastewater treatment costs. Today, many new plants are at or near zero effluent facilities. The water in the cooling tower and the boiler blow-down water can be stored in a pond and eventually released to the environment. Water supply for the operation appears to be adequate. SEC recycles much of its water (it has adequate water from a rural water district and a well) and requires only about 800 gallons per day to operate.

*Fuel* for the plant is important even though significant improvements have been made to reduce the energy intensiveness of ethanol production. Currently, about 45,000 BTU of energy is required to produce a gallon of ethanol, which contains 76,000 BTU of energy. Fifteen years ago, as much as 65,000 BTU of energy was required. SEC representatives have reported an efficiency of 50 percent (*Iowa Value-Added Resource Manual* 2000). Natural gas is the preferred fuel for an ethanol plant, and SEC is located near a natural gas pipeline. Propane gas serves as a backup but is generally 50 to 70 percent higher than natural gas. Both natural gas and electricity costs have exceeded earlier projections, even though a gas line goes through the property and the co-op received a good electric rate from the energy company.

## Projected Operations

The plant has yet to complete its first year of operation (the first grain was delivered on September 7, 1999, and production started on November 25, 1999), so operating and profit information is not available. The production cost projections from the *Iowa Value-Added Resource Manual* (2000) provide a useful cash flow summary for the SEC's ethanol unit.

**Table 2. Cash Flow Summary**

| *Production* | *Quantity* | *Unit Price ($)* | *Annual Operations ($)* | *Pct. of Total* |
|---|---|---|---|---|
| Denatured ethanol | $5,263,160 | 1.07/ gal | 5,631,581 | 77.1 |
| Carbon Dioxide | 11,799 tons | 5.00/ ton | 59,000 | 0.9 |
| DDGS | 15,566 (dry) | 103.40 | 1,609,590 | 22.0 |
| **Production Income** | | | 7,300,171 | 100.0 |
| *Production* | *Quantity* | *Unit Price ($)* | *Annual Operations ($)* | *Pct. of Total* |
| Grain | 0.37740 bu/gallon | $1.80/ bu | $3,396,600 | 60.6 |
| Chemicals, enzymes, denaturants, yeast, etc. | | | $409, 530 | 7.3 |
| Steam | 25 lb per gal./ethanol | $2.98/ 1,000 lb | $372,040 | 6.6 |
| Electricity | 2.251 kw-hrs/ gal | 0.0372/ kw-hr | $418,690 | 7.5 |
| **Total Variable Costs** | | | $4,596,860 | 82 |
| *Fixed Costs* | | | *Annual Operations ($)* | *Pct. of Total* |
| Payroll and Burden | | | $375,980 | 6.7 |
| Maintenance | | | $219,250 | 3.9 |
| Other costs (Ins., misc.) | | | $415,770 | 7.5 |
| **Total Fixed Costs** | | | **$1,011,000** | **18** |
| **Fixed + Variable Costs** | | | **$5,607,860** | **100** |
| ***Production Income—Fixed and Variable Costs*** | | | ***$1, 692,2311*** | |
| Projected facility cost | | | $8,769,996 | |

*Source: Iowa Value-Added Resource Manual* 2000.

## Debt Reduction

The audit report shows that the co-op's current liabilities exceed current assets by almost $900,000 (unaudited) as of January 31, 2000. This does not include the recent arbitration judgment by the general contractor of $675,000 plus interest. The ethanol plant balance sheet projected a long term debt of $4,337,836 at the end of the first year of operation (Iowa Department of Natural Resources Web site n.d.; *Iowa Value-Added Resource Manual* 2000). It appears that the long-term debt is longer, and the cash flow to service the debt load is of concern.

According to the audit, the USDA-guaranteed loan is for $4,986,000, with interest accruing daily and payable monthly at a rate equal to the *Wall Street Journal's* prime rate plus 1 percent. Principal is payable in equal consecutive monthly installments commencing 15 months after the completion of the ethanol facility. Repayment of 70 percent of the loan balance has been guaranteed by the U.S. Department of Agriculture. In addition, there is a subordinated loan to the Iowa Department of Economic Development and a second loan made on November 8, 1999, for an additional $1,000,000 from the Iowa Department of Economic Development. The latter loan is non-interest bearing for a term of five years, with monthly principal payments beginning on September 1, 2000, at the rate of $0.08 per bushel of processed corn during the previous month,

estimated at approximately $13,000. The loan is collateralized by the general business assets of the co-op and personal guarantees by the members of the co-op's board of directors (personal guarantees limited to a maximum of $500,000).

## Start-up Operations

Delivery of high moisture corn to SEC, Iowa's first farmer-owned ethanol plant, began in September 1999 (*Ethanol Promotion* n.d.). The processing of ethanol commenced on November 25, 1999. Subscribers were happy with the idea of harvesting their corn at a high moisture level (22 to 30 percent) and avoiding the drying cost. Taking in more than two million bushels of high moisture corn, however, was more of a problem than anticipated because the unloading and grinding of the corn slowed the process considerably. Reports of truckers waiting in line for hours to unload grain made those delivering grain unhappy. The co-op has located a high energy roller-crusher that will process 20,000 bushels per hour (versus 6,000 bu/hour last year), but the recent arbitration ruling has put that expenditure on hold for the time being. For the coming delivery season, deliveries may need to be of dry corn, or those delivering grain may have to pay a processing fee if they bring in high moisture corn.

When the Iowa Grain Licensing Bureau ordered SEC to stop accepting corn, the SEC voting members resolved the situation by changing the enterprise from 499 Cooperative Association (grain dealer) to a 501 Closed Cooperative. The 501 cooperative arrangement allows the SEC to store grain and defer payments as well as use the corn for ethanol production ("Shareholders Resolve Dispute at Ethanol Plant" 1999). The issue was reported as an administrative problem tied to whether grain is worth more processed or unprocessed. Under the new rules, the co-op continues to buy grain only from those who own delivery rights.

## Economic Impact

The impact on the region is positive because 20 jobs have been created by the ethanol plant and additional jobs are being created by the Sunrise BEIFF co-op. The addition of an adjacent dairy facility will also create economic growth for the region as will a proposed aquaculture unit. According to the Iowa Department of Natural Resources (energy bureau), the SEC is benefiting about 300 farmers from the five million or more million gallons of ethanol produced there each year. In addition, the operation generates $8 million of economic activity (*Ethanol Promotion* n.d.). The marketing of the ethanol is handled by Heartland Grain and Fuels, which has a 2.5 year marketing agreement at a 2.5 percent commission. The ethanol is priced daily and paid to the co-op on a weekly basis, which is considered a good arrangement by SEC. Heartland Fuel and Grain is a consortium of ethanol plants, and the consortium sells about 30 million gallons of ethanol per year. Farmer-members are projected to receive $3 per bushel for their corn ("Sunrise Energy Taking Deliveries" 1999).

## Summary and Lessons Learned

SEC began operation in the fall of 1999. The idea for the plant started when a group of growers from eastern Iowa saw a videotape about an ethanol plant in Garden City, Kansas (Reeves Agri-Energy, a 10 million gallons per year ethanol plant). The Kansas plant centerpiece

was the ethanol plant but also included were an integrated beef feedlot and aquaculture operation. SEC processes more than two million bushels of wet corn each year, and the corn is provided by about 600 owners of corn delivery rights who will make their deliveries in the fall. One major promoter for SEC was the general manager of the Iowa Beef Cooperative, and his endless efforts, with the help of other farmer promoters and the support of the co-op, made the plant a reality.

The concept of the integrated plant is to provide producers a way to make a profit by processing their grain into ethanol. In addition, the product left over after the starch is removed to make ethanol is called stillage and is used for animal feed. About one of every four bushels of corn that goes into the ethanol plant comes back as animal feed and is sold to area beef feeders and milk producers. The presence of a feedlot on the plant site is a ready market for a major portion of this feed, and the proximity of the plant and feedlot eliminates the cost of transportation. The implementation of an integrated system, such as SEC, can serve as a model for other producer groups interested in creating new facilities. Also, the lessons learned (some of them difficult lessons) can help other groups in their planning.

SEC experienced some problems with its organizational planning. This was apparent when the Iowa Grain Licensing Bureau ordered SEC to stop accepting loads of corn in fall 1999. The situation was resolved, but it created a temporary problem for the co-op and those farmer-members delivering grain to the plant. SEC did not choose to utilize a PDC for its management, and it had a dispute with its general contractor which recently resulted in a judgment against the co-op. Because of the arbitration ruling, the delay in construction brought about by the dispute, and other early production problems associated with management, the cost of construction per bushel processed appears to be high. The total construction and start-up cost is more than $2 per gallon of ethanol produced, which is high when compared to some other recent ethanol plants either completed or under construction such as, Golden Triangle and Northeast Missouri Grain Processors who had construction and start-up costs of less than $1.50 per gallon processed. These plants are larger (15 million gallons per year) and both employed an experienced PDC for the construction phase and for plant management. In both cases, the PDC made a substantial investment in the plant which helped with the financing.

The Iowa Department of Natural Resources has provided support for the project and initiated a project to develop an economic feasibility study, computer model, and business plan for a hypothetical energy-producing farm.

SEC served as the general contractor for this project. Likewise, the Iowa Department of Economic Development provided much needed funding as difficult times evolved in the pre- and early operational stages of the project.

Based on the auditors' report (Redmond, Broghammer & Jonas, P.C.), the deficit accumulated during the development stage and current liabilities exceed current assets by $900,000 (as of January 31, 2000) (SEC 2000a). In addition, recent arbitration awarded a significant judgment to the general contractor at the expense of SEC. Based on these financial shortfalls, additional funding or financing is needed to sustain operations and pay the short-term

and long-term debt. The cash flow to meet the long-term debt payment is a concern that the board of directors is continuously addressing.

The co-op has been responsive to problems as they evolve and generally has found satisfactory solutions. The problem of handling the delivery of more than two million bushels of wet corn in early fall will exist when the corn is delivered in fall 2000, and plans to handle this problem are being considered. The support of the Iowa Department of Economic Development in providing funding to support the issuance of Class E Shares when the co-op status was changed is evidence of the working relationship between the co-op and state agencies.

It is a major undertaking for a group of producers to create an operation of this magnitude. They have learned from mistakes made and have developed a model that could be useful for other producer groups. The integrated concept is a unique approach and one with the potential for assisting producer groups to benefit from value-added profits to their commodities.

Many lessons, such as the following, are learned from the creation of an operation such as the SEC:

- There must be a vision and desire to generate a new program for adding profit to agricultural commodities.
- Promoters must learn and understand the steps in forming an organization that conforms to local and state laws and still protects the basic concept of the proposed organization (in this case, an integrated energy farm).
- Promoters must be ready to hire professional help (e.g., management help) as needed to have the proper skills for running such an operation.
- Creating an accurate business plan that can be used in acquiring capital is a necessity. In addition, if the project is not financed adequately, major problems at start-up will be faced.
- Promoters must consider selecting a PDC for the construction phase and possibly the initial management phase. Selecting the proper general contractor is of utmost importance.
- The product flow from producer to plant must be visualized so as to avoid unnecessary handling difficulties.
- Networking with other co-ops to share information and to work together to add value to farmers' commodities is a good idea. If possible, join with other farmer-owned co-ops in joint efforts (such as marketing) which provide mutual benefit.

Developing a new business such as the SEC requires the dedication of members who want the operation to succeed. This is certainly true of this co-op as the work of fundraising, organization, construction, and management were made possible because of the dedication of members of the Iowa Beef Cooperative, loyal promoters, and a board of directors who wanted to turn their vision into a reality.

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