



# Economic Analyses of DDGS Values and Alternative Ethanol Policies

by

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# Presentation on Two Topics

- The first topic concerns our work to estimate the value of new DDGS products that could be produced from the technical research in this project.
- The second topic relates to some of our work on alternative policies designed to reduce risk in ethanol investments



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# DDGS Value Estimation

- To estimate the value of DDGS products, we developed feed ration models for hog production in the Mid-west.
- Models were developed for three stages of hog production: Grower-1, Grower-2, and Finish.



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# DDGS Models

- The feed ration models minimize the cost of feed rations given the nutritional content of feed ingredients, ingredient cost, and animal nutritional requirements.
- The models use linear programming to estimate the least cost rations.
- DDGS values were obtained from the shadow price of DDGS at different incorporation rates in the rations.



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# Data – Nutrient Content

		Agri-Energy LLC, Luverne; Minnesota	Central MN Ethanol Coop, Little Falls; Minnesota	Minnesota Energy, Buffalo Lake; Minnesota	"New" DDGS, Purdue University, Indiana
	Units	DDGS2	DDGS3	DDGS4	DDGS5
MEnergy	kcal/lb	3610	3504	3764	3424
Crude Protein	per lb	0.2913	0.2715	0.2664	0.3451
App.Dig.Meth+Cyst	per lb	0.0101	0.01	0.0096	0.0132
App.Dig.Threonine	per lb	0.0079	0.0077	0.0080	0.0096
App.Dig.Tryptophan	per lb	0.0014	0.0012	0.0014	0.0015
Calcium	per lb	0.0006	0.0004	0.0002	0.0008
Phosphorus	per lb	0.0074	0.0064	0.0067	0.0073
Avail. Phosphorus	per lb	0.0062	0.0054	0.0057	0.0062
Fat	per lb	0.0972	0.0999	0.0930	0.0121
App.Dig.Lysine	per lb	0.0051	0.0048	0.0055	0.0065
Crude Fiber	per lb	0.0589	0.0496	0.0690	0.0643



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# Data – Feed Ingredient Cost (\$/lb.)

DDGS	0
Corn	0.0393
Soybean Meal	0.0911
Limestone	0.024
DiCalPhosphate	0.1865
VitP_TM	0.85
LysineHCL	0.801
DLMethionine	1.445
Grease	0.195
Lthreonine	1.875
Ltryptophan	22.7



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# Data – Nutritional Constraints

	Grower1 50-100 lbs		Grower2 100-150 lbs		Finisher2 200-250 lbs	
	Min	Max	Min	Max	Min	Max
MEnergy	1605		1585		1545	
CrudeProtein						
AppDigMethCys	0.005063		0.004399		0.003818	
AppDigThreon	0.005472		0.004788		0.004104	
AppDigTryp	0.001404		0.001248		0.001092	
Calcium	0.008	0.0095	0.0075	0.009	0.0065	0.008
Phosphorus	0.007	0.0085	0.0065	0.008	0.0055	0.007
AvailPhosp	0.0023	0.00475	0.0021	0.0045	0.0015	0.004
CrudeFat		0.085		0.08		0.07
AppDigLysine	0.0095		0.0083		0.00664	
CrudeFiber		0.035		0.035		0.035

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# Results – DDGS4/Grower2

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	<b>0%</b>	<b>5%</b>	<b>10%</b>	<b>15%</b>
COST (\$/lb)	0.05183	0.0491	0.04651	0.04402
VALUE OF DDGS4 (\$/lb)	0.05447	0.05447	0.04973	0.04973
<b>Nutrients (\$/lb)</b>				
AppDigThreon	1.58057	1.58057		
AppDigTryp			4.19631	4.19631
Calcium	-0.01762	-0.01762	-0.02303	-0.02303
Phosphorus	0.86312	0.86312	0.85814	0.85814
AppDigLysine	0.98768	0.98768	0.98501	0.98501

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# Results – DDGS5/Grower2

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	<b>0%</b>	<b>5%</b>	<b>10%</b>	<b>15%</b>
COST (\$/lb)	0.05183	0.0489	0.04632	0.04373
VALUE OF DDGS5 (\$/lb)	0.05849	0.05849	0.05164	0.05164
<b>Nutrients (\$/lb)</b>				
App.Dig.Threonine	1.58057	1.58057		
App.Dig.Tryptophan			4.19631	4.19631
Calcium	-0.01762	-0.01762	-0.02303	-0.02303
Phosphorus	0.86312	0.86312	0.85814	0.85814
App.Dig.Lysine	0.98768	0.98768	0.98501	0.98501

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# Change in DDGS Value

Product	\$/lb.	\$/ton
DDGS5	.05164	103.28
DDGS4	.04973	99.46
Difference	.00191	3.82



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# Use of Change in DDGS Value

- The DDGS values can then be used in the dry-mill model that you have seen previously, together with changes in capital and operating costs and changes in other product yields to estimate overall economic impacts of the new technology.



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# Ethanol Subsidy Policy

- The current federal ethanol subsidy is 51 cents per gallon of ethanol and is invariant with the price of crude oil.
- We have designed alternative ethanol subsidies that vary with the underlying economic conditions.
- Today we will present one that varies with the price of crude oil.



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# Basic Ethanol Economics

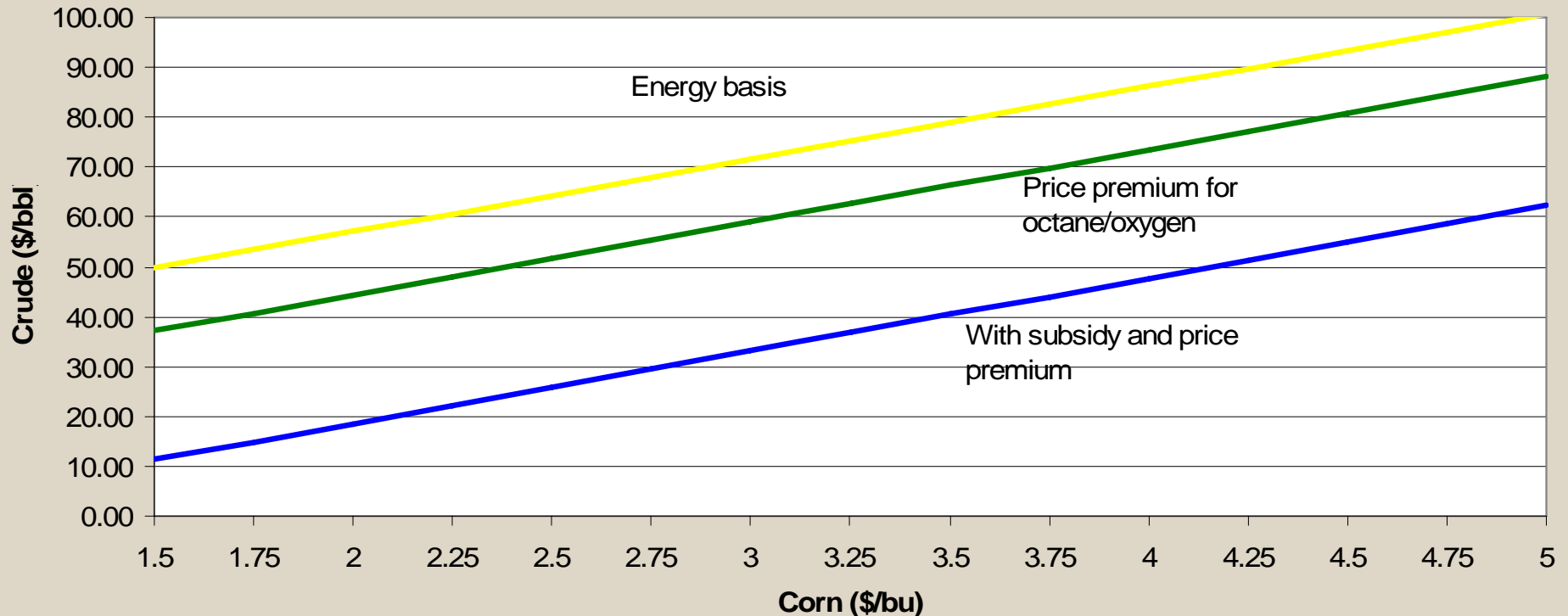
- First, we will translate basic corn ethanol costs into a two dimensional graph showing the corn price breakeven for different crude oil prices.
- Assumptions are used on crude – gasoline price linkage, gasoline – ethanol price linkage, corn – DDGS price linkage, capital costs, operating costs, yields, etc.



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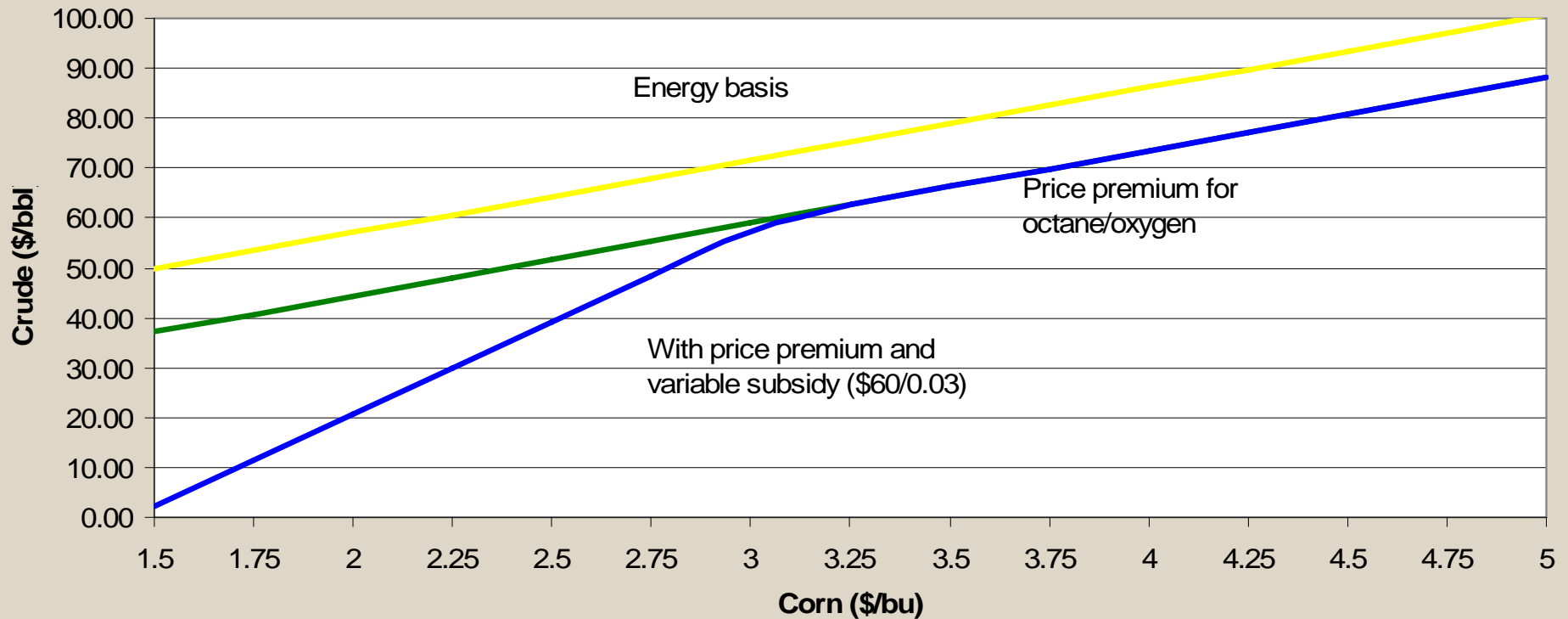
## Breakeven Corn and Crude Prices with Ethanol Priced on Energy and Premium Bases plus Ethanol Subsidy



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## Breakeven Corn and Crude Prices with Ethanol Priced on Energy and Premium Bases plus Variable Ethanol Subsidy



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# Variable Subsidy Impacts

- The variable subsidy provides a safety net for ethanol producers while limiting the pressure for upward corn price increases.
- Cellulosic ethanol could be stimulated through an additional variable incentive, a capital cost subsidy for early plants, a loan guarantee, or other options. Research is continuing on these options.



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