



**Guidebook to
Energy-Related
Resources for the
Food Industry**

Guidebook to Energy-Related Resources for the Food Industry

Coordinated by:



October 2005

ACKNOWLEDGEMENTS

Many people have contributed to the creation and publishing of this document. Special thanks are extended to the individuals and companies noted below.

- Iowa Energy Center, Ames, especially Bill Haman, P.E., Industrial Program Manager.
- Industrial Assessment Center at Iowa State University, Ames.
- Anderson Erickson, Des Moines, especially Norm Dostal, Frank McDowell, and Bruce Schultz for allowing the project team to visit their site while developing the refrigeration section.
- General Mills, Cedar Rapids, especially John Burgess, Paul Lemke, Greg Godsey, and Mark Hindman for allowing the project team to visit their site while developing the materials for the steam section.
- Tyson, Waterloo Complex especially Tim Schelle and Ed Albert (and Angela Wakeland in Madison, NE) for allowing the project team to visit their site while developing the steam and refrigeration sections.
- George Briley, Technicold Services, Inc., San Antonio, TX for his contributions to the refrigeration section.
- Kelly Paffel, Plant Support & Evaluation, Inc., Naples, FL for his contributions to the steam section.
- Ronald Cox, Director CIRAS, Iowa State University Extension
- Alexandre Kisslinger Rodrigues, CIRAS, Iowa State University Extension.
- Tim Sullivan, CIRAS, Iowa State University Extension.

1. Introduction

DEFINITION OF FOOD PROCESSING

Food processing is defined as converting edible raw materials into higher value consumer food products. The conversion process utilizes significant amounts of labor, machinery, and energy. In addition, it relies increasingly on scientific knowledge to both improve food quality and safety, and to reduce production costs.

ENERGY CONSUMPTION

Food processing is an energy intensive activity. In 1998, it consumed 7%—more than 213 trillion Btu—of the total electricity used nationwide by the manufacturing sector.

According to the American Council for an Energy Efficient Economy, less than 8% of the energy used by manufacturing is for non-process uses such as facility heating/cooling, lighting, ventilation, etc. Therefore, managers who want to reduce energy costs must focus on process-related uses.

PURPOSE OF THIS PUBLICATION

This Guidebook is an excerpt of a larger publication, *Energy-Related Best Practices: A Sourcebook for the Food Industry*, which was funded by a grant from the Iowa Energy Center. The purpose of that publication is to introduce food processors to money-saving best practices as well as to identify resources that can be of assistance in helping food processors manage their energy costs.

The *Sourcebook* contains nine chapters: Introduction; Energy Management; Energy Cost Structure; Mixing; Separation; Drying; Process Heating; Refrigeration; and Industrial Air Handling. There are also appendices that provide information on: Steam; Lighting; Compressed Air; and, Motors and Pumps/Fans. Each chapter and appendix concludes with a section that identifies resources for food processors. All of the resources are consolidated into a final appendix, which is reprinted here for easy dissemination to the Food Industry.

To obtain the publication, *Energy-Related Best Practices: A Sourcebook for the Food Industry*, visit the webpage www.ciras.iastate.edu/publications/EnergyBP-FoodIndustry/ or contact CIRAS office in Ames by phone at (515) 294.3420.

Resources

PRINTED MATERIAL

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The U.S. Department of Energy maintains an extensive listing of publications and articles that provide information on best practices and standards. These publications can be found in a publications library site (www.oit.doe.gov/bestpractices/library.shtml).

ON-LINE TOOLS

Alliance to Save Energy: www.ase.org

Bonneville Power Administration: www.bpa.gov

The Carbon Trust: www.thecarbontrust.co.uk

Publications: www.thecarbontrust.co.uk/energy/pages/publication_search.asp

Compressed Air Challenge: www.compressedairchallenge.org

Earle, R.L., Unit Operations in Food Processing:

www.nzifst.org.nz/unitoperations/index.htm

Energy Information Bridge: www.osti.gov/bridge

Energy Manager Training: www.energymanagertraining.com/new_index.php

Energy Matters: www.oit.doe.gov/bestpractices/energymatters/energy_matters.shtml

Energy Services, Energy Solutions Database: www.energyexperts.org/energy_solutions

Energy Star for Manufacturers: www.energystar.gov/index.cfm?c=manuf_res.pt_manuf

Food Engineering: The Magazine for Manufacturing Management:

www.foodengineeringmag.com

Gartner Refrigeration and Manufacturing: www.gartner-refrig.com

Tips and Tools: www.gartner-refrig.com/resources/tips.asp

The Industrial Refrigeration Consortium: www.irc.wisc.edu.

Downloads: www.irc.wisc.edu/software/downloads.php

Publications: www.irc.wisc.edu/publications/

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Basics: www.air.ingersoll-rand.com/NEW/pedwards.htm

Lawrence Berkeley National Laboratory, The Energy Analysis Department:

<http://eetd.lbl.gov/EA.html>

Oak Ridge National Laboratory (ORNL) – Buildings Technology Center:

www.ornl.gov/sci/btc/apps

Building Envelopes Program: www.ornl.gov/sci/roofs+walls/

Insulation Fact Sheet: www.ornl.gov/sci/roofs+walls/insulation/ins_01.html

ZIP-Code Insulation Program: www.ornl.gov/~roofs/Zip/ZipHome.html

Online Chemical Engineering Information, Pinch Technology: Basics for Beginner:

www.cheresources.com/pinchtech1.shtml

Singh, Paul, Teaching Resources: Animation:

www.rpaulsingh.com/animated%20figures/animationlist.htm

Spirax Sarco Learning Center:

www.spiraxsarco.com/learn/default.asp?redirect=html/3_13_01.htm

Steaming Ahead: www.steamingahead.org

U.S. Department of Energy – Energy Efficiency and Renewable Energy:

www.eere.energy.gov

Building Technologies Program: www.eere.energy.gov/buildings

Information Resources: www.eere.energy.gov/buildings/info/publications.html

Energy Savers: www.eere.energy.gov/consumerinfo

Energy Information Bridge: www.osti.gov/bridge

Industrial Technologies Program: www.eere.energy.gov/industry

BestPractices: www.oit.doe.gov/bestpractices

Compressed Air: www.oit.doe.gov/bestpractices/compressed_air

Energy Matters:

www.oit.doe.gov/bestpractices/energymatters/energy_matters.shtml

Fact Sheets: www.oit.doe.gov/factsheets/fact_other.shtml

Motors: www.oit.doe.gov/bestpractices/motors

Plant-Wide Assessments: www.oit.doe.gov/bestpractices/assessments.shtml

Process Heating: www.oit.doe.gov/bestpractices/process_heat

Tools and Publications: www.oit.doe.gov/bestpractices/pubs.shtml

EERE Information Center: 1-877-EERE-INF or eeic@ee.doe.gov

Publications Library: www.oit.doe.gov/bestpractices/library.shtml

- Technical Publications
- Case Studies
- Plant-Wide Assessment Summaries
- Energy Matters
- Training Materials
- Library Links

Software Tools: www.oit.doe.gov/bestpractices/software_tools.shtml

- AIRMaster+
- Fan System Assessment Tool (FAST)
- MotorMaster+
- MotorMaster+ International
- NOx and Energy Assessment Tool (NxEAT)
- Process Heating Assessment and Survey Tool (PHAST)
- Pumping System Assessment Tool (PSAT)
- Steam System Tool Suite
 - Steam System Scoping Tool (SSST)
 - Steam System Assessment Tool (SSAT)
 - 3EPlus
- Decision Tools for Industry
- ASDMaster: Adjustable Speed Drive Evaluation Methodology and Application

Steam: www.oit.doe.gov/bestpractices/steam

Simply Insulate: www.simplyinsulate.com

ORGANIZATIONS

Alliance to Save Energy: www.ase.org

American Council for an Energy Efficient Economy: www.aceee.org

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE): www.ashrae.org

Association of Energy Engineers: www.aeecenter.org

Boiler Efficiency Institute: www.boilerinstitute.com

British Compressed Air Society: www.britishcompressedairsociety.co.uk

The Carbon Trust: www.thecarbontrust.co.uk/energy

Centre for Analysis and Dissemination of Demonstrated Energy Technologies (CADDET): www.caddet.org

Council of Industrial Boiler Owners (CIBO): www.cibo.org.

Energy User News: www.energyusernews.com

Food and Drink Federation, Voice of the UK Food and Drink Manufacturing Industry: www.fdf.org.uk/home.aspx

Gas Research Institute: www.gri.org

The Industrial Refrigeration Consortium: www.irc.wisc.edu

International Energy Agency: www.iea.org

International Institute of Ammonia Refrigeration: www.iiar.org

Iowa Energy Center: www.energy.iastate.edu

Iowa State University Industrial Assessment Center (IAC): (515) 294-3080 or www.me.iastate.edu/iac

Lawrence Berkeley National Laboratory, The Energy Analysis Department, National: <http://eetd.lbl.gov/EA.html>

National Electrical Manufacturers Association: www.nema.org

North American Insulation Manufacturers Association (NAIMA): www.naima.org

Sustainable by Design: www.susdesign.com

Technical Information Services: www.ntis.gov

United Kingdom Energy Efficiency: www.etsu.com

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