

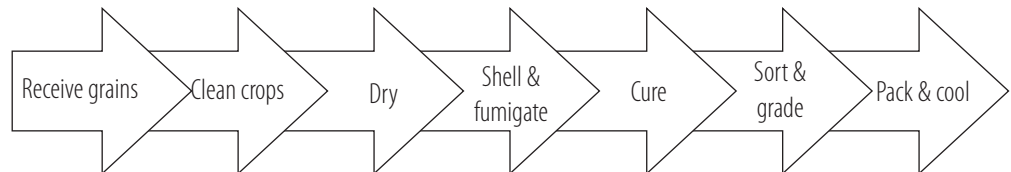
Grain Elevators with Drying Operations

Sub-sector Description

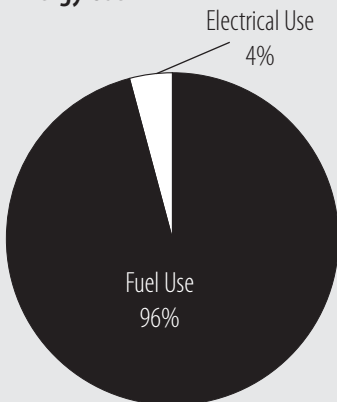
Several grain elevators perform services on crops, subsequent to their harvest, with the intent of preparing them for market or further processing. These services, for facilities in this sub-sector, include drying. Elevators engaged in drying grain use significantly more fuel energy than those that are primarily offices. Grain drying most often occurs between October and April/May each year.

| Facility Type | SIC | NAICS |
|---------------|------|--------|
| Grain drying | 2048 | 115114 |

Process Information



Energy Use¹



Benchmarks

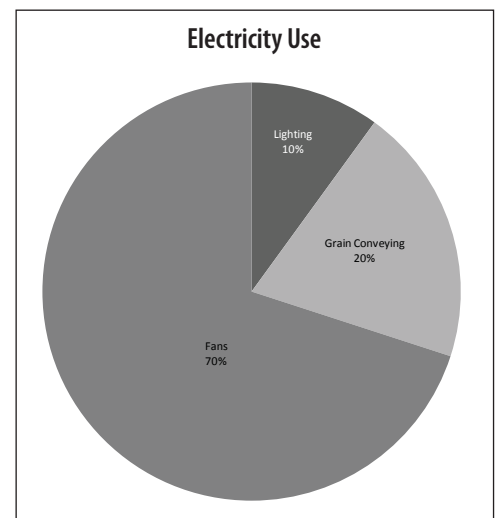
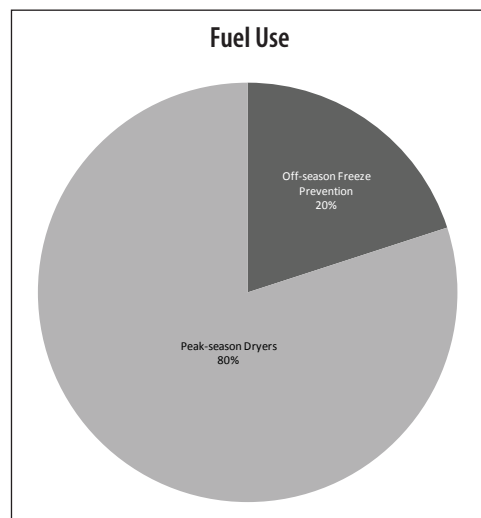
Thermal and electrical benchmarks were unable to be reliably derived from facility-specific energy use, sales, employee numbers, and area data. For more information about the benchmarking study that MnTAP conducted and how to determine if your facility may have energy efficiency opportunities remaining, view the report Web pages at <http://www.mntap.umn.edu/resources/DOC/index.html>.

Savings Potential

Opportunities and technologies for energy conservation were identified for facilities within this sub-sector. Industry case studies and reports of implementation were used to determine what opportunities may be available and achievable savings from those opportunities. However, additional energy conservation measures may apply to your facility. The tables on Page 2 of this summary reflect a number of energy conservation measures available for this sub-sector.

Estimated Fuel Savings: 30%

Energy Use Footprints



Fuel Savings Estimate and Opportunities

| Improvement / Opportunity | Estimated Payback | Reported Savings | Overall Savings |
|---|-------------------|------------------|-----------------|
| Routine maintenance on drying equipment ² | | 0-2% | |
| Use flue gases to heat process or service water ³ | | 4-8% | |
| Use waste heat from hot flue gases to preheat combustion air ⁴ | | 2-4% | |
| Microwave livestock feed drying (beet pulp) ⁵ | | 0-3% | |
| Switch to combination drying ⁶ | | 4-8% | |
| Switch to dryeration or in-bin cooling ⁶ | | 1-3% | |
| Use of a stirring device in bin dryers ⁶ | | 2-4% | |
| Install waste heat recovery on column dryers ⁶ | | 0-2% | |
| TOTAL FUEL SAVINGS ESTIMATE | | | 30% |

Electric Savings Estimate and Opportunities

MnTAP researched and analyzed this sub-sector for a natural gas utility. Therefore, electric savings opportunities and an estimate of potential savings were not identified as part of MnTAP's industrial energy efficiency study.

References

- ¹ "Preserving the Iowa Corn Crop: Energy Use and CO2 Release", Applied Engineering in Agriculture. VOL. 14(3):293-299. 1998.
- ² IAC Industrial Assessments; DOE, <http://iac.rutgers.edu/database/findassessment.php?ID=AM0056>
- ³ AURI AG Innovation News Apr-Jun 2009, "Pulp frequency: Scientists test energy-saving microwaves to dry beet pulp for livestock feed"

- ⁴ May be limited to smaller drying operations, such as individual farms
- ⁵ AE-701, Nov 1994, Dr. Kenneth J. Hellevang, PE. Extension Agricultural Engineer, NDSU
- ⁶ "Strategies For Managing Energy-Related Grain Drying Costs", Wisconsin Focus on Energy. 2007.