



# Industries of the Future Roadmap for the Wisconsin Food Processing Industry

October 2002

**FIRST RELEASE**

This report (in whole or in part) is the property of the State of Wisconsin, Wisconsin Department of Administration, Division of Energy, and was funded through the Focus on Energy Program.

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This document reports the ideas, suggestions, and opinions of a variety of interests in the food processing industry, discussed in a group forum without any attempt to reach consensus. Opinions on industry needs expressed in this report are anonymous, and should not be construed as representing the viewpoint of any particular individual or organization.

### **Acknowledgements**

The First Release Roadmap exists because of the generous contributions of the industries, individuals, and organizations listed in Appendix C, who attended the 2002 Wisconsin Food Processing Roundtable.

### **Input Encouraged**

This Roadmap for the Wisconsin food processing industry is a living document, starting with the first release. To continue improving the efficiency and competitiveness of the Wisconsin food processing industry, we need your continued input. If you would like to discuss industry needs or potential solutions for items within the Roadmap, contact the Industries of the Future Program Manager:

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# Contents

1.0 Introduction ..... 1

2.0 Industry Needs and Potential Solutions ..... 3

3.0 Opportunity Discussion on Industry Needs ..... 14

Appendix A: Quick Resource Directory for Wisconsin Industry ..... 22

    General ..... 22

    Food Processing Specific ..... 24

Appendix B: The Wisconsin Food Processing Industry Assessment ..... 26

Appendix C: Miscellaneous Reference ..... 34



# 1.0 Introduction

## 1.1 Food Processing – A Wisconsin Industry of the Future

The Wisconsin Department of Administration (DOA) has undertaken the Wisconsin Industries of the Future (IOF) program with the goal to improve the competitiveness of Wisconsin industry by accelerating the adoption of new energy-efficient and environmentally-friendly technologies.

The Wisconsin IOF program has a mandate to work with the state’s economically-critical industry sectors to move innovative technologies out of R&D and into manufacturing plants. The program supports public-private partnerships to achieve its goal, with industry playing a major role in identifying the priority areas for action. This report, the *Industries of the Future Roadmap for the Wisconsin Food Processing Industry*, provides a starting point for building partnerships with the Wisconsin food processing industry, an important industry of the future for Wisconsin.

The Wisconsin food processing industry is one of the largest segments of the state’s manufacturing sector and a leading employer in the state<sup>1</sup>. Manufacturing establishments in food, beverage, and kindred products process raw animal and plant materials into products for consumption. This industry manufactures many kinds of products including dairy products, bakery products, beverages, condiments, frozen foods, pet foods and vegetable and animal fats and oils.

The food processing industry employs over 63,000 people in Wisconsin and accounts for over \$21 billion in annual sales. Small firms account for nearly two-thirds of the total firms in Wisconsin. However, it should be noted that the few large firms that make up just six percent of the total establishments in the food processing industry employ over half of the food processing workers in the state; the small firms employ less than 10 percent.

The food processing industry uses 2,320 GWh of electricity and 32.4 trillion Btu of natural gas each year, making this industry one of the larger energy consumers in Wisconsin. Table 1.1 provides additional detail.

**Table 1.1**  
**Energy Consumption Statistics for the Wisconsin Food Processing Industry**

End-User Category	Energy Use			Energy Use per Employee	
	Electric (GWh)	Electric (10 <sup>12</sup> Btu)	Natural Gas (10 <sup>12</sup> Btu)	Electric (MWh)	Natural Gas (10 <sup>6</sup> Btu)
Food processing industry	2,320	7.9	32.4	36.6	511
All industrial industries	18,384	63	179	34.1	332

Sources: Dick Kliebenstein, personal communication<sup>2</sup>, and Manufacturing Energy Consumption Survey (U.S. Department of Energy 1993)

<sup>1</sup> Refer to Appendix B for additional background information on the Wisconsin food processing industry

<sup>2</sup> Wisconsin Public Service Commission, referencing “Advanced Plan 7.” Madison.

## **1.2 A Roadmap for Working with the Wisconsin Food Processing Industry**

“In order for Wisconsin to remain competitive globally, new technological innovations must be fostered through partnerships between industry, trade associations, universities, investors and government.”<sup>3</sup> To help carry out projects that will improve industry competitiveness, the Industries of the Future program follows an “industry roadmap” developed by these partnership members. The roadmap describes current industry needs, identifies potential solutions and offers guidance for pursuing partnerships.

There are three primary steps to creating the industry roadmap:

### **Step 1 Identify needs and potential solutions for improving energy efficiency, environmental performance, and production efficiency in the Wisconsin food processing industry.**

The Wisconsin food processing industry needs and potential solutions are defined in Section 2. The initial draft of Section 2 was developed from facilitated discussion at the 2002 Wisconsin Food Processing Roundtable, held April 30, 2002<sup>4</sup>. Participants at the roundtable included representatives from industry, associations, universities, private companies and organizations, and government. The roadmap is a “living” document that will be periodically updated by members of IOF partnerships. In particular, the list of potential solutions will grow through ongoing discussion and interaction with industry and technology innovators as partnership efforts proceed.

### **Step 2 Facilitate technical and financial partnerships between industry, government, and technology innovators who seek to implement projects.**

There is strong potential to build on existing infrastructure within the state to accelerate technology innovation. Some needs identified in the roadmap have related R&D projects at the state or national level. Section 3 discusses opportunities for partnership activities in priority need areas.

### **Step 3 Identify resources to pursue opportunities and help make them accessible to project implementation teams.**

There are many resource people available to assist the Wisconsin food processing industry. The difficulty is in knowing where they specialize and how to contact them. Appendix A provides a quick reference to these resources.

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<sup>3</sup> Wisconsin Governor Scott McCallum, June 2002.

<sup>4</sup> See Appendix C for the list of roundtable attendees.

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## 2.0 Industry Needs and Potential Solutions

Wisconsin began a state-based roadmapping initiative for the food processing industry in April 2001. The industry needs and potential solutions presented in this roadmap have been identified by food industry stakeholders who volunteered their time at a food industry roundtable on April 30, 2002. Additional insight was gained through an industry assessment<sup>5</sup> and discussions with Wisconsin food industry stakeholders.

The advantage of creating a consolidated “needs list” is that it serves as a tool for food processing businesses and their trade organizations to communicate their needs to local, state, and national government and organizations that can work with them on potential solutions. The state roadmap illustrates that many needs cross energy, environmental and production boundaries. The roadmap will be shared with national supporters of the IOF strategy, and will inform state-level follow-up actions. Working collectively to meet these needs will help ensure a viable food processing industry in Wisconsin.

### 2.1 The 2002 Wisconsin Food Processing Industry Roundtable

The 2002 Wisconsin Food Processing Industry Roundtable was designed to meet four objectives: 1) bring into one room a good (not statistical) sample of key experts from Wisconsin food industry, research organizations (public and private), and government to discuss how to make the Wisconsin food processing industry more competitive, 2) create a brainstormed list of industry needs, 3) begin to identify potential solutions for high priority industry needs, and 4) encourage formation of collaborative teams to work on high priority industry needs.

A steering team led by the Wisconsin IOF program and staffed by industry volunteers designed the roundtable. Local industry leaders and associations promoted the event to their members and colleagues. The roundtable drew 45 participants, mostly from different food processing companies, with additional representation from suppliers and technology developers, and some staff from organizations and programs with a mission to help industry.

**Table 2.1 Participant Representation for the April 30, 2002 Roundtable**

Type of Roundtable Participant	Number Attending
Food processing industry	28
Technology development (public and private)	11
Wisconsin and federal industrial assistance programs and organizations	6

Participants at the roundtable received context on industry issues and trends. Afterwards, they broke into smaller groups for a facilitated brainstorming session addressing the needs of their industry to remain competitive. Individuals made lists of needs and potential solutions, discussed them in small groups, and reached majority agreement by the full group (not consensus) on priority industry needs. The full group then conducted a follow-up

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<sup>5</sup> Appendix B.

discussion of the priority needs and potential solutions, and was encouraged to participate in action teams that would pursue potential solutions.

## 2.2 Wisconsin Food Processing Industry Needs and Solutions List

The needs and solutions list of the Wisconsin food processing industry was organized into three target areas: Waste Management and Byproduct Utilization, Energy Efficiency and Policy, and Process Enhancement and Elimination of Bottlenecks. Table 2.2 outlines a vision for these Industries of the Future program target areas.

**Table 2.2 Vision for Industry of the Future Program Target Areas**

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**Waste Management and Byproduct Utilization Target:** Food production inevitably leads to the production of large amounts of solid and nutrient laden liquid waste. Sanitation requires a great deal of water. These characteristics of operation present the industry with both significant challenges and potential opportunities. Chief among these is the identification of alternative uses for extraneous plant and animal material, packaging materials, and the production of value-added products, including energy, from these waste streams. Additionally, markets for these products must be identified and / or developed. Technologies that use less water outright or facilitate the reuse of water are also sought.

**Energy Efficiency / Energy Policy Target:** The identification and application of technologies and techniques to reduce energy costs are sought. Additionally, the industry must have access to or the ability to self-generate economical, reliable energy. This desire incorporates both technical and regulatory challenges.

**Process Enhancement / Elimination of Bottlenecks Target:** This target area subsumes several diverse categories that present food processors with challenges. These include physical plant constraints, process improvement needs, access to funds for efficiency improvements, regulatory compliance, transportation, training and other human resources issues.

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Roundtable participants and follow-up reviewers condensed the results of brainstorming sessions into a total of 126 needs. These are divided among the three categories as shown in Table 2.3.

**Table 2.3 Industry Needs within the Target Areas**

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Target Area	Number of Needs
Waste Management and Byproduct Utilization	37
Energy Efficiency and Policy	44
Process Enhancement / Elimination of Bottlenecks	45

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Roundtable results are presented in Tables 2.4, 2.5, and 2.6, producing an outline of needs where innovative solutions could benefit the state food processing industry. The results are available for industry for feedback, and ongoing suggestions are encouraged. The roadmap is a “living” document that will be periodically updated with input from members of IOF partnerships.

Tables 2.4, 2.5, and 2.6 are expansions of Table 2.3. The first column in each table names specific needs identified by roundtable participants and roadmap reviewers. Roundtable participants noted some of the specific needs as priorities. Table 2.4 describes the specific needs by category in the Waste Management and Byproduct Utilization area. Table 2.5 covers Energy needs, and Table 2.6 covers Process needs.

The second column in each table identifies "Potential Solutions" (R&D projects, demonstration, or other activities) to respond to specific needs. The third column allows for reporting the current status of potential solutions listed in column 2 of the roadmap tables. The status designations, abbreviated below, identify the stage of a project in the pathway from research to implementation.

Although the "Potential Solutions" and "Technology Status" columns have not been completely identified at this time, several industry representatives expressed a need for knowing the current status of the many technology development projects ongoing in Wisconsin, the U.S., and internationally. The Wisconsin IOF program has plans for converting these roadmap tables into an on-line database that would be maintained with current status information.

<b>Abbreviation</b>	<b>Technology Status (third column of Tables 2.4, 2.5, and 2.6)</b>
<b>Discuss</b>	Initial discussion to define the problem and assess potential solutions. Section 3 summarizes the results of discussions regarding on the priority industry needs.
<b>Conceptual</b>	Concept stage, including proposed ideas and theories. The next step could be R&D or demonstration.
<b>LT R&amp;D</b>	Longer-term R&D effort, including medium and long-term R&D that takes over three years to reach a demonstration stage.
<b>ST R&amp;D</b>	Short-term R&D effort within three years to reach a demonstration stage.
<b>Demo</b>	Demonstration projects, including pre-commercial trials at host companies.
<b>Bus. Develop.</b>	Business development, including: evaluate demonstration results, refine product or service, establish technical performance, business planning, integrating technologies into packaged solutions, and commercialization. Also includes market assessments and other studies.
<b>Delivery</b>	Deliver the solutions, including outreach such as showcase events, seminars, training, and fact sheets; technical assistance; and financial assistance to spur implementation.

**Table 2.4 Waste Management and Byproduct Utilization**

Needs		Potential Solutions	Status
1.1.	<b>Waste water disposal</b>		
1.2.	<b>Water use reduction/reuse (High Priority)</b>		Discuss
1.2.1.	Process water re-use		
1.2.1.1	Slaughterhouse water reuse		
1.2.1.1	Vegetable rinse water reuse		
1.2.2.	Sanitation (High Priority)		
1.2.3.	Water purification		
1.2.4.	Filtration		
1.2.5.	Treatment		
1.2.6.	Animal/Poultry fat separation		
1.2.7.	BOD reduction/removal		
1.3.	<b>Valued-added products from liquid waste (Priority)</b>		
1.3.1.	Energy production (High Priority)		Discuss
1.3.1.1	Dairy waste to methane production (Priority)		
1.3.2.	Non-energy products		
1.4.	<b>Value-added products from solid food waste (Priority)</b>		
1.4.1.	Alternative uses for fruit and vegetable wastes and other biomass		
1.4.2.	Tools to determine cost effectiveness of by-product use		

Needs		Potential Solutions	Status
1.4.3.	Alternative uses of meat trimmings, fat or spoiled by-products		
1.4.4.	Alternative use of waste products in grease traps		
1.4.5.	Energy production (High Priority)		Discuss
1.4.6.	Non-energy production		
1.4.7.	Conversion of waste to animal feed		
<b>1.5.</b>	<b>Solid Waste – Non-Food</b>		
<b>1.6.</b>	<b>Reduce packaging (High Priority)</b>		
<b>1.7.</b>	<b>Recycling of packaging</b>		
1.7.1.	Plastic		
1.7.2.	Plastic pallets		
1.7.3	Pallet wrap		
1.7.3.	Tray lidding		
1.7.4.	Cardboard		
<b>1.8.</b>	<b>Use of recycled materials</b>		
<b>1.9.</b>	<b>Creation of markets for waste products (Priority)</b>		
<b>1.10.</b>	<b>Creation of clearinghouse for waste or off-spec materials (Priority)</b>		
<b>1.11.</b>	<b>Substitution for hazardous materials</b>		
1.11.1	Reduce use/replacement of VOCs		
<b>1.12.</b>	<b>Land spreading of waste</b>		

**Table 2.5 Energy Efficiency / Energy Policy**

<b>Needs</b>		<b>Potential Solutions</b>	<b>Status</b>
<b>2.1.</b>	<b>Boiler efficiency (Priority)</b>		
<b>2.2.</b>	<b>Motor efficiency</b>		
<b>2.3.</b>	<b>Lighting</b>		
<b>2.4</b>	<b>Refrigeration (Priority)</b>		
2.4.1.	Alternatives to R22 and ammonia (Priority)		
2.4.2.	Efficient technologies		
2.4.3.	Faster cooling of packaged products		
2.4.4.	Subterranean coolers use of winter cold air		
2.4.5.	Cryogenics		
2.4.6.	Defrosting		
<b>2.5.</b>	<b>Compressed air efficiency</b>		
2.5.1.	Compressors		
2.5.2.	Air leak reduction		
<b>2.6.</b>	<b>Cooking</b>		
<b>2.7.</b>	<b>HVAC</b>		
<b>2.8.</b>	<b>Energy audits/surveys (Priority)</b>		
<b>2.9.</b>	<b>Peak reduction strategies and technologies (Priority)</b>		
<b>2.10.</b>	<b>Process changes to reduce energy requirements (Priority)</b>		
<b>2.11</b>	<b>Co-generation</b>		

Needs		Potential Solutions	Status
2.12.	<b>Efficient production of hot water (Priority)</b>		
2.13.	<b>Heat recovery</b>		
2.13.1.	Process		
2.13.2.	Sanitation		
2.13.3.	Ventilation		
2.13.4.	Refrigeration		
2.14.	<b>Back up and distributed generation in food plants</b>		
2.14.1.	Micro turbines		
2.14.2.	Fuel cells		
2.14.3.	Gas engine generators		
2.15.	<b>Engines designed to burn low quality bio-gas</b>		
2.16.	<b>Interconnection for sale of excess power</b>		
2.17.	<b>Biogas cleaning</b>		
2.18.	<b>Access to multiple energy sources (High Priority)</b>		Discuss
2.19.	<b>Fuel switching</b>		
2.20.	<b>Applications for renewable energy</b>		
2.21.	<b>Energy availability (High Priority)</b>		Discuss
2.22.	<b>Reduction of power interruptions</b>		
2.23.	<b>Permitting of waste to energy production</b>		
2.24.	<b>Renewable energy policy</b>		

<b>Needs</b>		<b>Potential Solutions</b>	<b>Status</b>
<b>2.25.</b>	<b>Control of NO<sub>x</sub> and SO<sub>x</sub> emissions</b>		
<b>2.26.</b>	<b>Assess implications of utility restructuring on food processing industry</b>		
<b>2.27.</b>	<b>Energy buying pools</b>		
<b>2.28.</b>	<b>Price volatility</b>		
<b>2.29.</b>	<b>Energy procurement</b>		

Table 2.6 Process Enhancement / Elimination Of Bottlenecks

Needs		Potential Solutions	Status
3.1.	Refurbishment of old and/or urban facilities (Priority)		
3.2.	Working within physical size constraints		
3.3.	Continuous flow, conversion from batch processing		
3.4.	Increased automation (High Priority)		
3.5.	Preventive maintenance strategies		
3.6	Funding and incentives (Priority)		
3.6.1.	Capital for energy or environmental related production changes		
3.6.2.	R&D funds		
3.6.3.	Funds earmarked for small manufacturers		
3.6.4.	Tax incentives		
3.7	Regulatory compliance / relations		
3.7.1.	HACCP – compliance (Priority)		
3.7.1.1.	Lower cost sterilization equipment		
3.7.2.	OSHA		
3.7.3.	PSM		
3.7.4.	USDA		
3.7.5.	FDA		
3.7.6.	DNR		
3.7.7.	Assistance with regulatory compliance		

Needs		Potential Solutions	Status
3.7.8.	Assistance with input into regulatory decision making processes		
3.7.9.	Food security and bio-terrorism		
3.7.9.1.	Monitor policy development		
3.7.9.2.	Potential compliance issues		
<b>3.8</b>	<b>Transportation costs (Priority)</b>		
3.8.1.	Reduction of water to reduce transport costs		
3.8.2.	Sharing of refrigerated trucks (Priority)		
3.8.3.	Reduction of transportation distances		
3.8.4.	Marketing products in proximity to producers		
<b>3.9.</b>	<b>Training</b>		
3.9.1.	Energy efficiency training (Priority)		
3.9.2.	Ammonia handling (Priority)		
3.9.3.	HACCP – training (Priority)		
3.9.4.	Maintenance		
3.9.5.	Shared/Coop training opportunities (Priority)		Discuss
<b>3.10.</b>	<b>Working Conditions / HR Issues (Priority)</b>		
3.10.1.	Indoor air quality		
3.10.2.	Noise reduction		
3.10.4.	Improved bagging equipment – dust reduction		

<b>Needs</b>		<b>Potential Solutions</b>	<b>Status</b>
3.10.5.	Employee health care affordability		
3.10.6.	Employee retention		
3.10.6.	Employee motivation / receptiveness to change (Priority)		
3.10.7.	Employment of W2 workers		
3.10.8.	Employment of speakers of English as a second language		
3.10.9.	Substance abuse		
3.10.10.	Discharge of employees for cause		

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## 3.0 Opportunity Discussion on Industry Needs

The roundtable process that produced the list of industry needs, summarized in Section 2, was followed by a further group discussion of the potential benefits and barriers if priority needs were to be satisfied. The whole roundtable group reviewed the categorized needs and voted by majority on their priority needs:

### **Priority Needs:**

- 1. Water Re-use and Water for Sanitation**
- 2. Energy Production from Waste**
- 3. Alternative Energy Supply – Energy Availability**
- 4. Low Cost Training for Small Manufacturers – Combine / Share**

Using the series of questions in Table 3.1, the facilitator led discussion by smaller groups to identify the benefits, examples and other consequences of addressing these needs.

**Table 3.1 Food Processing Industry Roundtable-Discussion Guide Questions**

- |   |
|---|
| <ol style="list-style-type: none"><li>1. What are the direct benefits to our industry or organizations of directing resources towards this issue or opportunity?</li><li>2. What are the latest advances in this area?</li><li>3. What are the underlying energy issues related to this challenge or opportunity?</li><li>4. What has been tried already that is similar to this, and has it been successful?</li><li>5. Unsuccessful?</li><li>6. What else should be done to move this issue or opportunity forward?</li><li>7. If we can't make headway right now, what additional information do we need that will help us better understand this issue or opportunity?</li><li>8. Who else needs to be involved in order to learn more about or address the issue or opportunity?</li><li>9. What are some "success factors" that would indicate that this opportunity has been addressed well? (We would know this has been worth the effort when...)</li><li>10. What are some ways this group could work together to address this issue or opportunity?</li><li>11. What is exciting about this opportunity?</li></ol> |
|---|

The results of the guided discussion are summarized for each priority need in Tables 3.2 to 3.5.

**Table 3.2 Food Processing Roundtable – Opportunity Discussion Guide – Water Re-use and Water for Sanitation**

<b>Water Re-use and Water for Sanitation</b>	
1.	<p>What are the direct benefits to our industry or organizations of directing resources towards this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Conserve material resources</li> <li>▪ Lower production costs</li> <li>▪ Utility bill will decrease (lower cost for water/lower wastewater production)</li> <li>▪ Reduce potential regulatory regulations</li> </ul>
2.	<p>What are the latest advances in this area?</p> <ul style="list-style-type: none"> <li>▪ In-house pretreatment and post treatment</li> <li>▪ Heat recovery</li> </ul>
3.	<p>What are the underlying energy issues related to this challenge or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Pumping</li> <li>▪ Cleaning</li> <li>▪ Treatment</li> <li>▪ Monitoring</li> <li>▪ Process water in use as sanitation water</li> <li>▪ Heating and cooling</li> </ul>
4.	<p>What has been tried already that is similar to this, and has it been successful?</p> <ul style="list-style-type: none"> <li>▪ Treatment – use of chemicals</li> <li>▪ Re-use of clean-in-place water</li> </ul>
5.	<p>Unsuccessful?</p> <ul style="list-style-type: none"> <li>▪ Treatment and inadequacy of monitoring to determine optimum process</li> </ul>
6.	<p>What else should be done to move this issue or opportunity forward?</p> <ul style="list-style-type: none"> <li>▪ Funding and pilot studies</li> <li>▪ Get regulatory agencies involved</li> </ul>
7.	<p>If we cannot make headway right now, what additional information do we need that will help us better understand this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Knowledge of available technology and human resources</li> </ul>
8.	<p>Who else needs to be involved in order to learn more about or address the issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ DNR</li> <li>▪ USDA</li> <li>▪ Utilities</li> </ul>
9.	<p>What are some “success factors” that would indicate that this opportunity has been addressed well? (We would know this has been worth the effort when...)</p> <ul style="list-style-type: none"> <li>▪ Actual reduction of energy costs, reduced outfall</li> <li>▪ Use of metering in the plant</li> </ul>
10.	<p>What are some ways this group could work together to address this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Share ideas</li> <li>▪ Technology transfer / improve access to technology</li> </ul>
11.	<p>What is exciting about this opportunity?</p> <ul style="list-style-type: none"> <li>▪ The potential for improvement / cost savings / protect material resources</li> <li>▪ Potential for use of innovative technology that could be a model for the nation</li> </ul>

**Table 3.3 Food Processing Roundtable – Opportunity Discussion Guide – Energy Production from Waste**

<b>Energy Production from Waste</b>	
1.	<p>What are the direct benefits to our industry or organizations of directing resources towards this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Saving natural resources</li> <li>▪ Decrease disposal costs</li> <li>▪ Decrease energy costs</li> <li>▪ Possible decrease in regulatory issues</li> <li>▪ Possible P.R. benefits</li> <li>▪ Generate income</li> </ul>
2.	<p>What are the latest advances in this area?</p> <ul style="list-style-type: none"> <li>▪ Manure – methane to sell to utilities via anaerobic digestion; making fertilizer too</li> <li>▪ Heat – recovery methods</li> <li>▪ Air turnoff units</li> </ul>
3.	<p>What are the underlying energy issues related to this challenge or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Regulatory</li> <li>▪ Emissions</li> <li>▪ DNR approval</li> <li>▪ Cost of existing energy</li> <li>▪ Payback (r.o.i); given a 3 yr expected turn - around</li> </ul>
4.	<p>What has been tried already that is similar to this, and has it been successful?</p> <ul style="list-style-type: none"> <li>▪ Selling the by-product from waste materials (e.g. methane gas)</li> <li>▪ Anaerobic digestion</li> </ul>
5.	<p>Unsuccessful?</p> <ul style="list-style-type: none"> <li>▪ Anaerobic digestion – may not be cost effective</li> <li>▪ Incineration abandoned due to emissions</li> <li>▪ Chemical conversion may not work</li> </ul>
6.	<p>What else should be done to move this issue or opportunity forward?</p> <ul style="list-style-type: none"> <li>▪ Commitment from utilities, government, and corporate</li> <li>▪ Beneficial tax codes (otherwise, no incentive)</li> <li>▪ Subsidies to help pay for the longer pay-back time</li> <li>▪ Increase payback threshold expectations of companies (get your \$ back later)</li> </ul>
7.	<p>If we can't make headway right now, what additional information do we need that will help us better understand this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Technical help, research to do bench and pilot scale work; industry partnership to work with University researchers</li> <li>▪ Market research</li> </ul>
8.	<p>Who else needs to be involved in order to learn more about or address the issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Regulatory agencies, state, federal, industry to work together to increase cooperation vs. adversarial stances</li> </ul>

<b>Energy Production from Waste</b>	
9. What are some “success factors” that would indicate that this opportunity has been addressed well? (We would know this has been worth the effort when...)	<ul style="list-style-type: none"><li>▪ Come up with one successful project that would provide benefit across the industry</li><li>▪ Generate a proposal for DOE to fund</li></ul>
10. What are some ways this group could work together to address this issue or opportunity?	<ul style="list-style-type: none"><li>▪ Follow up to this meeting</li><li>▪ Generating an active network</li></ul>
11. What is exciting about this opportunity?	<ul style="list-style-type: none"><li>▪ Synergies among a number of stakeholders – identify them</li></ul>

**Table 3.4 Food Processing Roundtable – Opportunity Discussion Guide – Alternative Energy Supply**

<b>Alternative Energy Supply – Energy Availability</b>	
1.	<p>What are the direct benefits to our industry or organizations of directing resources towards this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Maintaining economic viability</li> <li>▪ Financing for alternative “inside the fence” generation</li> <li>▪ Reliable, affordable energy</li> </ul>
2.	<p>What are the latest advances in this area?</p> <ul style="list-style-type: none"> <li>▪ Fermentable sugars</li> <li>▪ Gasohol</li> <li>▪ Wind energy</li> <li>▪ Biogas</li> </ul>
3.	<p>What are the underlying energy issues related to this challenge or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Wisconsin is a net importer of electricity</li> <li>▪ Electric transmission constraints</li> <li>▪ Generation capacity within Wisconsin</li> <li>▪ Fuel diversity in new generation</li> <li>▪ Regulatory issues</li> </ul>
4.	<p>What has been tried already that is similar to this, and has it been successful?</p> <ul style="list-style-type: none"> <li>▪ Gas fired co-gen</li> </ul>
5.	<p>Unsuccessful?</p> <ul style="list-style-type: none"> <li>▪ Waste to alcohol</li> </ul>
6.	<p>What else should be done to move this issue or opportunity forward?</p> <ul style="list-style-type: none"> <li>▪ Legislation to streamline siting of cogen</li> <li>▪ National energy policy for seed money</li> <li>▪ Alternative renewable crops for fuel</li> </ul>
7.	<p>If we can’t make headway right now, what additional information do we need that will help us better understand this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ No information clearinghouse, need better web system</li> </ul>
8.	<p>Who else needs to be involved in order to learn more about or address the issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Universities</li> <li>▪ USDA</li> <li>▪ Food industry people to help educate legislators</li> <li>▪ Food safety</li> </ul>
9.	<p>What are some “success factors” that would indicate that this opportunity has been addressed well? (We would know this has been worth the effort when...)</p> <ul style="list-style-type: none"> <li>▪ Number of inside the fence users</li> <li>▪ New transmission lines</li> <li>▪ New, diverse fuel, generation</li> </ul>

<b>Alternative Energy Supply – Energy Availability</b>
<ul style="list-style-type: none"><li>▪ Measure food processing by-product used for fuel</li></ul>
10. What are some ways this group could work together to address this issue or opportunity? <ul style="list-style-type: none"><li>▪ Unknown currently</li></ul>
11. What is exciting about this opportunity? <ul style="list-style-type: none"><li>▪ Environmentally friendly</li><li>▪ Re-use</li></ul>

**Table 3.5 Food Processing Roundtable – Opportunity Discussion Guide – Low Cost Training for Small Manufacturers**

<b>Low Cost Training for Small Manufacturers – Combine / Share</b>	
1.	<p>What are the direct benefits to our industry or organizations of directing resources towards this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Reduce costs – consistent</li> <li>▪ Creates standards for food industry to use</li> <li>▪ Creates efficiencies (less duplication of effort)</li> <li>▪ Makes us get the training</li> </ul>
2.	<p>What are the latest advances in this area?</p> <ul style="list-style-type: none"> <li>▪ Web based training</li> <li>▪ Value added training from vendors</li> </ul>
3.	<p>What are the underlying energy issues related to this challenge or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Process efficiencies</li> <li>▪ Reduction in re-work</li> </ul>
4.	<p>What has been tried already that is similar to this, and has it been successful?</p> <ul style="list-style-type: none"> <li>▪ Web based</li> <li>▪ Vendor</li> </ul>
5.	<p>Unsuccessful?</p> <ul style="list-style-type: none"> <li>▪ Unknown currently</li> </ul>
6.	<p>What else should be done to move this issue or opportunity forward?</p> <ul style="list-style-type: none"> <li>▪ Buy in – show \$ value to employer</li> <li>▪ Create awareness that this is an issue</li> <li>▪ Employee / union buy in</li> <li>▪ Marketing to companies and decision makers</li> </ul>
7.	<p>If we can't make headway right now, what additional information do we need that will help us better understand this issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ Unknown currently</li> </ul>
8.	<p>Who else needs to be involved in order to learn more about or address the issue or opportunity?</p> <ul style="list-style-type: none"> <li>▪ UW-Madison</li> <li>▪ Food vendors</li> <li>▪ Technical colleges</li> <li>▪ Trade organizations</li> </ul>

**Low Cost Training for Small Manufacturers – Combine / Share**

9. What are some “success factors” that would indicate that this opportunity has been addressed well?  
(We would know this has been worth the effort when...)
- Less turnover
  - Less re-work
  - Higher profits
  - Improved safety
  - Employee satisfaction
  - Efficiency
10. What are some ways this group could work together to address this issue or opportunity?
- Unknown currently
  - What is exciting about this opportunity?
  - We all need this – we all have the same problem
  - Can make a real impact on the profitability of the company

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## Appendix A: Quick Resource Directory for Wisconsin Industry

### Partnership Resources

#### General

##### **Focus on Energy — Industrial Programs – [www.focusonenergy.com](http://www.focusonenergy.com) 1-888-291-6434**

Focus on Energy is a statewide energy efficiency and renewable energy program authorized by the Wisconsin legislature and administered by the Wisconsin Department of Administration. The Major Markets Segment of Focus on Energy is comprised of a team of independent subcontractors, ready to assist the needs of the commercial, industrial and agricultural energy customers of Wisconsin. There are two industrial programs, outlined below.

The Wisconsin Industries of the Future program provides technical and financial assistance to encourage innovative projects that reduce process energy intensity or expand use of renewable energy. The program targets projects that can apply to multiple sites across an industry, deliver environmental benefits, improve statewide electric reliability, support business development in Wisconsin or address a competitive need recognized as an industry priority.

The Industrial Program of Focus on Energy helps companies develop an energy plan based on a survey of the facility that identifies a range of saving opportunities. Industrial Program Energy Advisors then guide companies through the process of translating the plan into actions. Technical services and financial resources are available to make sure companies have the resources needed to implement the plan.

##### **U.S. Department of Energy, Office of Industrial Technology— Industries of the Future [www.oit.doe.gov](http://www.oit.doe.gov)**

OIT maximizes its technology investments by supporting collaborative R&D partnerships in nine vital industries. These nine industries necessarily use large amounts of heat and energy to physically or chemically transform materials. Collectively, they supply 90% of the materials vital to our economy and produce \$1 trillion in annual shipments. The OIT web site provides complete information on available technical and financial resources.

##### **U.S. Department of Energy, Office of Industrial Technology— BestPractices – [www.oit.doe.gov](http://www.oit.doe.gov)**

BestPractices, a program of the U.S. Department of Energy's (DOE) Office of Industrial Technologies (OIT), works with industry to identify plant-wide opportunities for energy savings and process efficiency. The BestPractices program offers a variety of tools and tip sheets for industry in the following areas:

- Motors and Pumps
- Compressed Air
- Steam Heat Systems
- Plant-wide Assessments

**Energy Center of Wisconsin – [www.ecw.org](http://www.ecw.org)**

ECW is a private, nonprofit organization dedicated to improving energy efficiency in Wisconsin. They provide energy-efficiency programs, research, and education to residents, businesses, industry and government.

**The Industrial Assessment Center (IAC) at the University of Wisconsin – Milwaukee —Ph: (414) 229-4052**

The IAC at the University of Wisconsin – Milwaukee can help you reduce your energy costs, minimize waste handling costs and improve profits. This service is free to companies whose major products are within SIC Codes of 20 and 39. Besides restrictions on SIC, your company must be located within a 150-mile radius of Milwaukee, and also satisfy at least 3 of the following 4 criteria:

- have gross annual sales of \$75 million or less;
- consume energy at a rate of \$75,000 to \$1.75 million a year;
- have a working force of less than 500; and
- do not have in-house expertise to perform the assessment.

**Manufacturing Assessment Center — [www.commerce.state.wi.us/mt/MT-FAX-0902.html](http://www.commerce.state.wi.us/mt/MT-FAX-0902.html)**

The Manufacturing Assessment Center provides broad-based assessment of manufacturing operations and develops assessment protocols for use by manufacturing extension organizations. We participate with other Wisconsin Manufacturing Extension Partnership (WMEP) partners and employees in assessing the operations of small and medium manufacturers and assisting them in developing a plan of action to increase their competitiveness.

**The Northwest Wisconsin Manufacturing Outreach Center — <http://nwmoc.uwstout.edu/>**

The Northwest Wisconsin Manufacturing Outreach Center provides operations assessments, technology training, and on-site assistance to help firms in northwest Wisconsin modernize and streamline their manufacturing processes.

**The UW Extension Solid and Hazardous Waste Education Center — [www.uwex.edu/shwec](http://www.uwex.edu/shwec)**

The UW Extension Solid and Hazardous Waste Education Center (SHWEC) was created to provide waste reduction services to waste generators in Wisconsin. The Center has offices in Madison, Milwaukee, Stevens Point, and Green Bay. This is a statewide service, open to all industrial sectors.

**UW College of Engineering: Engineering Professional Development – <http://epdweb.engr.wisc.edu/>**

EPD offers more than 400 courses annually in engineering, architecture, management and other technical areas. These courses provide the skills and knowledge needed to master new approaches and solve on-the-job problems. They are offered on the UW-Madison campus and other locations around the nation.

**UW College of Engineering; Office of Engineering R&D and Technology Commercialization – [www.engr.wisc.edu/services/ortt/](http://www.engr.wisc.edu/services/ortt/)**

This office is the primary contact point for business, industry and government to access technical capabilities in engineering. The staff develops relationships between industry and college faculty, students, research centers and consortia, creating new opportunities for interaction and cooperative projects.

**UW Graduate School – University- Industry Relations – [www.wisc.edu/uir](http://www.wisc.edu/uir)**

UIR works to establish productive relationships between the private sector and the University of Wisconsin-Madison. UIR staff work to build partnerships in basic and applied research, promote technological innovation and assist in technology transfer for the social good, and foster local, regional and national industrial and economic development.

**Wisconsin Department of Commerce – [www.commerce.state.wi.us/MT/MT-COM-2000.html](http://www.commerce.state.wi.us/MT/MT-COM-2000.html)**

The Wisconsin Department of Commerce has a broad range of financial assistance programs to help businesses undertake economic development. Their quick reference guide identifies these programs and selected programs from other agencies.

**Wisconsin Department of Natural Resources— Bureau of Cooperative Environmental Assistance (CEA) – [www.dnr.state.wi.us/org/caer/cea/](http://www.dnr.state.wi.us/org/caer/cea/)**

CEA helps Wisconsin industries with coordinating and integrating pollution prevention, waste reduction, business recycling, small business clean air assistance, hazardous waste minimization and other voluntary approaches to environmental protection within DNR.

**Wisconsin Manufacturing Extension Partnership – [www.wmep.org](http://www.wmep.org)**

WMEP is the manufacturer’s resource for improving productivity, profitability and competitiveness. WMEP provides manufacturing, technical and management assistance to Wisconsin’s small and midsize manufacturers, delivering bottom line improvements.

**Wisconsin Small Business Clean Air Assistance Program – [www.commerce.state.wi.us/MT/MT-CA-sbcaap.html](http://www.commerce.state.wi.us/MT/MT-CA-sbcaap.html)**

The SBCAAP helps small businesses understand and comply with air pollution regulations and air permitting requirements. Serving as a free, confidential, non-regulatory resource to smaller businesses, the SBCAAP staff provides technical assistance, creates fact sheets, informational brochures and other publications, answers compliance questions, conducts on-site consultations, responds to permitting inquiries, coordinates environmental compliance workshops and directs businesses to other pertinent assistance providers.

## **Food Processing Specific**

**Institute of Food Technologists – [www.ift.org](http://www.ift.org)**

The Institute of Food Technologists advances the science and technology of food through the exchange of knowledge. They publish news, articles, and other information of interest to food scientists and food technologists including the journals *Food Technology* and *Journal of Food Science*.

**UW-Madison Babcock Institute for International Dairy Research and Development — <http://babcock.cals.wisc.edu/>**

The Babcock Institute serves as a crossroads for international dairy activities at the University of Wisconsin. Their strategy is to enhance the competitiveness of the US dairy industry by drawing on global perspectives and to strengthen dairy industries around the world by sharing US expertise.

**UW-Madison Food Research Institute -- [www.wisc.edu/fri/](http://www.wisc.edu/fri/)**

The Food Research Institute, in the College of Agricultural and Life Sciences, University of Wisconsin-Madison, is both a research institute and an academic department, the Department of Food Microbiology and Toxicology.

**UW-Madison Center for Dairy Research — [www.cdr.wisc.edu/](http://www.cdr.wisc.edu/)**

The Center links its staff and University faculty, students and the dairy/food industries to address key issues resulting in transfer of technology and communication of information.

**UW-Madison Wisconsin FIRST: Food Industry Research, Service and Training — [www.wisc.edu/foodsci/first/](http://www.wisc.edu/foodsci/first/)**

This team is a part of the UW Cooperative Extension's Agriculture and Natural Resources program area designed to help Wisconsin's food processors keep pace in an ever more competitive food industry.

**The Industrial Refrigeration Consortium (IRC) – [www.irc.wisc.edu](http://www.irc.wisc.edu)**

The IRC helps industry improve the safety, efficiency, and productivity of their industrial refrigeration systems. They specialize in the following refrigeration issues: process cooling, process controls, facility energy surveys, manufacturing process assessments, and research & demonstration. Industries targeted include food & kindred products (SIC 20) and chemicals & allied products (SIC 28).

**The Midwest Food Processors Association, Inc. (MWFPA) – [www.mwfpa.org](http://www.mwfpa.org)**

The Midwest Food Processors Association (MWFPA) is a legislative voice of the food processing industry in the Midwest. Information is furnished on government and agency regulations, technical matters and general food processing industry affairs. Recently processor membership has been opened to all food processors. The MWFPA has 16 food processor members operating 70 facilities in Illinois, Minnesota, and Wisconsin. It also has over 150 Associate Members consisting of firms in allied industries.

MWFPA maintains an office in Madison, Wisconsin, and carries on supportive activities through its professional staff. Through advisory committees, the MWFPA supports vocation school instruction for plant and field equipment maintenance mechanic apprentices, technical institute instruction leading to an associate degree in food manufacturing technology, university instruction leading to degrees in various branches of agriculture and food science, and short courses in related subjects. Workshops, seminars and round tables on a variety of industry concerns are offered on a regular basis.

MWFPA makes annual grants to universities to support research affecting the industry on crops, processing methods, and waste disposal. MWFPA hosts two Expositions:

- **AGRI-SAFETY AND PROCESSING CROPS CONFERENCE/AG EXPO** - held in February, is a 2-day show. Exhibitors are suppliers with agriculture products and/or services supporting the industry.
- **BIENNIAL MIDWEST EXPO** - held in early December of each odd numbered year, is a 2-day show inviting agriculture, processing equipment, and supply companies to exhibit. Held in conjunction with that year's annual convention.

## Appendix B: The Wisconsin Food Processing Industry Assessment

### Description

#### Wisconsin Summary Statistics

Manufacturing establishments in Food and Kindred Products (SIC 20 or NAICS 311) process raw animal and plant materials into products for consumption. This industry manufactures many kinds of products including dairy, meat and poultry, vegetables and fruits, bakery products, condiments, and beverages.

The food processing industry employs over 63,000 people in Wisconsin and accounts for over \$21 billion in annual sales. As Table 1 shows, small firms account for nearly two-thirds of the total firms in Wisconsin. However, it should be noted that the few large firms that make up just 6 percent of the total establishments in the food processing industry employ over half of the food processing workers in the state; the small firms employ less than 10 percent.

**Table 1**  
**Size and Employment Distribution for the Wisconsin Food Processing Industry**

Food Processing Size Category	Small Single	Small Multiple	Medium 25–249 Employees	Large >249 Employees	State Total
	1–24 Employees				
% of WI food processing establishments	44%	18%	32%	6%	829
% of WI food processing employees	4%	2%	38%	55%	63,314

Source: 1997 Economic Census Data (U.S. Department of Commerce 1999)

The food processing industry uses 2,320 GWh of electricity and 32.4 trillion Btu of natural gas each year, making this industry one of the larger energy consumers in Wisconsin. Table 2 provides additional detail.

**Table 2**  
**Energy Consumption Statistics for the Wisconsin Food Processing Industry**

End-User Category	Energy Use			Energy Use per Employee	
	Electric (GWh)	Electric (10 <sup>12</sup> Btu)	Natural Gas (10 <sup>12</sup> Btu)	Electric (MWh)	Natural Gas (10 <sup>6</sup> Btu)
Food processing industry	2,320	7.9	32.4	36.6	511
All industrial industries	18,384	63	179	34.1	332

Sources: Dick Kliebenstein, personal communication<sup>6</sup>, and Manufacturing Energy Consumption Survey (U.S. Department of Energy 1993)

### Summary of Sources

This profile is based on analysis of secondary sources described at the end, as well as interviews with industry observers and end-users in Wisconsin’s food processing industry. For statistics in this profile taken from secondary sources based on SIC codes, interviews were targeted at the major group definition of the food processing industry associated with SIC Code 20: Food and Kindred Products. Our respondents represented factories, dairy-processing plants, vitamin manufacturers, and an industry trade association.

### Business Trends

Several trends in the food processing industry have recently emerged, including:

- *Increased federal regulation of the food processing industry* — After a series of *E. coli* concerns in the 1990s, the federal government has given unsolicited attention to the food processing industry. According to *Financial Times*, the industry receives a “disproportionate number of the regulatory battles being fought” (Jones 2001).
- *Rapid consolidation of food processors* — Though experiencing a drop in the first half of 2001, over the past few years the overall food business has seen tremendous growth in the number of mergers and acquisitions. The industry experienced 295 mergers and acquisitions in the first 6 months of 2001, as compared to 350 for the same period in 2000, and 386 in 1999. Food processing firms underwent 87 of those transactions, accounting for 27 percent of the total (Food Institute 2001).
- *Customer relationship management* — Companies are turning to CRM, a focused management approach to meeting customer and consumer needs through database technology, to improve their operations. This strategy is designed to increase responsiveness to inquiries, provide tailored information to customers, and generally improve customer service (Stanton 2001).

### Key Strategies

There appears to be diverse approaches to business success in Wisconsin’s food processing industry. An industry observer from the Midwest describes the food processing industry as one where success depends on being the low-cost provider in the market. However, only two of the five end-users interviewed for this profile, both large and

<sup>6</sup> Wisconsin Public Service Commission, referencing “Advanced Plan 7.” Madison.

small firms, agree with that assessment. From a list of possible strategies, each suggestion was selected by at least one respondent. The strategies include:

- Being the low-cost provider.
- Being first to market with new or technically improved products.
- Capturing market share through effective marketing and distribution.
- Establishing and defending a strong market niche.

### **Opportunities and Investments**

Our largest end-user respondents believe opportunities for increased profitability in the food processing industry will come from industry consolidations to reduce costs and capture economies of scale. One firm has recently purchased a new plant that enabled the company to introduce a new product line. Increased distribution capacity, product development, and marketing to gourmet or special tastes were considered effective strategies to maintain or increase profitability among medium- and small-sized customers.

Purchase of new equipment was cited by two-thirds of the end-users as an investment strategy to capture new opportunities. Hand in hand with purchasing new equipment is the reduction of labor costs throughout the process. Many food processors in Wisconsin felt that productivity gains would create improvements in profitability.

An industry observer noted that industry growth might also come from utilizing trade opportunities with countries overseas. In addition, using improved packaging and providing easier cuts of poultry and meat provide more convenience and better value for consumers and has been a successful new tactic to increase market share.

## **Key Challenges**

### **Outlook Prior to September 11**

Respondents fall into two major camps when considering challenges to their industry. Among the larger firms, respondents are concerned with keeping costs of raw materials down. They are troubled by consolidations in the food processing industry that increase competition with lower-cost products. The main challenges to these respondents are other competitors in the market.

The medium-sized respondents expressed apprehension about competing against “low-cost knockoffs” and trying to sell their products in a “slowed economy where consumer purchases are more economical.” A small-sized firm is concerned about the stability of the industry in which their products are sold. In these cases, medium and small food processors are concerned with the demand for their product, rather than the nature of competition in the industry.

Strategies for dealing with these threats are fairly diverse within the food processing industry, perhaps reflecting their varied business strategies for increased profitability. Some firms are turning to increased investment in equipment; others are buying and expanding plants to increase capacity. Still, others choose to address product quality to increase “consumer value” for their customers. An industry observer noted an increase in cooperative advertising, such as the "Fresh Isn't Always Better" and “Got Milk?” campaigns.

### **Effect of September 11 Attacks**

Perceptions of the September 11 attacks are mixed. Some respondents see a slowdown in the near term but do not anticipate any long-term effects. Others are concerned but cannot discern what may occur in the long term. One respondent said that his firm will “do better in a recession, when some people treat themselves to food.” An industry observer explained that the food processing industry is relatively stable, since “people always need to eat” and hopes that stay-at-home meals might be emphasized.

### **Environmental Issues**

Eighty-three percent of respondents cite one major environmental concern for the food processing industry: wastewater treatment and disposal. To address these concerns, respondents are making the process more efficient, improving pre-treatment plants, and trying to increase the amount of land available for wastewater spreading. Twenty percent of the firms surveyed feature environmental stewardship in their marketing materials or corporate communications.

### **Investment Decision Processes**

Two-thirds of the firms surveyed participate in a capital budgeting process, accounting for the large firms. Their capital budgets are organized annually, with the exception of one firm that evaluates its budget on a continual basis. The budgeting process tends to cover all facilities in the organization. All large capital expenditures are budgeted, including production equipment and investments in information technology. The smaller food processing firms do not go through a capital budgeting process and will typically identify and evaluate expenditures with “no elaborate process,” as stated by the owner of a respondent firm. One respondent described his company’s equipment-buying process: “When a lot of money is put into repairs, we try to replace it.”

The lowest-cost project to require an explicit investment decision ranged in value from \$2,500 to \$100,000; two respondents were not able to give a specific number value. In the medium and large organizations, the organization of the capital improvements process is usually done by a committee, with representation from plant engineers, managers, and upper management. The final decision lies with the top executives of the company. In smaller firms, the owners or partners are responsible for both organizing the capital improvements process and authorizing decisions.

Financial and planning techniques tend to look at the short- and long-term recovery rates and the state of profitability in the organization. Respondents fund capital expenditures with cash from operations, when it is available, or use a working capital line from a bank when cash is short. For the largest expenditures, some firms turn to asset leasing.

## **Potential Role of Energy Efficiency**

### **Importance of Energy and Energy Efficiency**

According to an industry observer, energy is important to the food processing industry, particularly for freezing operations. Although the majority of respondents were not able to estimate how much their company spends on energy, those who could make an approximation suggested an average of 10 percent of annual operating costs.

One industry observer mentioned that interest in managing energy costs was “large and getting larger.” He noted, “Almost every organization has some form, either at the corporate or plant level. It may be the plant manager or a corporate job, but everyone is involved.” Some firms are turning to consultants for additional guidance.

Two-thirds of the end-users have undertaken projects with an explicit goal of energy reduction in the past 2 years. In all cases, energy reduction was the main purpose of the project. These projects included:

- Changes to energy-efficient lighting;
- Placing automatic switches on lights;
- Installing wall insulation; and
- Replacing older equipment with more efficient models.

These renovations have been successful in reducing energy costs, as well as increasing capacity, reliability, and improving the quality of lighting in the facilities.

Table 3 examines results taken from the Major Markets omnibus survey conducted for the Baseline Market Research Wisconsin Focus on Energy (XENERGY 2001), which serve as further indicators of interest and activity in energy efficiency. Respondents in the food processing industry report considerably higher interest in energy management, with both higher numbers of firms assigning this responsibility to an individual or group, and with equal or larger numbers of people involved in energy-management activities, compared to general industry or the overall energy-intensive industries.

However, though food processing firms have undertaken significantly more capital projects in the past 2 years than firms in other industries, on average only seven percent of the projects were reported to have energy efficiency as a primary goal. With almost three-quarters of the food processors reporting energy costs as a criterion for selecting equipment, it is possible that energy efficiency is an implicit, rather than explicit, goal for the industry.

**Table 3**  
**Indicators of Energy-Efficiency Interest and Activity in the Wisconsin Food Processing Industry**

Indicator of Energy-Efficiency Interest / Activity	WI Industries of the Future	General Industrial	Food Processing
Have person or group with assigned responsibility for energy management	35%	25%	40%
Average number of persons assigned to energy management (when at least 1)	2	1	2
Have a budget for energy-management activities	13%	8%	17%
Have energy cost-reduction goals	38%	39%	38%
Undertook capital projects >\$10,000 in past two years	28%	17%	33%
Average percent of capital projects (>\$10,000 in past two years) with energy efficiency as primary goal	22%	20%	7%
Used energy-efficient equipment in capital projects:			
In all cases	28%	81%	7%
In most cases	51%	9%	24%
Use energy costs as a criterion in selecting equipment	51%	62%	71%
Equipment purchase policies <i>require</i> consideration of energy efficiency	15%	10%	10%
Equipment purchase policies <i>give preference</i> for energy efficiency	28%	19%	34%

Source: Baseline Market Research Wisconsin Focus on Energy (XENERGY 2001). The Wisconsin Industries of the Future included in this comparison group are Forest Products, Metal casting, Printing, Chemicals and Plastics, Food Processing, and Glass.

### Energy Investments Comparison with General Decision-Making Process

Of the firms that made energy-efficient renovations in the last 2 years, 67 percent were planned through the capital budgeting process. All renovations were approved using the same evaluation methods and criteria as other capital investments made at that time.

### Involvement with Previous Programs

Two-thirds of respondents were familiar with energy-efficiency programs offered by the Wisconsin utilities. This group included large- and medium-sized firms and one industry observer; none of the small firms was familiar with energy-efficiency programs offered by their utilities. Of those with knowledge of energy-efficiency programs, two-thirds of respondents participated in a utility’s program. These figures are higher than those reported in the Baseline Market Research Wisconsin Focus on Energy (XENERGY 2001), which are shown in Table 4. This study demonstrates that although food processors’ knowledge of programs and resources are on par with other energy-intensive industries and with the general industry, their participation is far less than expected.

**Table 4**  
**Recognition and Use of Energy-Efficiency Programs by the Wisconsin Food Processing Industry**

Indicator of Energy-Efficiency Program Awareness and Use	WI Industries of the Future	General Industrial	Food Processing
Are aware of programs or resources in Wisconsin designed to promote energy efficiency	27%	28%	28%
Of those aware: participated in utility programs	29%	0%	0%
Of those aware: participated in Focus on Energy	5%	0%	0%

Source: Baseline Market Research Wisconsin Focus on Energy (XENERGY 2001)

The main reason given in interviews for not participating was “not enough energy cost savings available.” An industry observer noted, “[Our members] work with their reps, but it depends on the program. Our members won’t participate in curtailable power because they can’t have limited power in the summer.” Reliability of energy supply is an extremely sensitive issue for the food processing industry, given the potential for food spoilage without constant refrigeration and completion of the packaging process.

Programs that participants have used in the past included rebates for energy-efficient upgrades, such as motor replacement, lighting replacement, and receiving a tune-up for a boiler. On average, respondents found these programs to be helpful in characterizing potential projects in terms of their benefits and costs to the organization. Program participants did not consider the aspect of identifying contractors to carry out the projects helpful.

## Opportunities

There is a good amount of potential gains for energy efficiency in Wisconsin’s food processing industry. Respondents were asked to assign a value for the usefulness a variety of energy-efficiency programs would be to their organization.

Overall, end-users believed that many program attributes would have some use to their organization. They were particularly receptive to two program offerings: Providing case studies of successful projects and benchmarking of energy use in similar facilities. Considered somewhat useful and following in popularity were rebates upon purchase of energy-efficient equipment, financial incentives for use in energy-performance contracts, and rebates for use of energy-efficient designs in new construction.

Directories of contractors and designers who specialize in energy-efficient installations and an energy audit of the facility were deemed less useful. Least useful to respondents was technical information on how to identify and implement energy-efficiency projects in the facility.

One respondent observed, “The food processing industry is not that diverse. There are not such broad ways to apply energy savings. There is equipment out there, different things plants can do, but it would be financing that would be the biggest thing [to encourage our participation in energy-efficiency programs].” An industry observer explained, “We have pragmatic and conservative members. They need to see where they will save money with hard data. Paybacks are often too long: 12 to 15 years. Two years is their payback horizon.” Given the homogeneity of the food processing industry, particularly for the largest firms, it is not surprising that they respond most strongly to case studies and benchmarking data. However, when asked what will make their organization more likely to participate

in programs, all asked for increased financing. The most challenging task may be to find returns on energy-efficient projects that will capture the interest or creativity of industry leaders.

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### Interviews

A total of six interviews were completed with business and industry observers. Table 5 summarizes the interview respondents.

**Table 5**  
**Wisconsin Food Processing Industry Interview Respondents**

End-Users	Size	Type of Business	Location
A	Small	Manufacturer	Lancaster, WI
B	Medium	Dairy processor	Oconto Falls, WI
C	Medium	Food processor	Wrightstown, WI
D	Large	Dairy processor	Spencer, WI
E	Large	Food processor	Plover, WI
Industry Observers			
1	Midwest Food Producer’s Association	Represents food processors’ interests in 3 states	Madison, WI

## Appendix C: Miscellaneous Reference

### Acknowledgements

This report exists because of the generous contributions of the industries, individuals, and organizations listed below.

<b>2002 Wisconsin Food Processing Roundtable</b>		
<b>April 30, 2002 Attendee List</b>		
	<b>Attendee</b>	<b>Affiliation</b>
Jane	Aldrich	UIR-CALS U.W.-Madison
Tom	Andringa	Specialty Ingredients
Randy	Barr	LSI - New Glarus Foods
Dennis	Beckley	Bush Brothers & Co.
Karen	Bender	Nestlé's
Tom	Benell	PBBS Equipment Corporation
Ron	Bichel	Kusel Equipment Company
Jim	Bloom	Bloom & Associates
Mike	Bown	Level Valley Creamery
Scott	Broesch	Clasen Quality Coatings, Inc
Darin	Davis	International Food Solutions
Geoff	Dean	Del Monte Foods
Jim	Elleson	Industrial Refrigeration Consortium
John	Exner	Midwest Food Processors Association
Bill	Frederiksen	Neesvig Purveyors
S	Gunasekaran	University of Wisconsin - Madison
Les	Ison	Foremost Farms
Todd	Jekel	Industrial Refrigeration Consortium
Jerry	Kikkert	Animix, LLC
Brian	Klepke	Gold'N Plump Poultry
Paul	Kowalis	Xcel Energy
Roy	Lambrecht	Agrilink Foods, Inc
Chuck	Lefebvre	Green Bay Cheese Company
Barry	Levnson	Mount Horeb Mustard Museum
Eric	Lind	Jack Link's Beef Jerky
Ken	Metz	Silver Spring Gardens
Bernie	Moen	Saputo Cheese USA
Karl	Orlofski	Pinas Company
Kelly	Paffel	Plant Support & Evaluations, Inc.

<b>2002 Wisconsin Food Processing Roundtable</b>		
<b>April 30, 2002 Attendee List</b>		
Don	Penly	Chiquita Processed Foods
Mark	Raabe	University of Wisconsin - Madison
Jim	Russell	Del Monte Foods
Bob	Rutschow	Gold'N Plump Poultry
Jim	Schwarzhoff	Lakeside Foods
Dennis	Swearingen	McCain Foods
Kim	Wall	Baensch Food Products Co
Dave	Wedl	Standard Process
Robert	Wills	Cedar Grove Cheese Inc.
Mike	Zeman	Wis-Pak
Jiahna	Zhou	University of Wisconsin - Madison

Participants representing Focus on Energy included Malcolm Jeffris (facilitator), Preston Schutt, Kelly Kavanagh, Kevin Grabner, Richard Hasselman, and Ron Wroblewski.