



Madelia Model: Project Update 4.2.2012

Linda Meschke
Rural Advantage

Madelia Model: Perennial Feedstocks to Advanced Biofuel



Goal:

Utilize Local Grown Renewable Energy as a
Catalyst for Increasing Perennials on the
Landscape to Reduce Pollution from
Production Agriculture

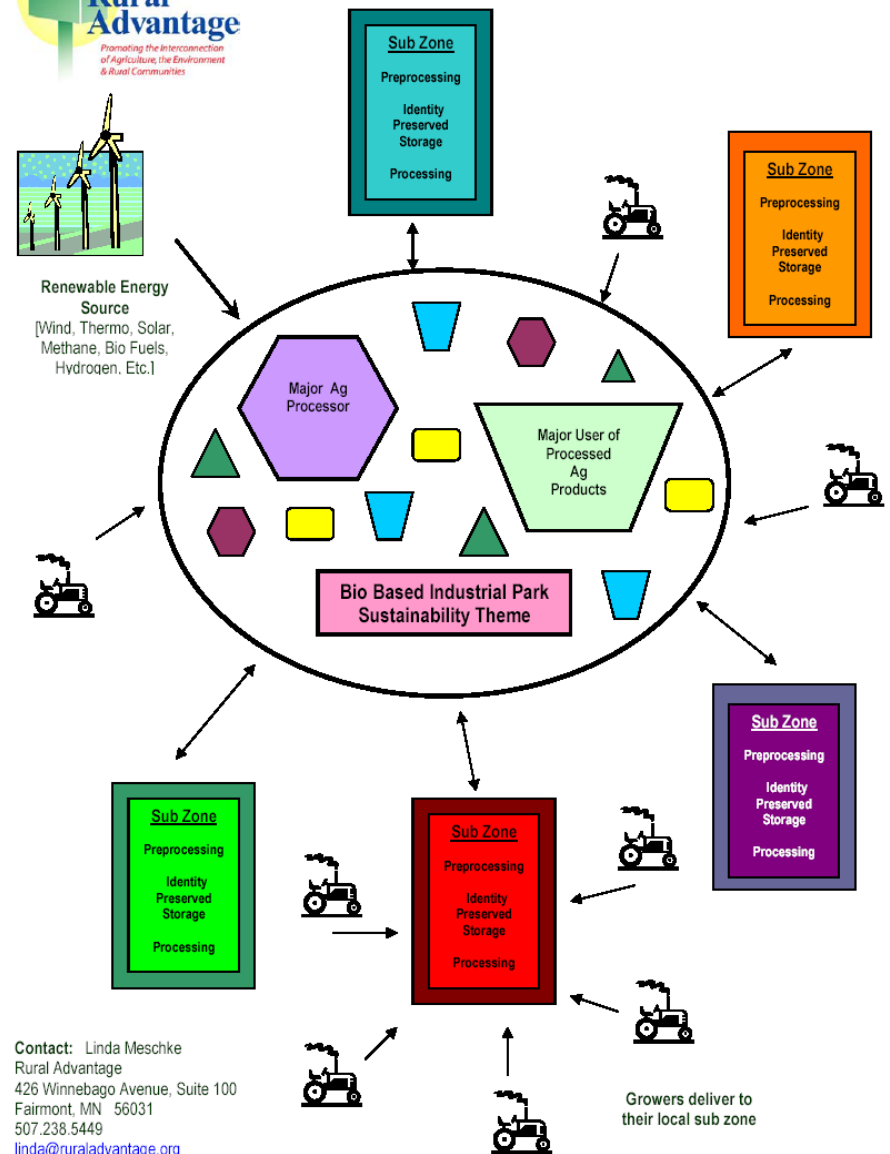
Concept

- ▶ Uses Renewable Energy & Bio-Industrial Processing as a Catalyst for Sustainable Regional Development
- ▶ Utilize perennial feedstocks, at priority sites on the landscape, to mitigate agricultural non point source pollution
- ▶ Provides a Market
 - ▶ 1,000's of acres of perennials
- ▶ Creates New Enterprises & Jobs

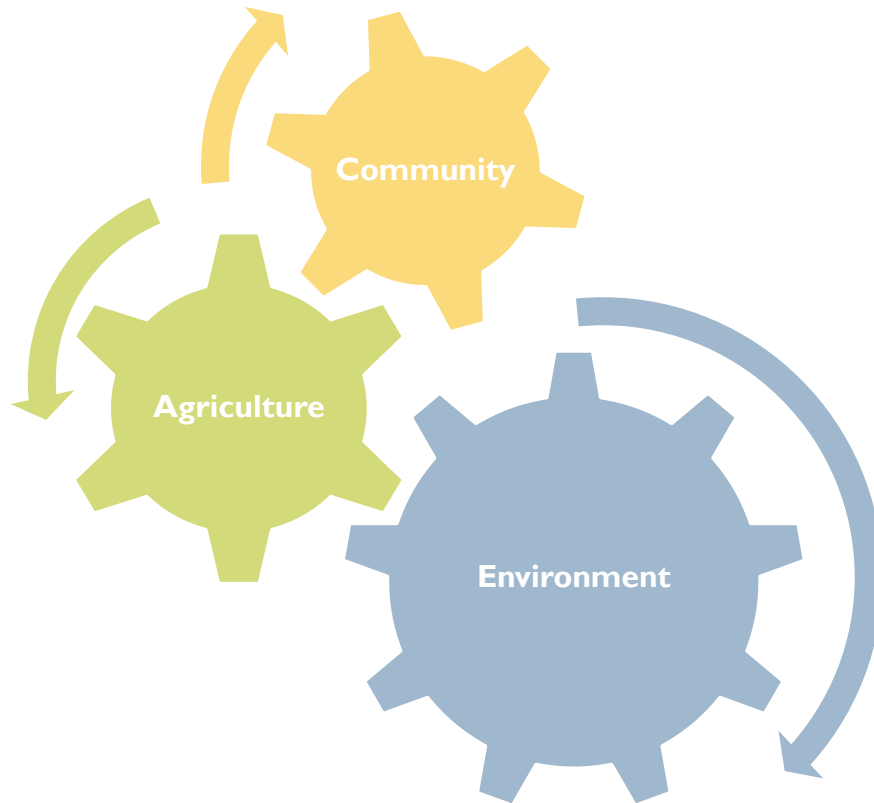




Rural Economic Development Concept

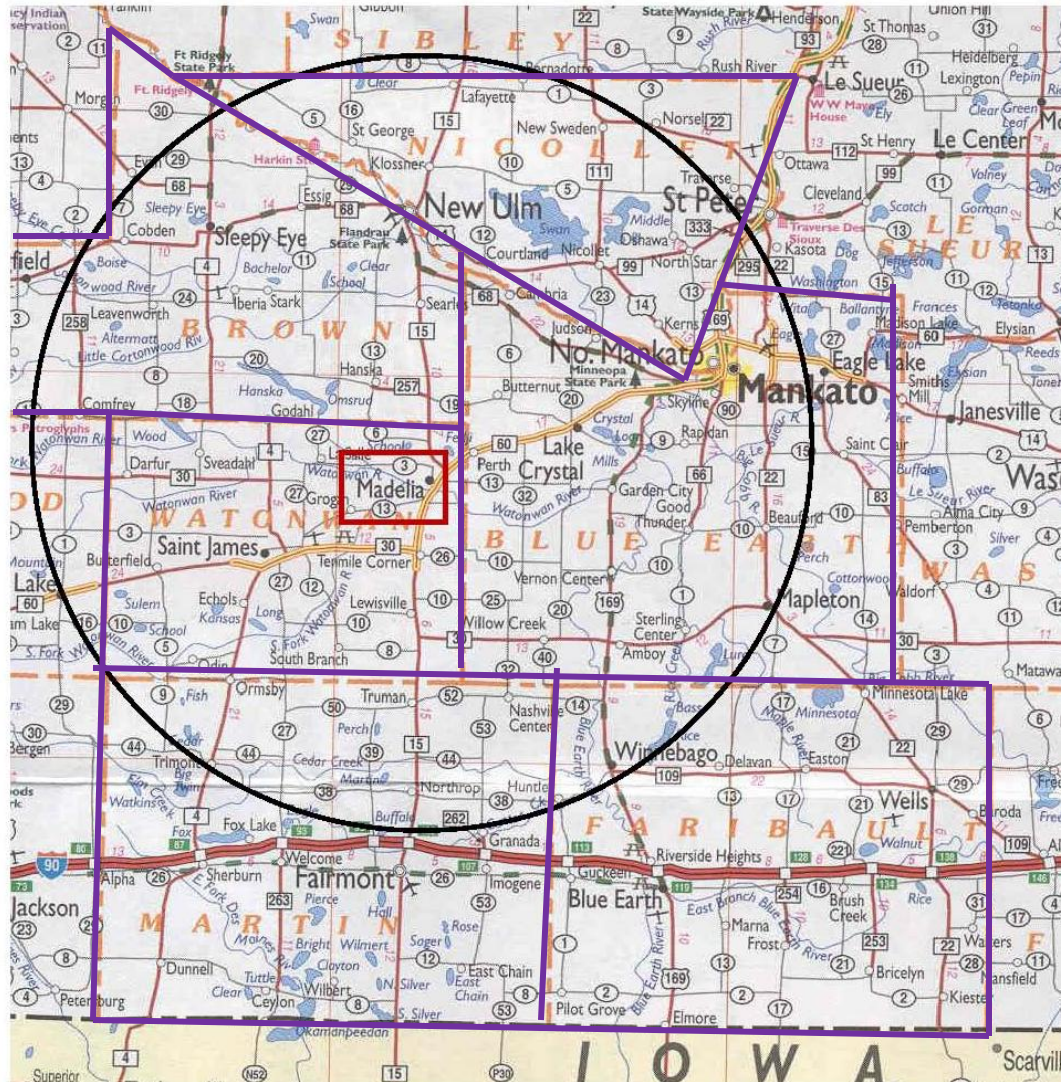


Results in Multiple Benefits



- ✓ **Water Quality**
- ✓ **Renewable Energy**
- ✓ **Habitat Enhancement**
- ✓ **Sustainable Agriculture**
- ✓ **Vibrant Rural Communities**
- ✓ **Retain Rural Wealth**

Madelia Fuelshed
Prairie Skies Bioenergy Facility
A 25 Mile Radius of Madelia, Minnesota
75% of the Feedstock is expected to come from this Area



Prairie Skies Bio-Energy Project Phase I



- Multiple Feedstocks Grown Locally
- Perennials Targeted to Priority Sites

Feedstocks

Torrefaction

- Produces an Advanced Biofuel
- Similar to Wyoming Coal in BTU's [8,600/lb]



Torrefaction Facility



Torrefaction is a thermo-chemical treatment of biomass in the 400 – 650 degree F range. In this process the biomass partly [especially the hemicellulose] decomposes, giving off various types of volatiles.

- Construction of a 300 ton/day torrefaction facility at Madelia [co-located next to Tony Downs Foods].
- Benefits of Torrefied Material
 - Hygroscopic
 - Densification – 80%
 - Reduces Volume
 - Increases Energy Value 30%

Prairie Skies Bio-Energy Project Phase II & III



- **Produces:**
 - Syngas
 - Electricity
 - Heat/Steam
- **Co-Located with a Major Ag Processor**

**High Pressure
Gasifier**

Bio-Fuels Refinery

- **D-4814 Gasoline**
- **D-975 Diesel**
- **Anhydrous Ammonia**



Madelia, MN - Waterwan County
Madelia Township, T-107N, R-30W
SW ¼, NE ¼ - Section 27 [Site]

Tony Downs Foods

Site Location

600 Benzel Ave. SW

Lat 44.024097

Long 94.250838W

County Hwy 9

State Hwy 60 & 15



Recent Updates:

- ▶ Prairie Skies Biomass Co-op Formed [9/2010]
- ▶ Local Grower Co-op
 - ▶ 15 Members
- ▶ Supply the Feedstock and Own the Torrefaction Facility [4/2011]
 - ▶ 300 Tons per Day
 - ▶ ~\$22 Million Capital Cost
 - ▶ ~45 Jobs in Facility
 - ▶ ~ 75 Jobs in Feedstock Supply Chain



Recent Updates: continued



- ▶ Biomass Crop Assistance Program [BCAP] Proposal
 - ▶ Similar to CRP except:
 - ▶ 5 Yr Grasses/ 15 Yr Woody
 - ▶ Pays Annual Rental Payment
 - ▶ Pays Establishment
 - ▶ Allows Harvest
 - ▶ Applied for \$42 Million
 - ▶ Did Not Receive – Needed Feasibility Study
 - ▶ Re-apply in 2012 ???
-



Recent Updates: continued

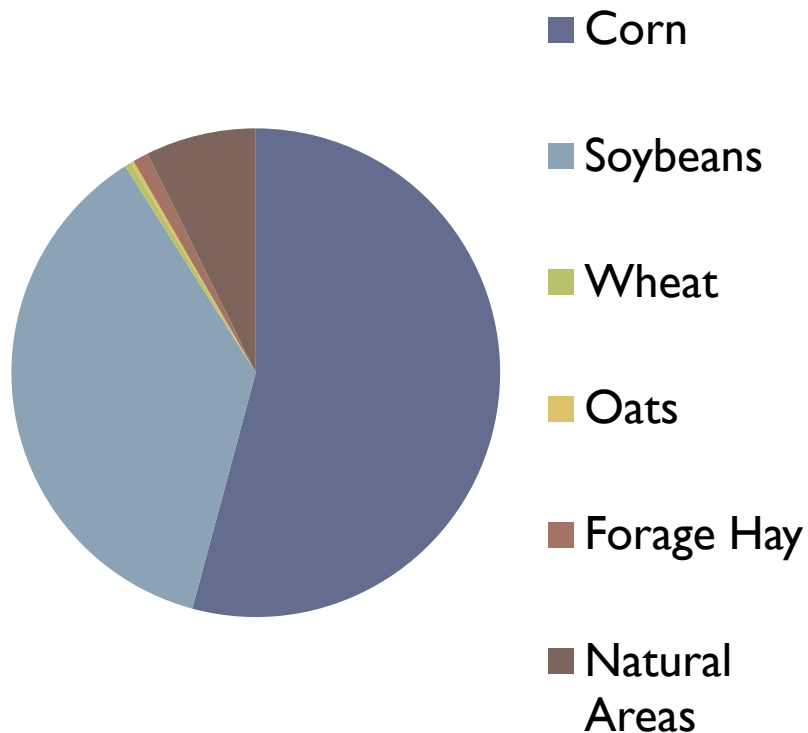


- ▶ Awarded an MDA Next Generation Grant
- ▶ \$73,000 Grant/ \$73,000 Match
- ▶ Deliverables:
 - ▶ 3rd Party Feasibility Study
 - ▶ Business Plan
 - ▶ PSBC Organizational Procedures, Share Development & Feedstock Agreements
- ▶ Partners: PSBC, SynGas Technologies, LLC, Cooperative Development Services, Black Dog Co-op Law, Minneapolis Biomass Exchange
- ▶ Completed by 6/30/2013



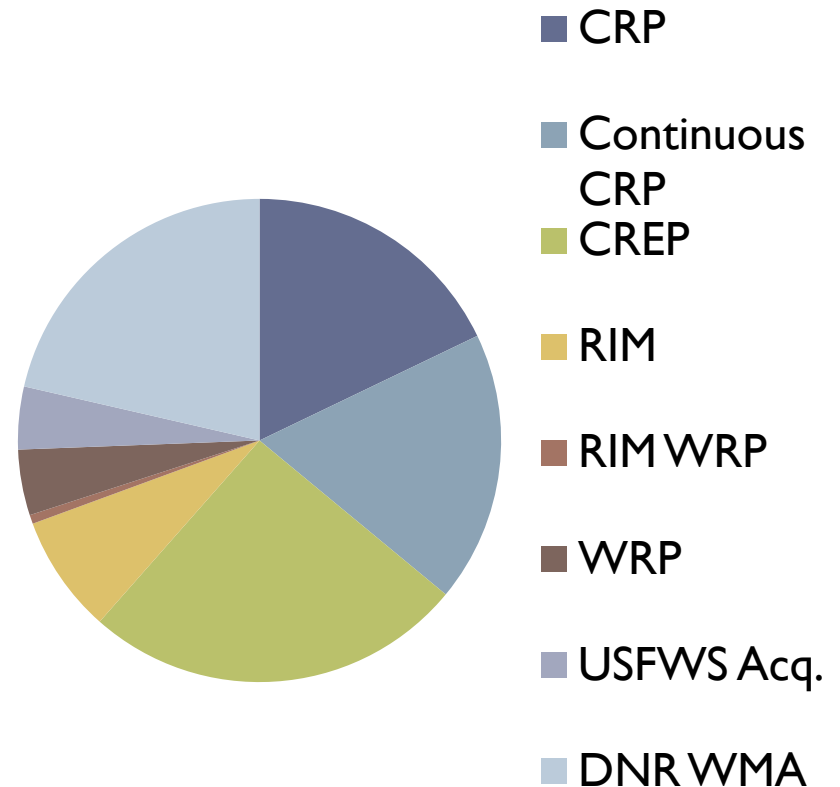
Current Feedstock Supply [six county area]

Agricultural Crops



2,071,229 Acres Total

Program Conservation Lands



91,641.99 Acres Total

MM Feedstock Supply



Feedstock	% of Supply	Tons	Acres	Yield
Native Grasses	35 %	38,325	19,162	2 T/A
Corn Stover	25 %	27,375	13,688	2 T/A
Alfalfa	10 %	10,950	2,190	5 T/A x 2 cut
Miscanthus	10 %	10,950	913	12 T/A
Small Grain Straw	10 %	10,950	5,475	2 T/A
Short Rotation Willow	10 %	10,950	2,736	12 T/A [3 yr]
Total	100 %	109,500	44,164	

Harvest Schedule

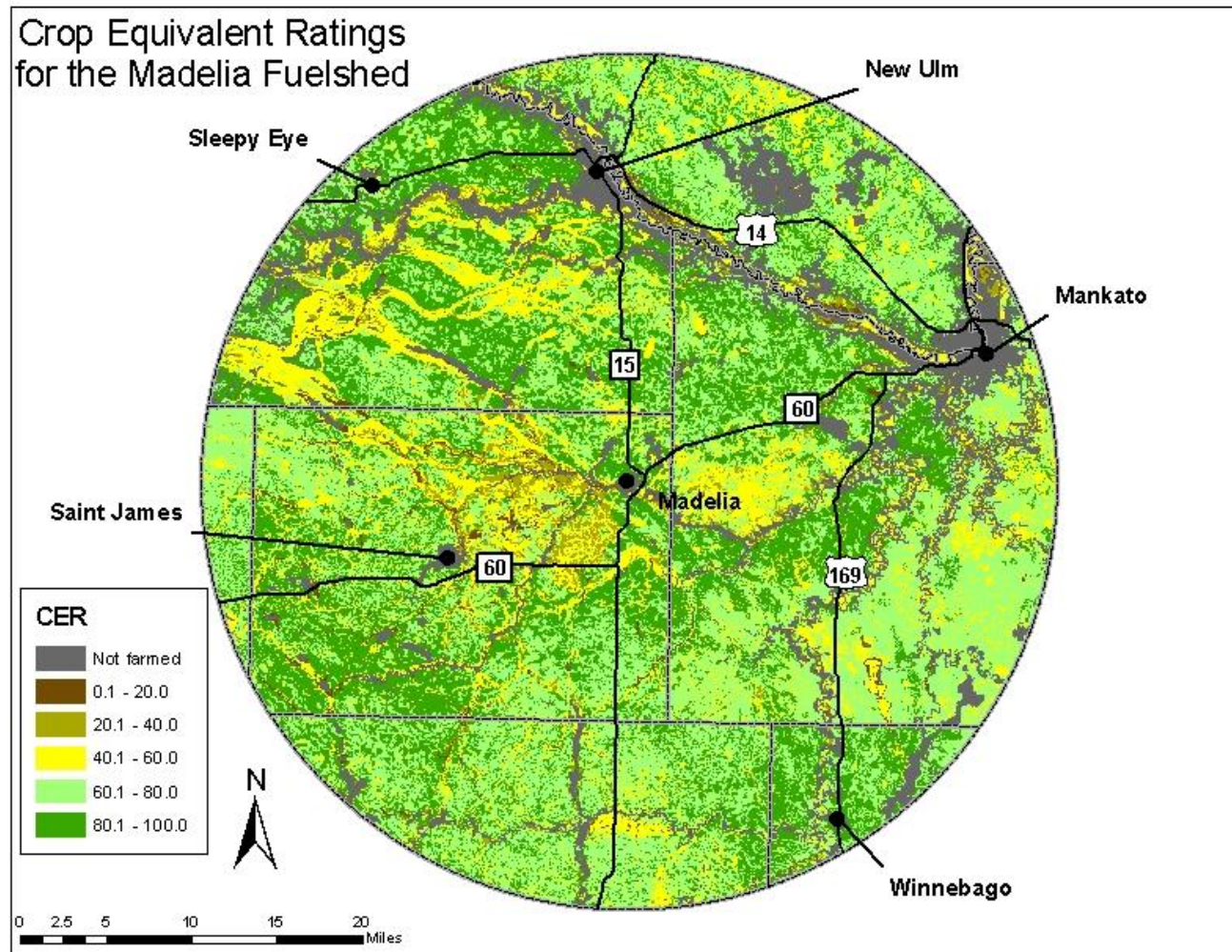
Prairie Skies Bio-Refinery Feedstock Supply Harvest Schedule

Feedstock	S	O	N	D	J	F	M	A	M	J	J	A
Native Grasses												
Short Rotation Willow												
Wheat Straw												
Alfalfa -Fiber												
Miscanthus												
Corn Stover												



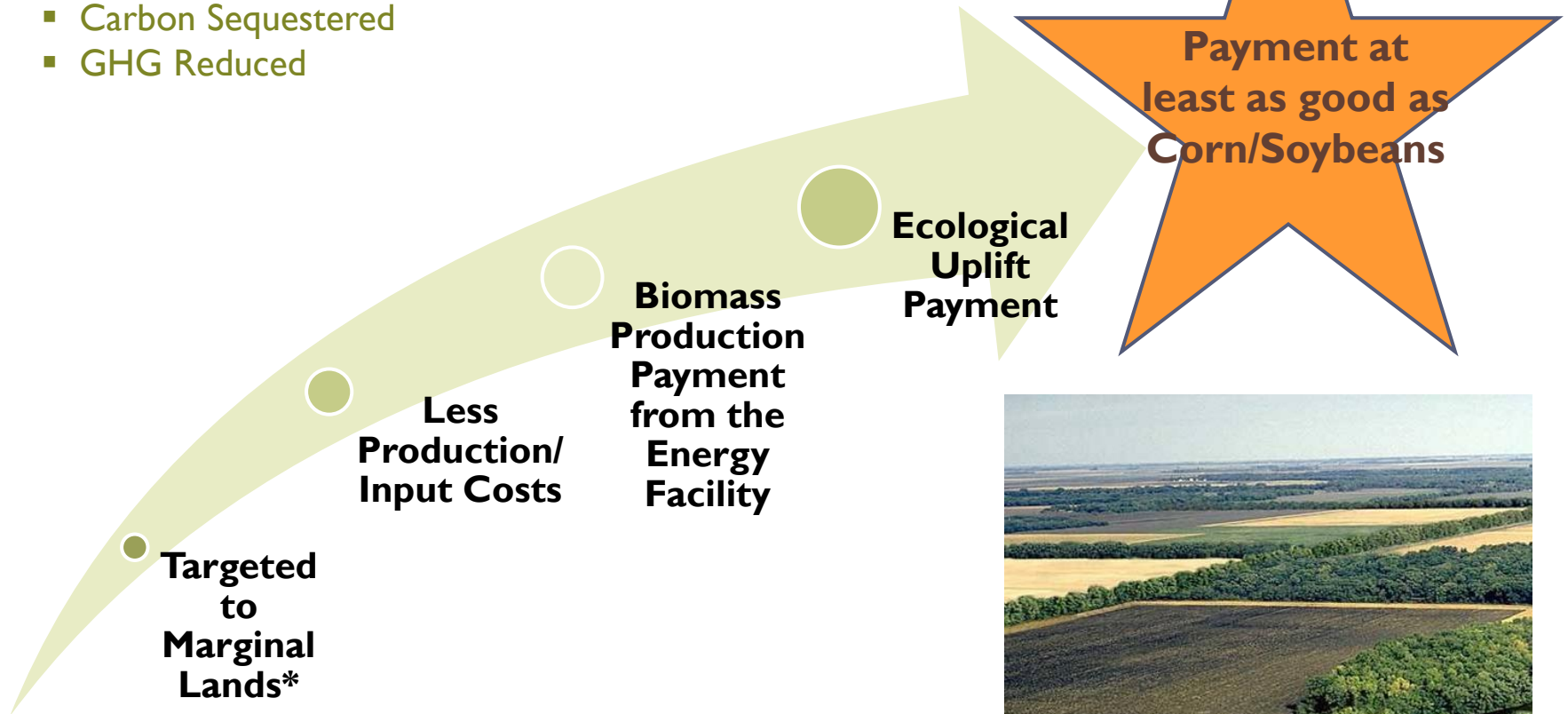
L Meschke Photo

Targeting Acres



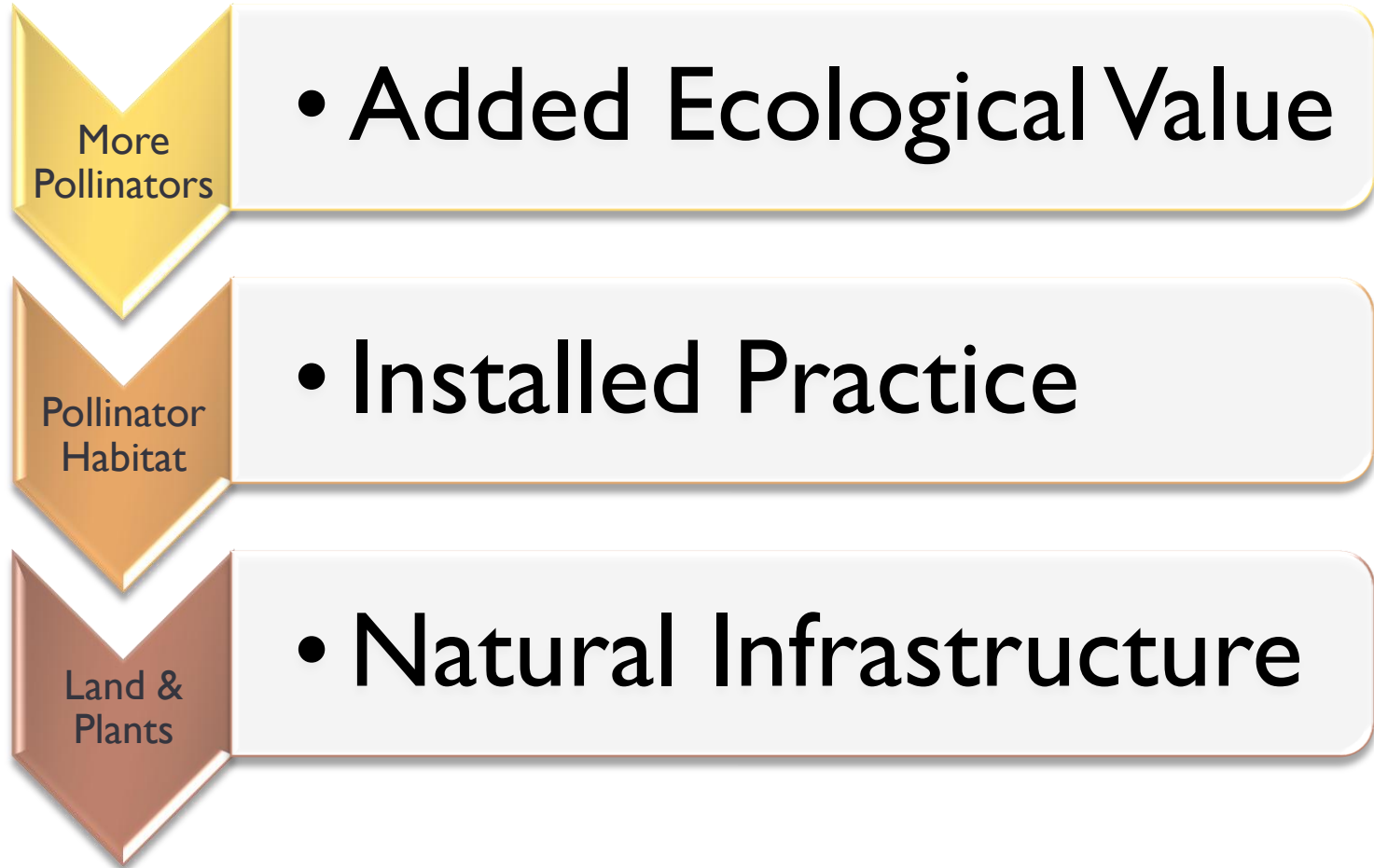
Potential Ecological Uplifts:

- Sediment, N & P Reduction
- Water Storage Increased
- Wildlife & Pollinator Habitat
- Carbon Sequestered
- GHG Reduced



* Compare economics of corn production on **marginal lands** to dedicated energy crop economics.

What are we paying for?



Stacking/ Bundling Credits

Sediment
Filtered

- Added Ecological Value

Phosphorous
Reduced

- Added Ecological Value

Carbon
Sequestered

- Added Ecological Value

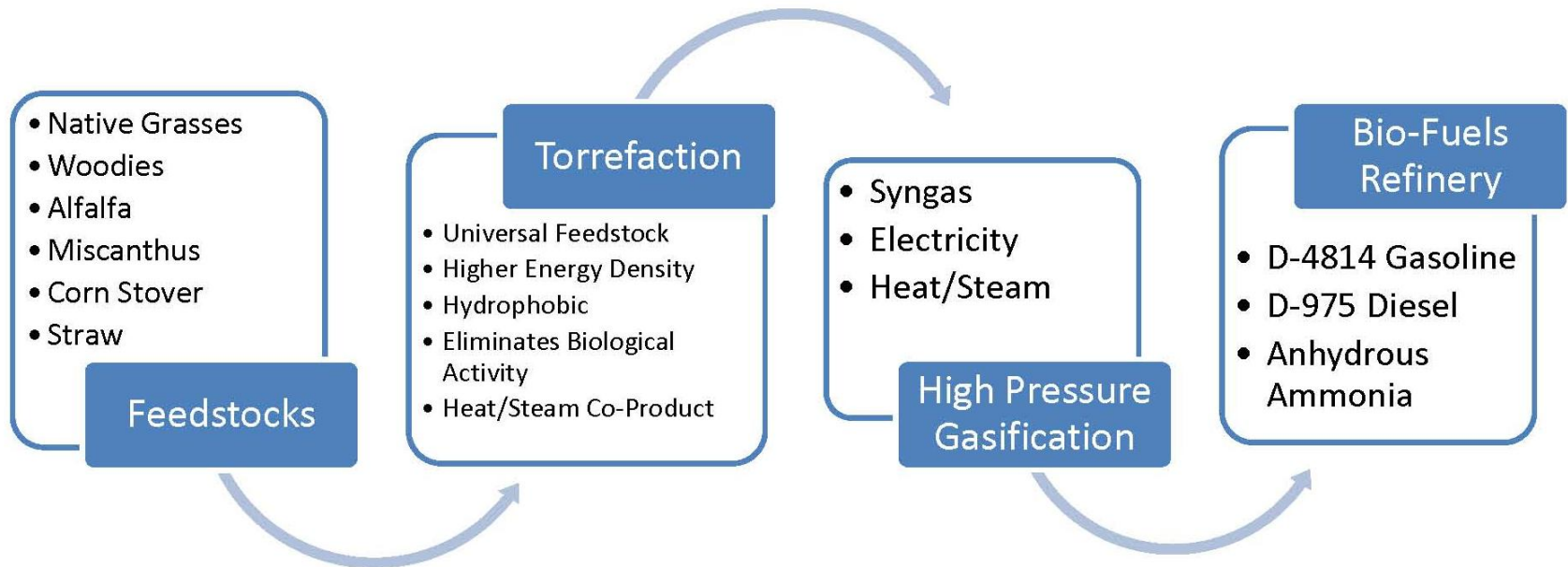
Vegetated
Buffer

- Installed Practice

Land & Plants

- Natural Infrastructure

Prairie Skies Bio-Energy Project



- Multiple Feedstocks
- Targeted to Marginal Lands
- Co-Located Next To A Major Agricultural Processor
- Supports Rural Economies

- Multiple Benefits
 - Water Quality
 - Wildlife Habitat
 - Less GHG
 - New Enterprises & Jobs



L Meschke Photo

The End

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