



In the 17 county area covered by the MN Rural Energy Board:

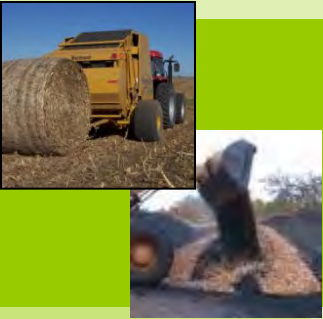
- There were **2,979,600 acres of corn** grown in 2008.
- The cobs on those acres could heat approx. **440,000 homes** each year.
- 50% of the stover on those acres could heat approx. **880,000 homes** each year.
- Together, the cobs and 50% of the stover could heat approx. **1,320,000 homes** each year.

Supply Chain for Biofuel and Biopower Markets

Feedstock Production



Feedstock Logistics



Production



Distribution



End Use



- Harvest
- Size
- Density
- Transport
- Storage
- Pre-process

Today's Focus

Harvesting Corn Cobs



Vermeer CCX770 Cob Harvester

- Self contained system
- Patented separation
- Returns leaves and husks to the soil
- Quick disconnect for harvest flexibility
- Hydraulic hitch for one person hook-up



Normal Grain Handling



Minimize impact to corn harvesting while helping create a new revenue stream

Operation



Catches material from combine



Leaves and husks back to the soil



Unload Cobs



The CCX770 holds up to 8000 lbs. of cobs or approximately 5 to 7 acres of corn. Unload cobs roughly every third grain dump of combine.

A full dump cycle takes less than 2 minutes. Half of this cycle is lifting/lowering the box to 15' clearance. Lifting/lowering is optional depending on in-field transport system



In-field transport options



Cotton boll buggies



Straight trucks with dump



Dump carts or wagons



Cob Storage



Above – 120 ton pile



Companies are still conducting storage tests but it appears cobs may be stored at a variety of moistures when harvesting dry corn. Cob moisture is usually higher than corn. Some uses may require covered storage.

Cob Quality

Variables in harvest impact cob quality so the value may be affected - depending on end use

1. Hybrid or variety of corn
2. Moisture
3. Combine settings
4. Collection system
5. Weather

Still defining how best to control these variables.



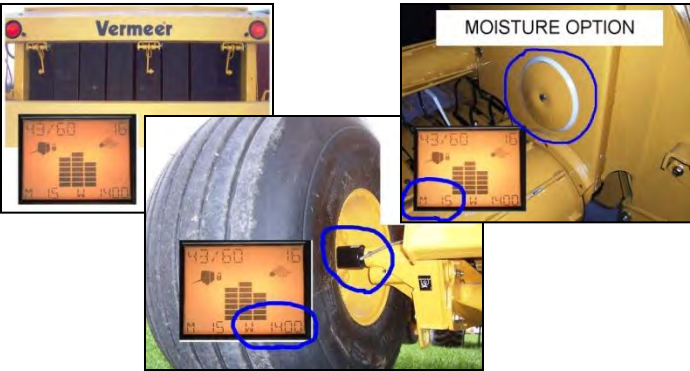
Corn Stalk Harvesting



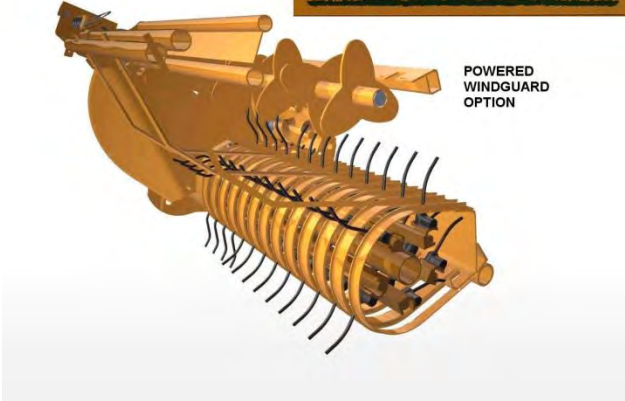
Corn Stalk Harvest

- Challenges
 - Tight window (crop harvest, tillage)
 - Corn variety (green, tough)
 - Weather (short days, cool, damp)
 - Hay tools

605 Super M Corn Stalk Special



Cornstalk Special



Corn Stalk Prep

Minimum -
rake to
create a
windrow to
bale.



Transport & Storage



Density

6x5 Alfalfa		6x5 Corn Stalks		6x5 Wheat Straw	
Average Weight(lbs)	2200	Average Weight(lbs)	1300	Average Weight(lbs)	1400
LBS/CU.FT	15.56	LBS/CU.FT	9.20	LBS/CU.FT	9.90

Twine vs Net Wrap



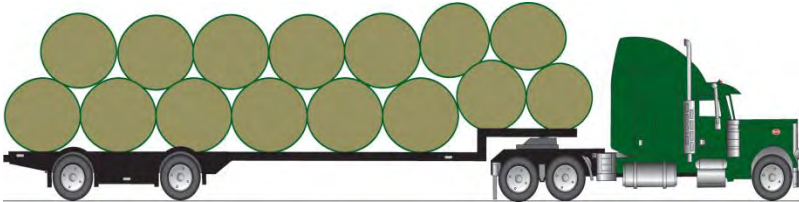
- Twine - \$25/20K ft.- 4" space - \$.46/bale – 53.2 seconds
- Net - \$210/7000 roll- 3.5 wraps - \$1.97/bale – 9.4 seconds
- Time, Handling, Transport, Storage protection

Residue management for sustainability



Stalk prep and Rake settings will impact remaining residue

Round vs Square



Purchase Price (1/3)

HP to Operate (1/2)

Storage – Moist Climates

14x – units sold annually



Continuous baling

Trailer loading/hauling

Common Ground

Similar performance in most crops

Bale Density

Crop Preparation and Bale Handling



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Questions

