



CERTs: Biomass for Poultry

Fritz Ebinger

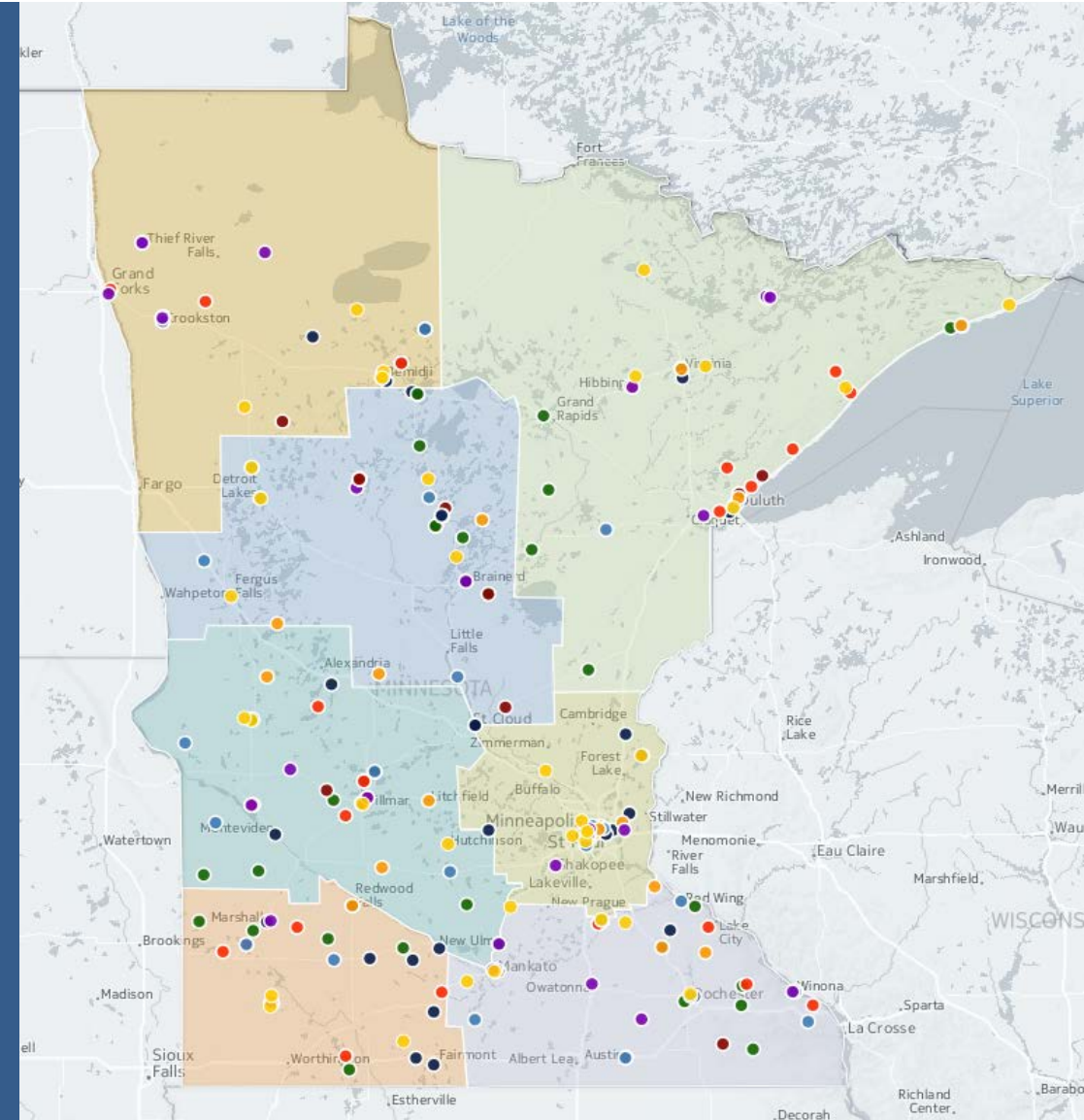
Heating the Midwest

April 10, 2017

Road Map



- What is CERTs?
- MN Poultry in general
- Project & Funding
- Data & Economics
- Bird health



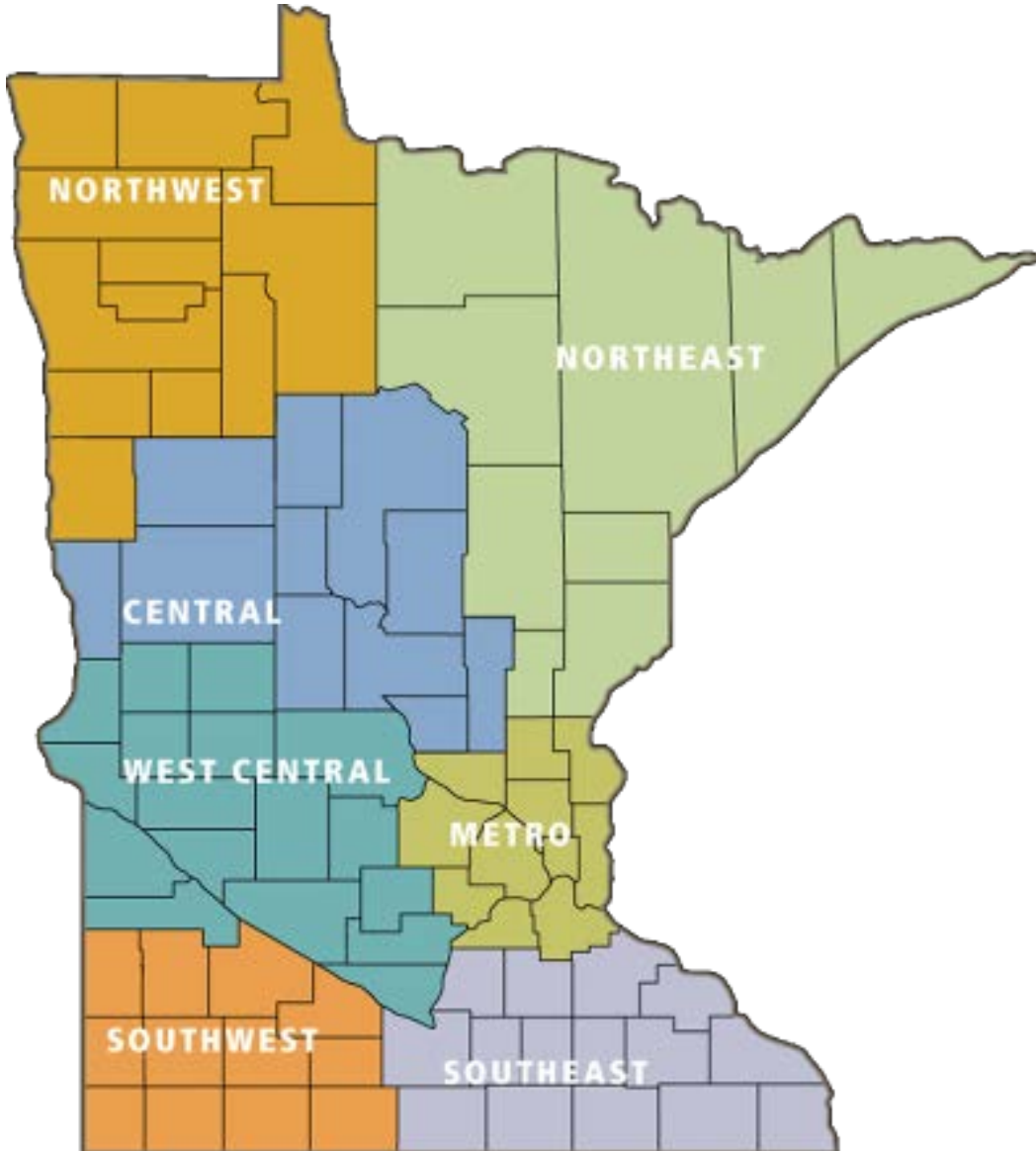
CERTs: Minnesotans Building a Clean Energy Future



Mission: We connect individuals and their communities to the resources they need to identify and implement community-based clean energy projects



How Does CERTs Work?



- **Staff:** Regional coordinators and statewide support
- **Steering Committees:** One per region; governing body for regional team
- **Regional Teams:** Anyone can join; broad range of skills, interest, and backgrounds

What Does CERTs Do?

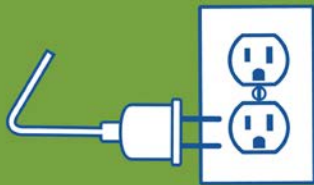


LEARN



Write blog posts & case studies
Create educational guides
Manage diverse web-based tools

CONNECT



Host events, tours, and conferences
Help with community organizing
Connect people to technical resources

ACT



Provide seed grant funding and more
Deliver research-based campaigns
Spur other statewide programs

CERTified Campaigns



Provide clear, actionable ways to save energy

- Sharing information about poultry-specific lighting
- Guiding people through funding options soup: USDA RD, NRCS, MDA, CIP, REC...



CleanEnergyResourceTeams.org/Turkeys

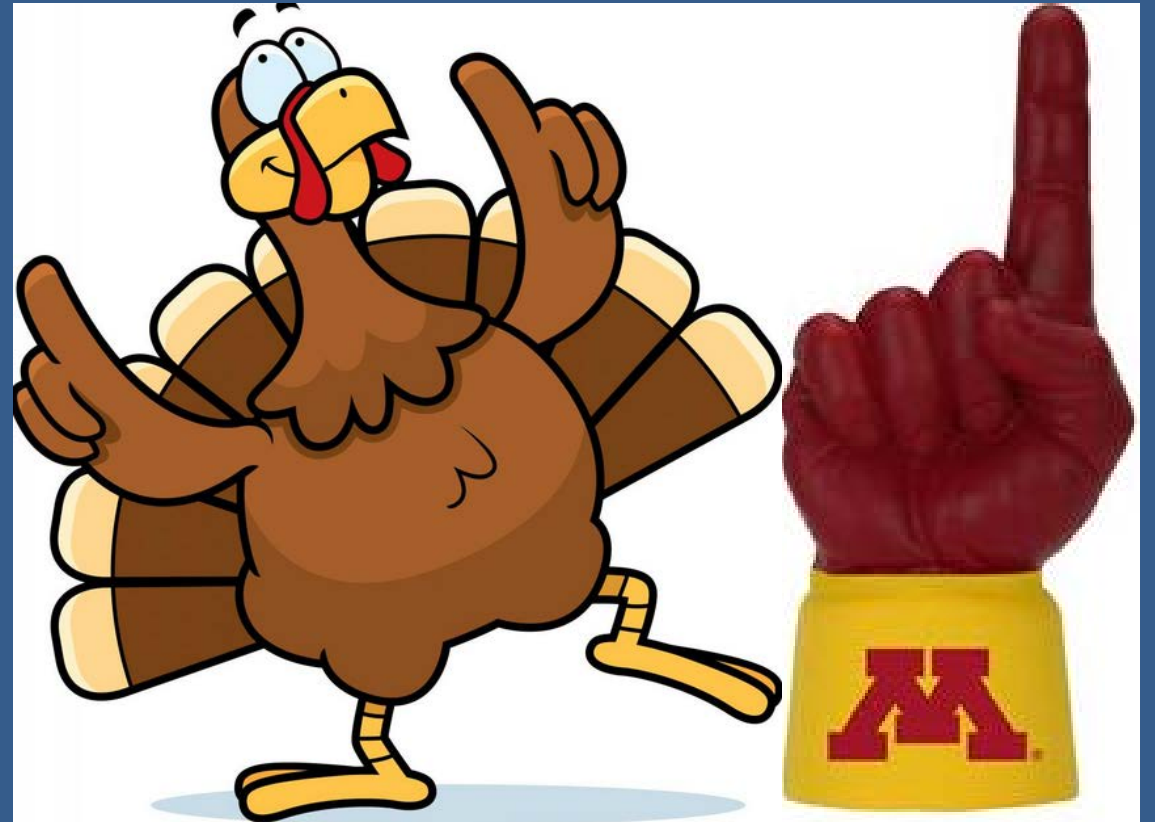
Renewable Energy



Why biomass for poultry?



- Minnesota is the #1 turkey producing state.
 - 46 million yearly
 - 450 farms
- **Big on chickens**
 - 47 million chickens
 - 300 farms
- **Mostly LP heat**



Turkeys like it HOT



Turkey Brooder Barns

- Two days to 4-6 weeks
- Barn temp is 90°F / 32°C
- Lowers by week

Finisher Barns

- Weeks 7 – 18 or 20
- Temp 75°F / 24°C



Chickens like it a little **HOTTER**



Chicken Broiler Barns (day old to 6 weeks)

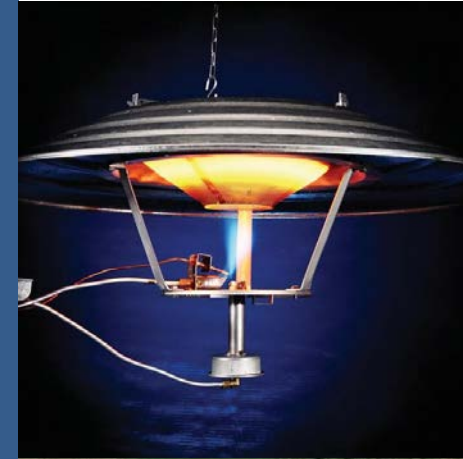
Barn temp starts 93°F / 34°C and decreases weekly to 72°F / 20°C before load out at 6+ lbs



Poultry & Btus



- Long, skinny barns
- 60-70 ft x 300-400 ft
- 3 MMBtus to heat a barn this size for 1 hour in cold months (avg. 1.5 MMBtu)
- Year with a hard winter can consume over 4,000 MMBtus



Project Originators



Photo Credit: Kimm Anderson, St. Cloud Times



Project History



- Original idea: Put a 1.2 mmBtu wood chip furnace on a turkey brooder barn:
 - Heat *half* with the furnace
 - Heat the other half with LP
- Went through several grant applications before the project landed

Shorter European Barn >>>



Insurance Barrier



- For the original project: Insurance broker refused coverage
- Cited NFPC 211 Standard for Chimneys, Fireplaces & Vents and solid fuel problems
 - Ash disposal
 - Sparking
 - Human error

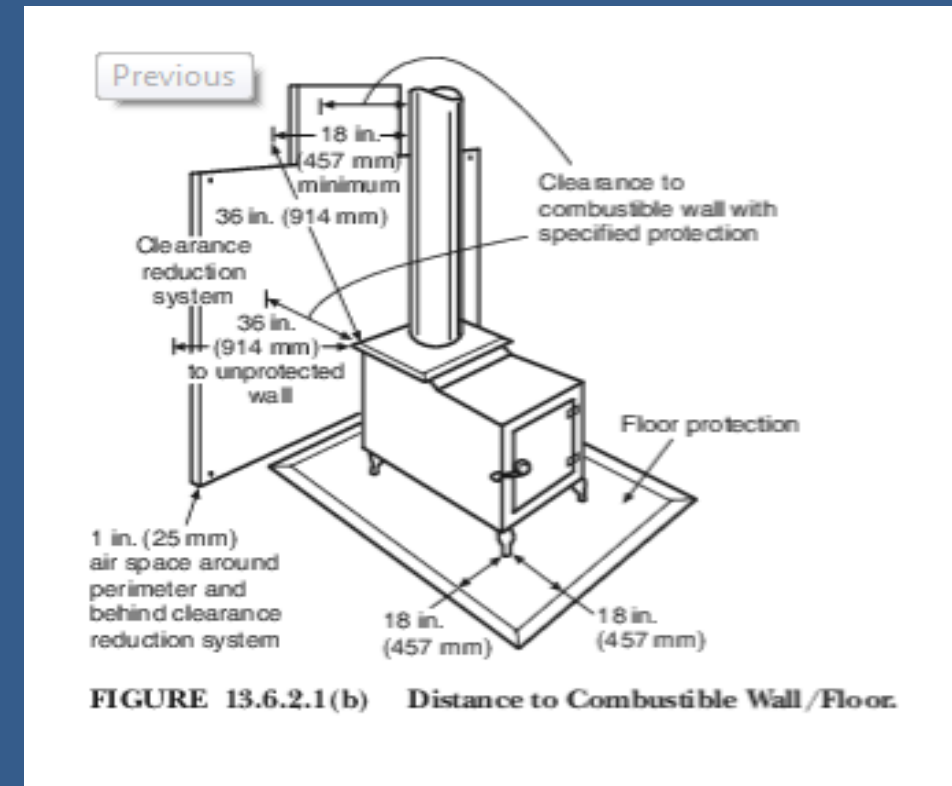


FIGURE 13.6.2.1(b) Distance to Combustible Wall/Floor.

Poultry Heating Reality



20-40 open flame heaters over a bed of wood chips and feathers



Poultry Heating Reality



ON JANUARY 21, 2015

Fire kills 17,000 Jennie-O poults, nearly destroys barn

Cause of fire has not yet been determined

Livestock see massive casualties in Upper Midwest farm fires

Farmers and safety groups are at odds over how to prevent casualties.

By Maya Rao Star Tribune | DECEMBER 26, 2014 — 6:30AM

Sheriff: More Than 8,000 Turkeys Lost In Meeker County Barn Fire

February 21, 2017 5:25 PM

NEWS

25,000 chickens perish in southern Minnesota farm fire



By FORUM NEWS SERVICE |

PUBLISHED: September 16, 2016 at 6:56 pm | UPDATED: September 16, 2016 at 7:25 pm

KNUJ
SAM 107.3

MULTIPLE FIRE CREWS BATTLE TURKEY BARN FIRE NEAR HANSKA

12 NOV 16

The Viking Project



- **Funded by MN Dept. of Ag's NextGen Energy Grant (Thank you!)**
- **Insured by Elmdale Farmers Mutual Insurance**
- **Hosted by Bill Koenig**



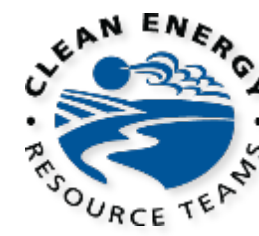
Photo Credit: Briana Sanchez St. Cloud Times

The Viking Project



- Mabre made 1.65 mil Btu forced air furnace
- \$71,000 for shipping, tech, 15 HP blower, feed augers, stirrers, and XL hopper.
- \$23,000 in ducting, chimney, 800' polymax tubing & labor
- \$28,400 in barn construction
- Total \$122,400 in hardware, install labor & shipping

The Viking Project

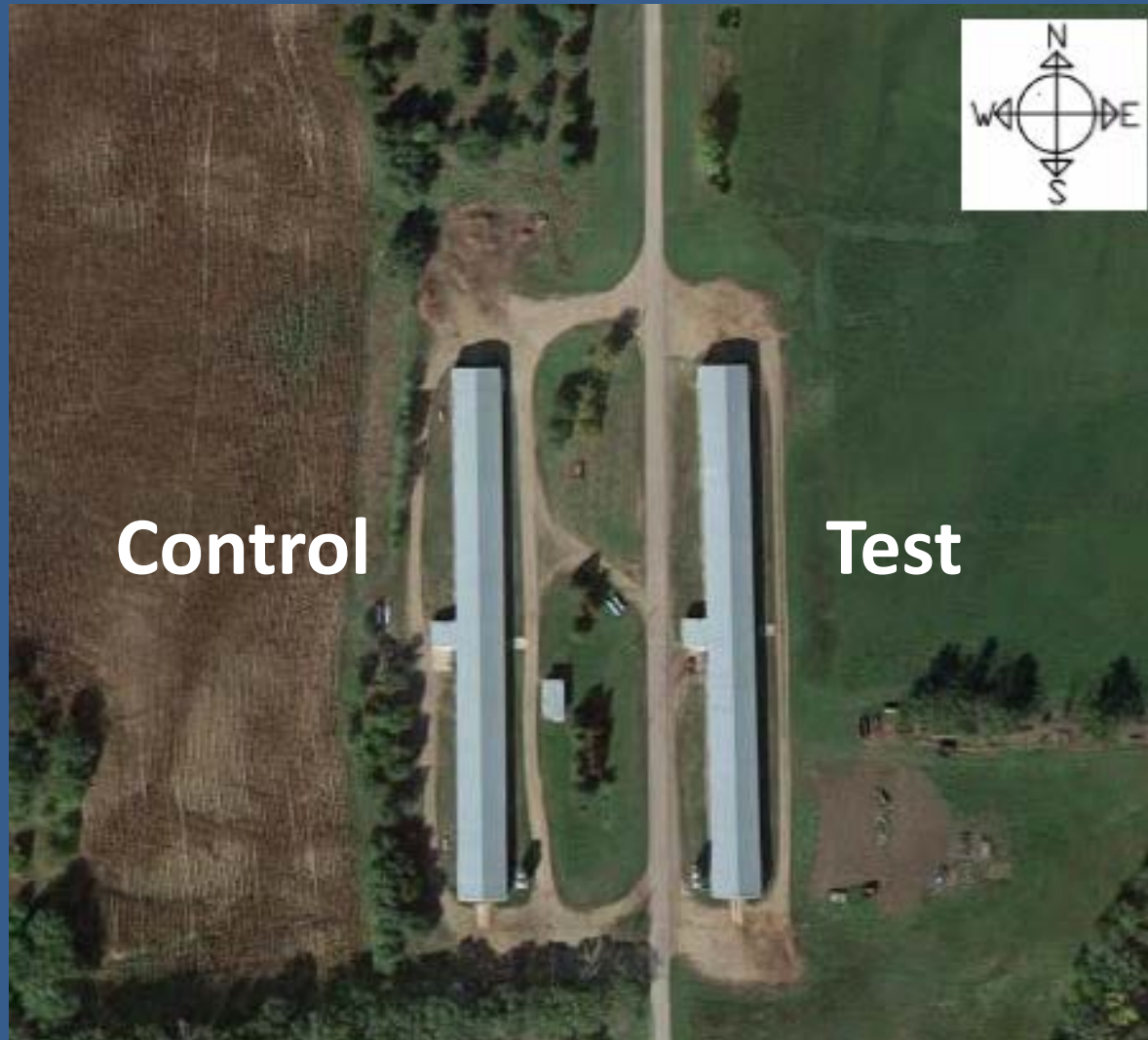


Two-story broiler chicken barn near Albany, MN

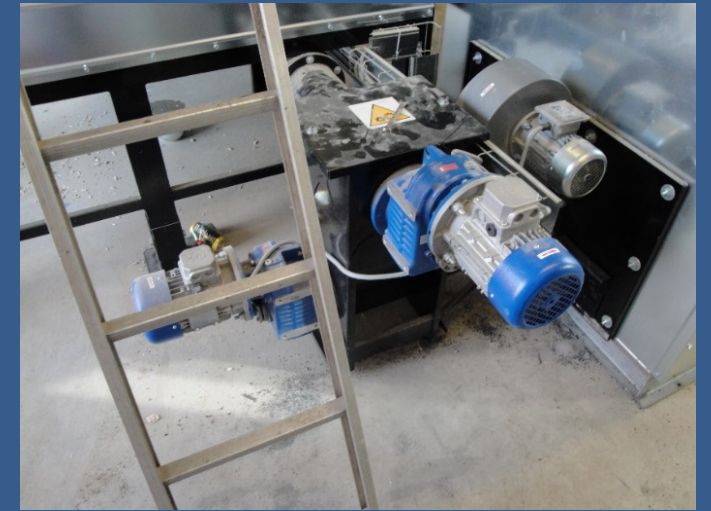
The Viking Project



The Viking Project



The Viking Project



Data & Economics



- Ten flocks across two winters
- Hardwoods with moisture content under 15% and sized 2 inches or less
- Blends of fuel: furniture byproduct, trim/molding, dry white oak

Wood Chips!



White Oak, 15% M.C. \$95 ton



Furniture Material, 8% M.C. \$50 ton



Trim/Molding, 10% M.C. \$38 ton



Recyc. Construction, 15% M.C. \$70 ton

Data & Economics

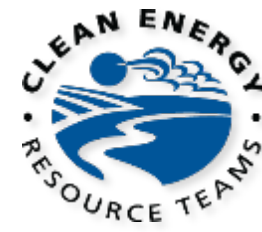


Flock	Wood Tons	LP Offset	\$/gal LP	\$/ton wood	Fuel Cost Savings
08/25/15 - 10/03/15	9.56	61%	\$ 1.29	\$ 48.60	\$ 244.88
10/04/15 - 12/08/15	22.29	74%	\$ 1.29	\$ 76.67	\$ 1,283.89
12/09/15 - 02/08/16	43.45	68%	\$ 1.06	\$ 76.67	\$ 1,269.10
02/09/16 - 04/06/16	33.14	67%	\$ 1.00	\$ 62.35	\$ 269.83
04/07/16 - 06/03/16	2	77%	\$ 1.01	\$ 73.33	\$ 1,586.51
06/04/16 - 07/29/16	0	0	\$ 0.99	\$ -	\$ (658.35)
07/30/16 - 09/27/16	3.9	75%	\$ 0.99	\$ 81.25	\$ (19.88)
09/28/16 - 11/29/16	22.56	93%	\$ 0.99	\$ 59.78	\$ 721.58
11/30/16 - 01/24/17	47.44	100%	\$ 1.00	\$ 49.39	\$ 2,426.80

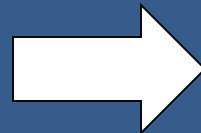
\$76.67/wood ton \cong \$0.84 gal/LP

\$49.39/wood ton \cong \$0.53 gal/LP

Ash Content



- Burns well – ash had less than 1 Btu/lb left
 - 2.8% phosphorus (P_2O_5)
 - 11.5% potassium oxide (K_2O)
- BUT also high in sodium oxide (Na_2O)
- Salts are not good for soil amendment

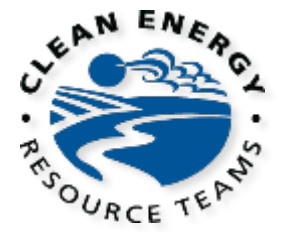


2016 Flock Health



2016 Year	Liq. Propane Barn	Wood Heat Barn
Effective Cost	35.49	35.15
Average Weight	6.36	6.28
Feed Conversion	1.841	1.823
Field Condemns	.61	.52
Livability	91.2%	90.93%
Litter	.75	.73
Effective Cost Ranking	124/183	72/183
Condemned Ranking	152/205	107/205

Winter 16-17 Flock Health



Three most recent flock averages

Average Results	LP Barn	Wood Barn
Feed Conversion	1.813	1.787
Weight	5.699	6.422
Field Condemn Percent (heads)	.266	0.316
Livability	93.069	87.848
Effective Cost	37.26	35.39

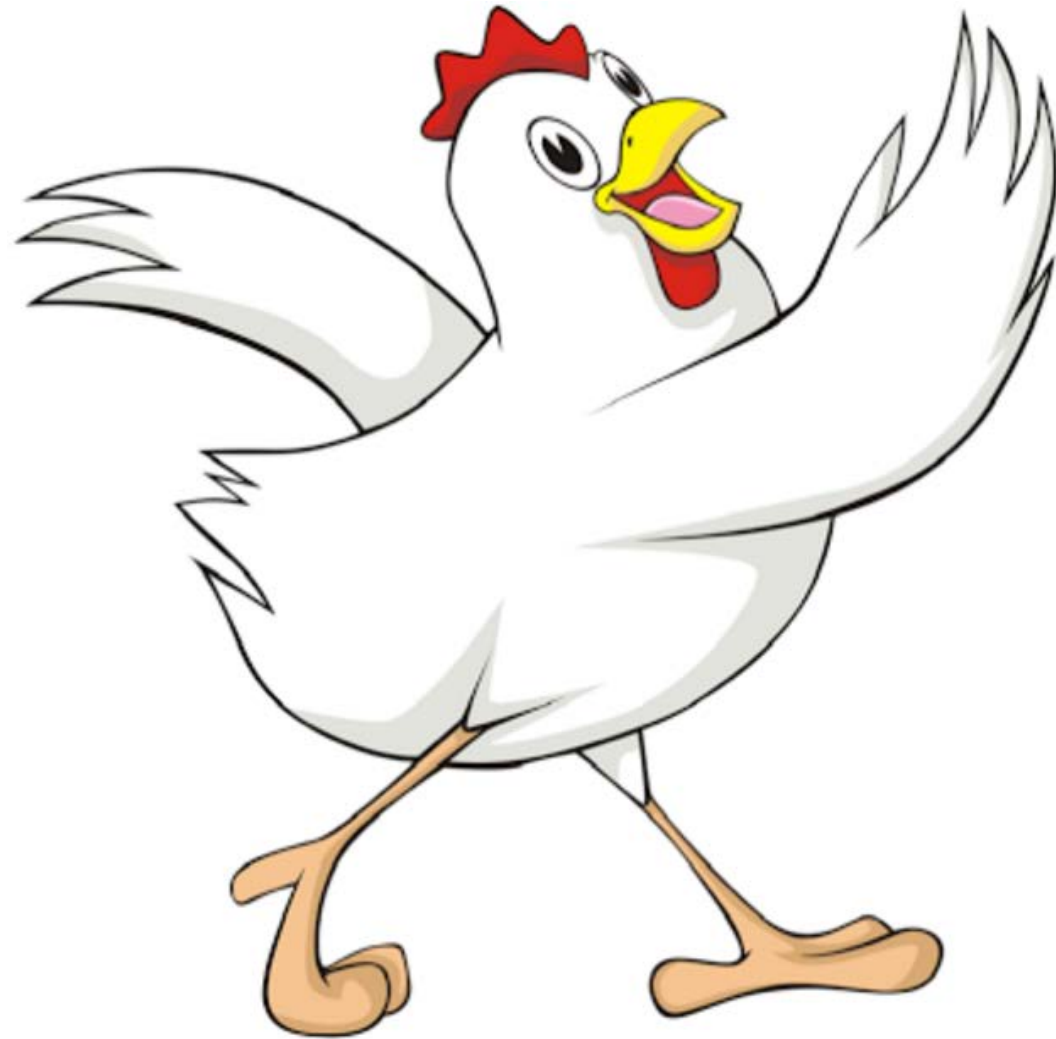
Winter 16-17 Flock Health



Three most recent flock rankings out of 26 barns

	LP Current	Wood Current	LP Oct/Nov	Wood Oct/Nov	LP Sep/Oct	Wood Sep/Oct
Feed Conversion	13	6	6	16	15	16
Weight	15	1	29	20	5	6
Field Condemn % (heads)	9	10	10	11	23	18
Livability	3	11	10	8	13	8
Effective Cost	17	6	12	7	10	5

Happy Birds!



CERTs:

Minnesotans Building a Clean Energy Future



Learn more: Visit the CERTs website, attend an upcoming event, or connect with a member of our staff.

www.mncerts.org

Contact me:

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