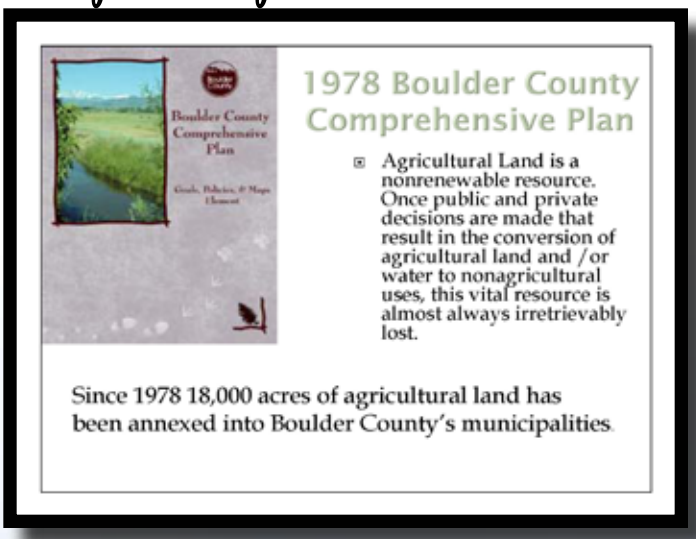
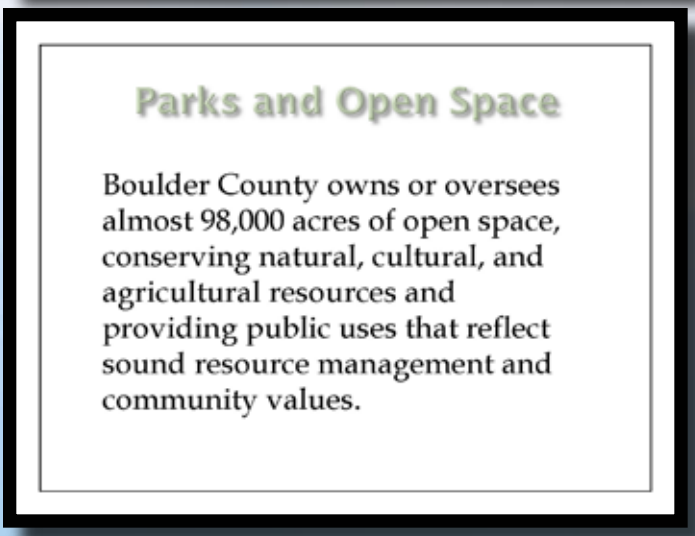
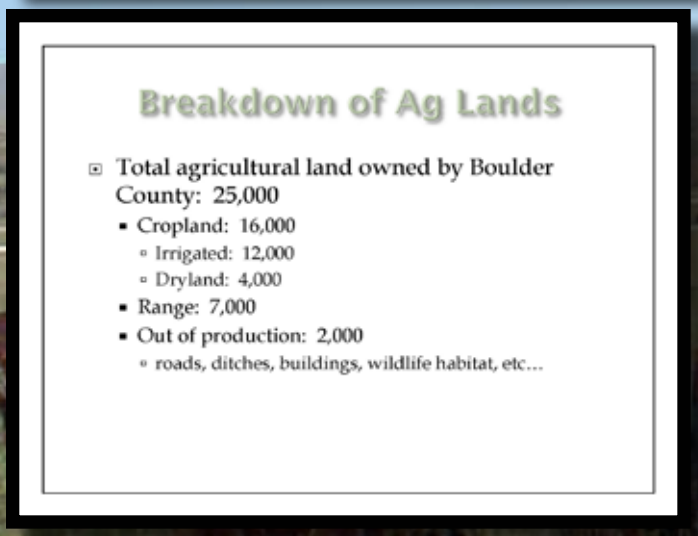
David Bell

Boulder County Parks and Open Spaces

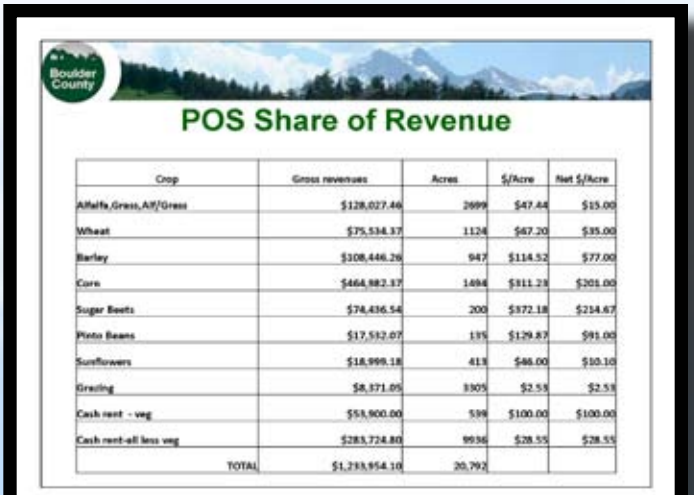




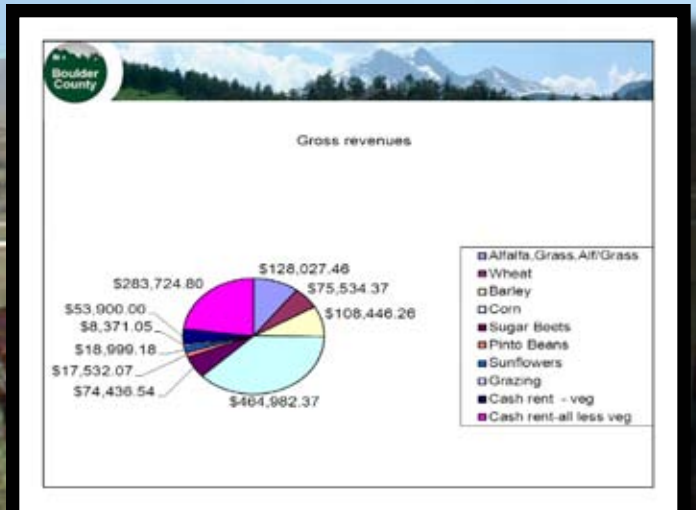



How Do We Accomplish This?


Partners in
Conservation

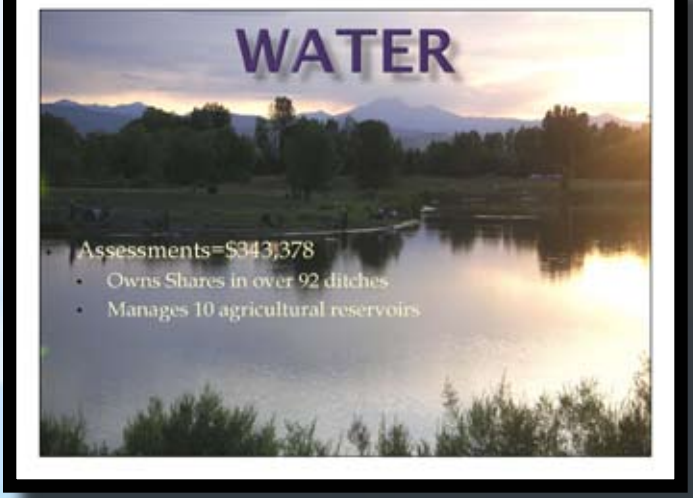


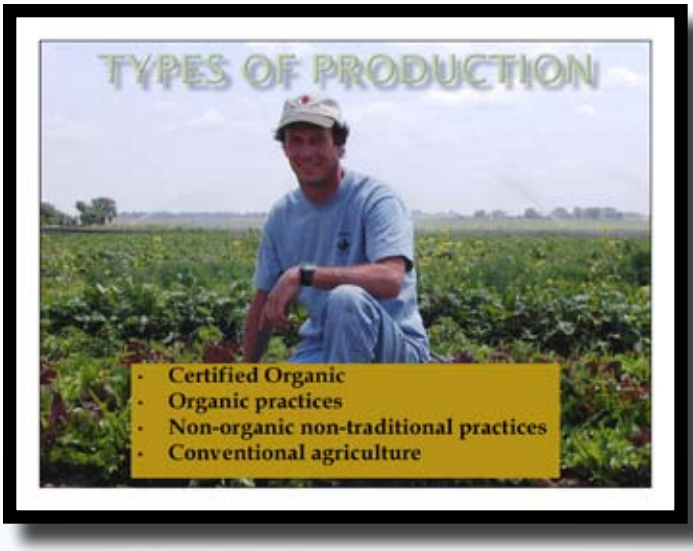
Crop	Gross revenues	Acres	$/Acre	Net $/Acre
Alfalfa,Grass,Alf/Grass	$128,027.46	2699	$47.44	$15.00
Wheat	$75,534.37	1124	$67.20	$35.00
Barley	$108,446.26	947	$114.52	$77.00
Corn	$464,982.37	1494	$311.23	$201.00
Sugar Beets	$74,436.54	200	$372.18	$214.67
Pinto Beans	$17,532.07	135	$129.87	$91.00
Sunflowers	$18,999.18	413	$46.00	$10.10
Grazing	$8,371.05	3305	$2.53	$2.53
Cash rent - veg	$53,900.00	539	$100.00	$100.00
Cash rent-all less veg	$283,724.80	9936	$28.55	$28.55
TOTAL	$1,233,954.10	20,792		



The Revenue is Returned to the Program

	Budgeted	Spent	Remainder
O&M	$178,163.00	$171,507.93	$6,655.07
Water	$352,000.00	$343,378.75	$8,621.25
Crop Share	$434,500.00	$473,532.62	-$39,032.62
Budgeted 2717	$964,663.00	$988,419.30	-$23,756.30





GROWERS ASSOCIATIONS

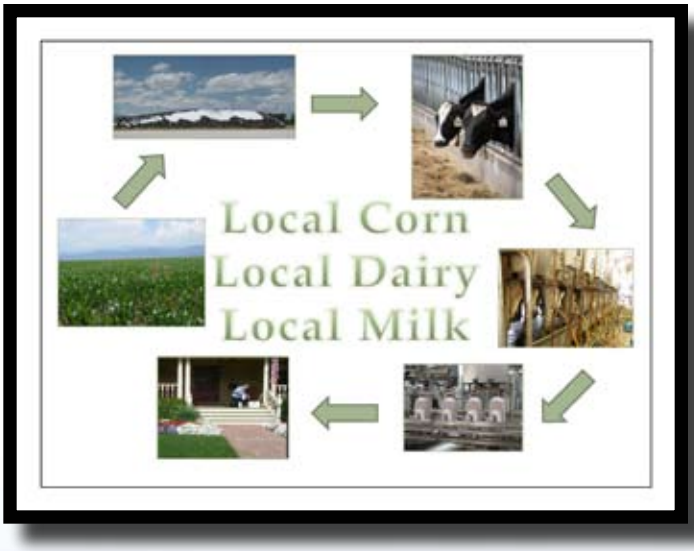
- Association of individuals who want to do small parcel farming
- County Breaks up larger potion of land to allow for smaller acreage than a typical lease
- County creates necessary water source for drip irrigation Association a necessity to deal with irrigation/water use issues

Market Farms

Ownership with an Ag Lease

LARGE SCALE VEGETABLE OPERATIONS

Traditional Commodity Crops



CHALLENGES

- Weather
- Water
- Wildlife
- Weeds

CHALLENGES CONTINUED

- The urban interface
  - Visual
  - Noise
  - Smells
  - Practices
  - The Crops

OPPORTUNITIES

- Local Food Movement
- Organic
- Gluten free
- Cage Free
- Grass feed
- Natural

OPPORTUNITIES CONTINUED

- Malting facilities
- Processing
- Milling

OPPORTUNITIES CONTINUED

- Innovation
- Creativity
- Efficiencies

Farmer's Market

- Gunbarrel Growers Association
  - Hoot- n- Howl
  - Dew Farm
  - Frog Star Farm
- Niwot Growers Association
  - Gorilla Farm
  - Ginger Cat Farm
  - Dew Farm
  - Oxford Gardens
- Monarch Growers Association
  - Black Cat
- Peck
  - Ollin Farm
- Peck Growers Association
  - Mark Guttridge
  - Peter Volz
  - John Brown
- Hygiene Dairy
  - Red Wagon Organic Farm
- ERTL
  - Glen Schultz

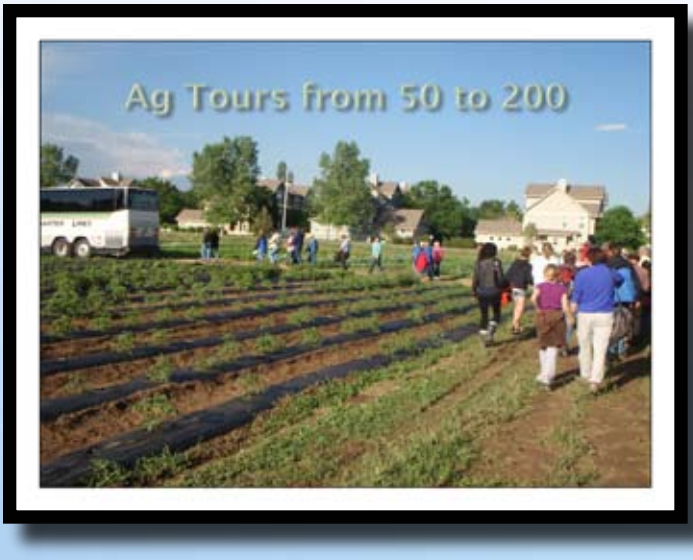
EXPANSION OF FARMER'S MARKET SITE IMPROVEMENTS

- Concrete walkway, trees and vendor sites with electric hookups: $150,000
- Electric upgrades: $80,000
- Additional vendor sites, concrete walkways and a pavilion: $150,000

St. Vrain Valley School District


ORGANIC INCENTIVES
Reduced rent during transition
Organic preferences
Infrastructure improvements


Exploring Local Markets
11 Producers
15 Buyers
12 Supporting entities


Ag Tours from 50 to 200


OUTREACH
Parks and Open Space
GROWN IN
BOULDER COUNTY
Community Outreach
Ag Tours
Booth at the County Fair


Evaluating the Use of Municipal Compost on Agricultural Properties


Local Biodiesel Program

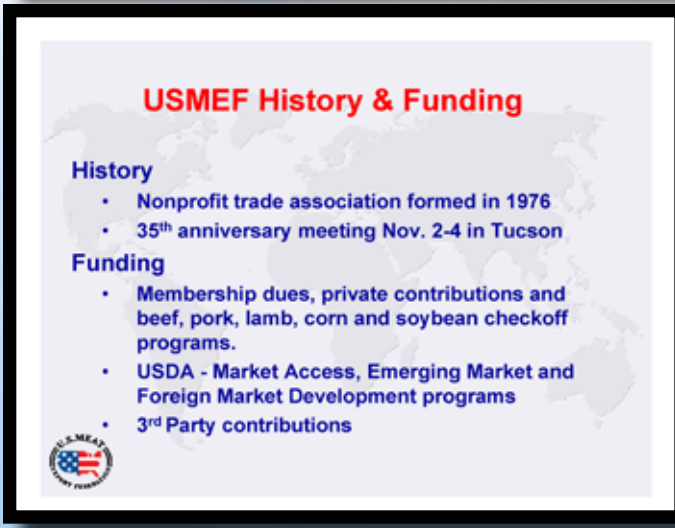
"The future of Wyoming agriculture rests on our ability to engage the next generation of farmer, ranchers and agribusiness innovators. The strong participation by knowledgeable and enthusiastic young people in the 2011 AgriFuture Conference left me with sense of comfort and hope regarding our future."

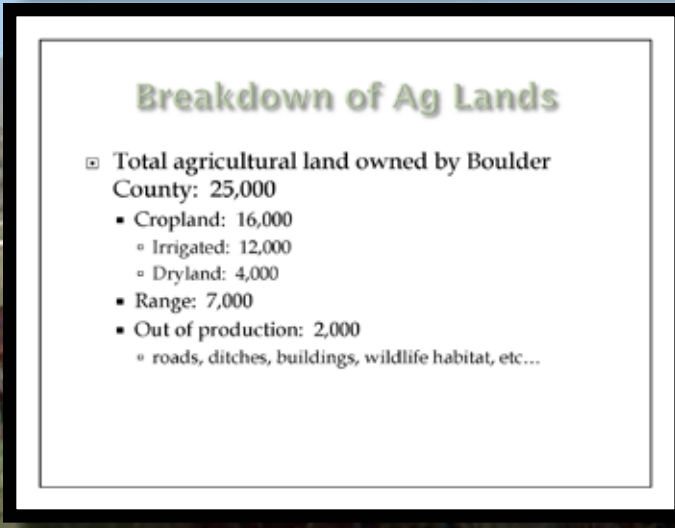
Jim Magagna

Wyoming Stock Growers Association

Greg Hanes

U.S. Meat Export Federation



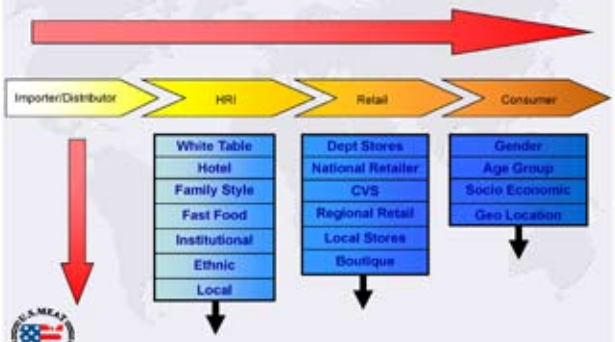


Two Key Strategies

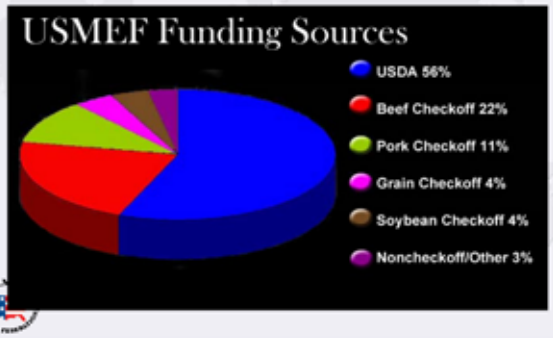
Market Access – minimize the impact on U.S. beef exports of issues arising in the international markets from government policies and consumer perceptions

Market Development – introduce U.S. beef to new buyers in each market while expanding the volume and range of cuts purchased by current buyers

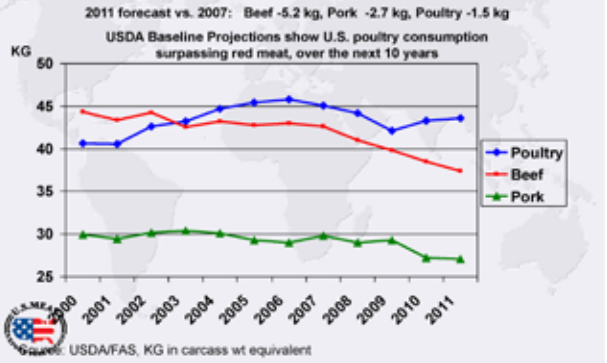
TQM Marketing



Importance of Checkoff Funds

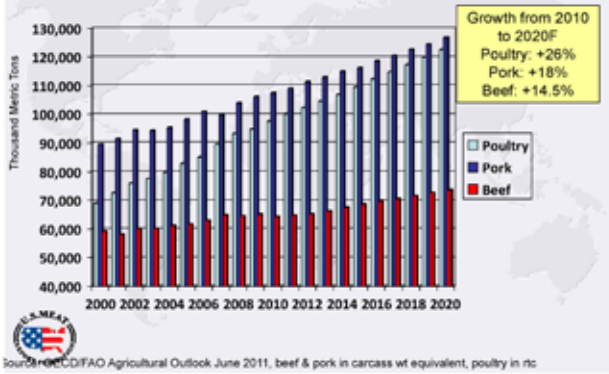


U.S. Per Capita Meat Consumption



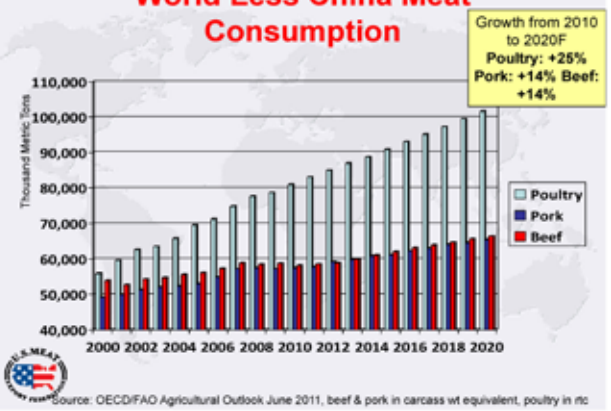
Source: USDA/FAS, KG in carcass wt equivalent

World Meat Consumption



Source: OECD/FAO Agricultural Outlook June 2011, beef & pork in carcass wt equivalent, poultry in rtc

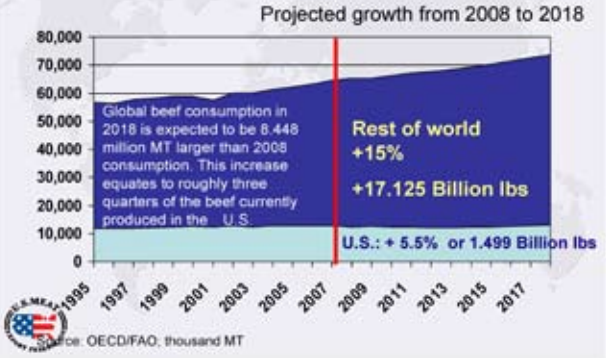
World Less China Meat Consumption



Source: OECD/FAO Agricultural Outlook June 2011, beef & pork in carcass wt equivalent, poultry in rtc

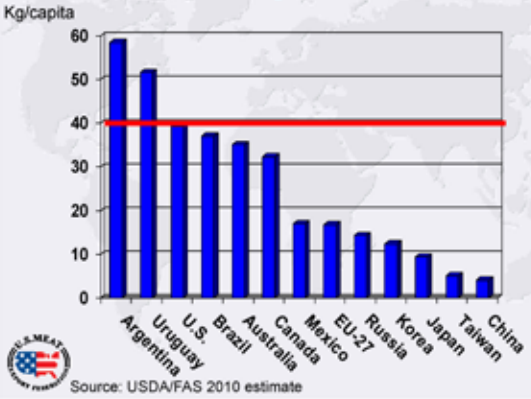
Beef Trends

Growth in Beef Consumption



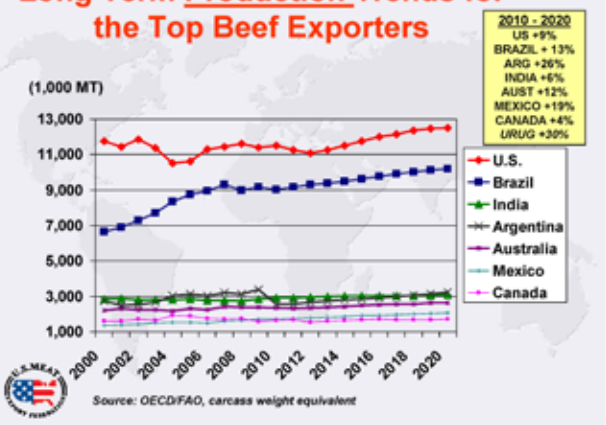
Per Capita Beef Consumption

Lots of room for growth outside the U.S.



Source: USDA/FAS 2010 estimate

Long Term Production Trends for the Top Beef Exporters



Source: OECD/FAO, carcass weight equivalent

Beef & Beef Variety Meat Import Status

January through July 2011 (yr/yr change)

- U.S. 435,147 MT, -15%
- Russia 428,940 MT, +12%
- Middle East Jan-June ~330,000 MT, +2%--depending on India's exports and excluding Iran
- Japan 321,668 MT, +7%
- Hong Kong 223,738 MT, -1%
- Korea 192,978 MT, +19%
- EU-27 147,289 MT, -17%

Beef & Variety Meat Export Status

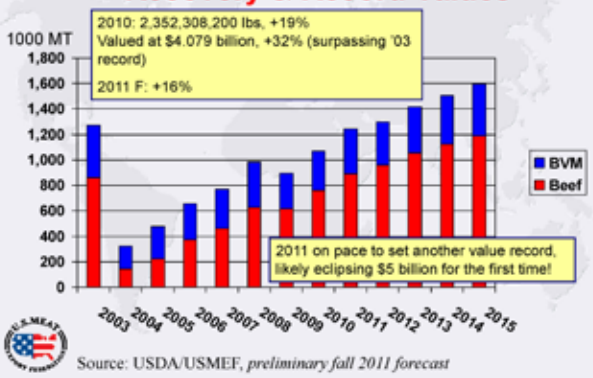
U.S. was the largest beef & variety meat exporter in Jan-July 2011!

- U.S. 741,275 MT, +26%
- Australia 630,507 MT, +2%
- Brazil 588,072 MT, -18%
- India ??? - likely >340,000 MT
  - Depending on Egypt ban, etc (export data only available through Feb)
- New Zealand 277,450 MT, -6.4%
- EU-27 262,150 MT, +124%
  - Turkey and Russia

Canada 193,975 MT, -22.4%

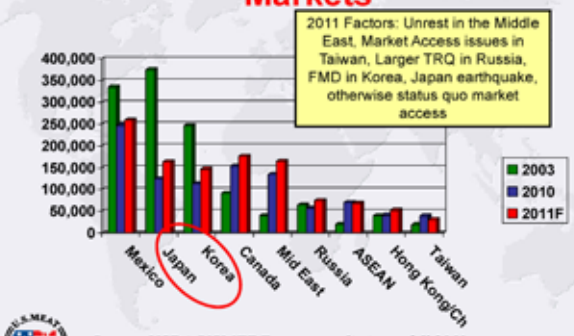
Jan-July Beef Export Status

U.S. Beef Exports, Volume Recovery & Record Values



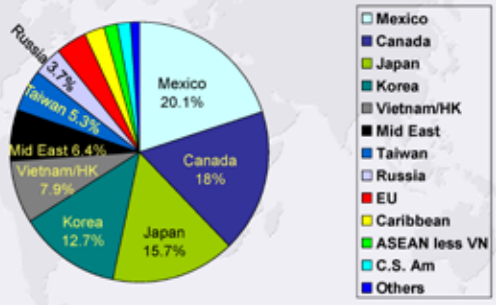
Source: USDA/USMEF, *preliminary fall 2011 forecast*

U.S. Beef Exports to Top Markets



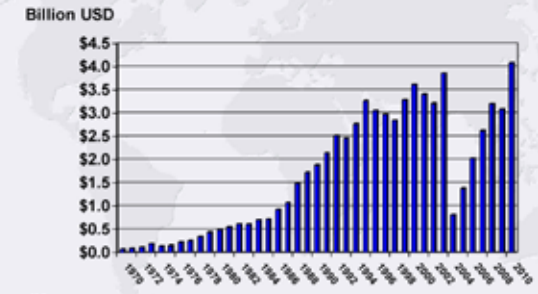
Source: USDA/USMEF Forecast *preliminary fall 2011*, thousand MT, includes variety meats

2010 U.S. Beef & Variety Meat Exports Top Value Markets



Source: USDA/FAS, USMEF

Value of U.S. Beef Exports



Source: USDA/USMEF

Value of Exports per Head Slaughtered

Source: USDA/USMEF, steer & heifer slaughter

Maximizing Carcass Value

Rounds, shoulder clods, inside skirts, and variety meats to Mexico

Rounds and livers to Russia

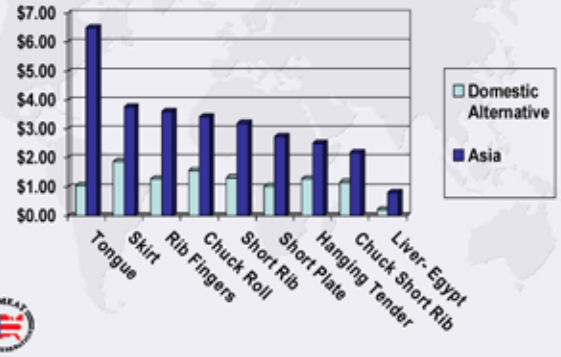
Livers to Egypt & growing volume of forequarter cuts

Short ribs, chuck rolls, short plates, variety meats to Korea

Short plates, chuck rolls, short ribs, and variety meats to HK/China & Taiwan

Short plates, chuck eye rolls, briskets, short ribs, tongues & outside skirts to Japan

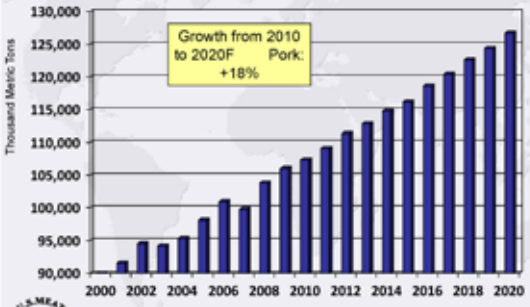
A Few Cut Premium Examples



Exporting our way to profitability: Maximizing carcass value

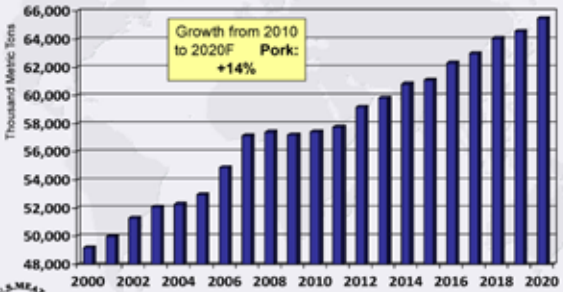
Pork Trends

World Pork Consumption



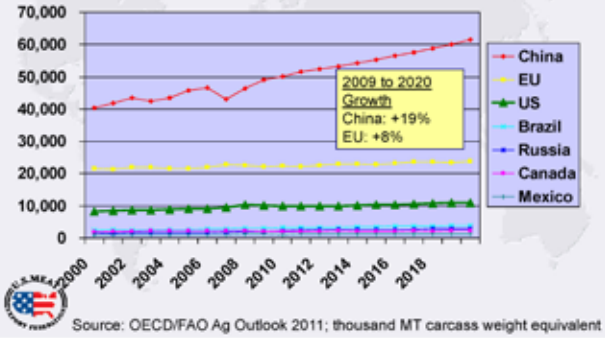
Source: OECD/FAO Agricultural Outlook June 2011, beef & pork in carcass wt equivalent, poultry in rtc

World Less China Pork Consumption



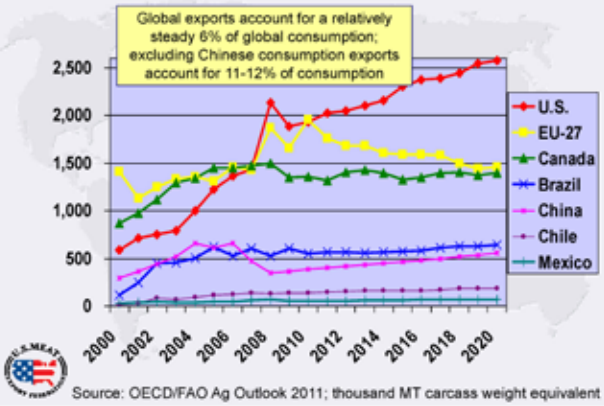
Source: OECD/FAO Agricultural Outlook June 2011, beef & pork in carcass wt equivalent, poultry in rtc

Pork Production Trends with China and the EU



Source: OECD/FAO Ag Outlook 2011; thousand MT carcass weight equivalent

Longer Term Pork Export Trends



Source: OECD/FAO Ag Outlook 2011; thousand MT carcass weight equivalent

Jan-July 2011 Pork Import Status

- Japan steady at 552,940 MT
  - U.S. market share 45%
- Russia up 8% to 404,389 MT
  - U.S. market share 7% (EU 49%, Brazil 28.5%, Canada 13%)
- Korea up 90% to 330,594 MT
  - U.S. market share 35%
- Hong Kong down 5% to 180,892 MT
  - U.S. market share 6% (EU 66%; Brazil 21%); *excludes imports from China*
- China up 51% to 155,772 MT
  - U.S. market share 49%
- Mexico down 4% to 232,147 MT
  - U.S. market share 92%

Source: GTA, excludes variety meats

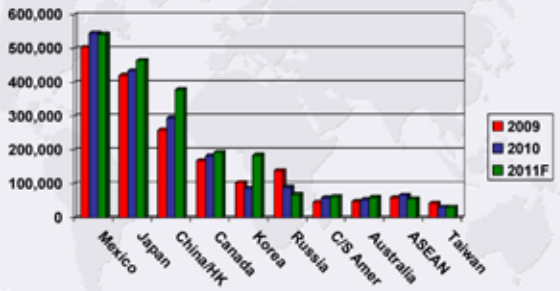
Pork Export Status, Jan-July 2011

U.S. was the largest pork exporter in the world…

- U.S. up 15% to 962,575 MT led by strong growth to Korea, China, Japan, Australia, Canada
- EU up 23.6% to 924,897 MT; led by strong growth to Korea, China, Hong Kong, Belarus, Russia
- Canada steady at 513,926 MT down to U.S. and Japan; up to Russia, Korea and China
- Brazil down 4% to 265,731 MT down to Russia but up to Hong Kong, Argentina, Angola, and down to Singapore
- Chile up 6% to 60,460 MT mainly on growth to Japan; decrease to Korea

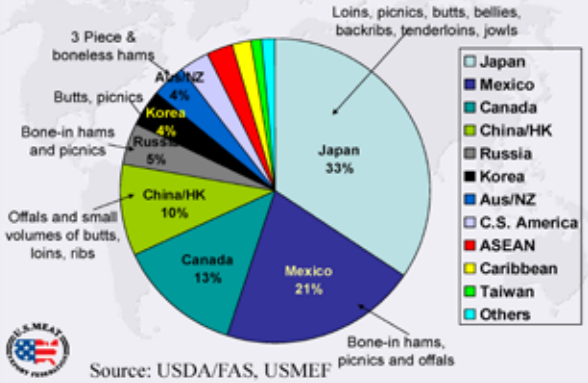
Source: GTA, excludes variety meats

U.S. Pork & Variety Meat Exports by Market



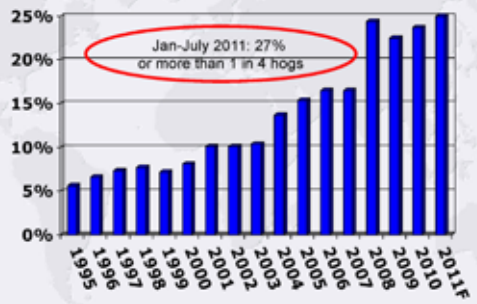
Source: USDA and USMEF Forecast, metric tons

2010 U.S. Pork Exports Top Value Markets & Main Export Items



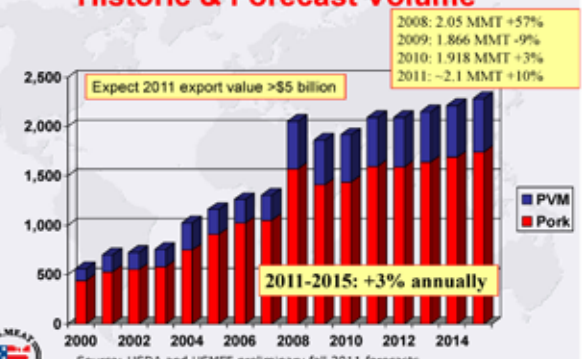
Source: USDA/FAS, USMEF

US Pork Exports as Percent Production



Source: USDA/USMEF, includes variety meats

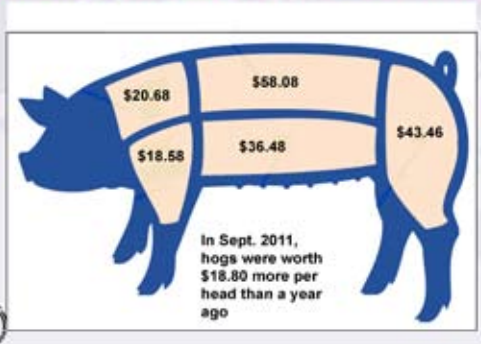
U.S. Pork Exports Historic & Forecast Volume



Source: USDA and USMEF preliminary fall 2011 forecasts

PVM= Pork Variety Meats; thousand metric tons

Exports Increase Pork Cutout Value



Don't Forget Our Farmers

- More than 470 million bushels of corn exported through U.S. red meat in 2010
- Nearly 80 million bushels of soybeans…
- Direct corn exports up 15% since 1990
  - Indirect exports through red meat: up 340%

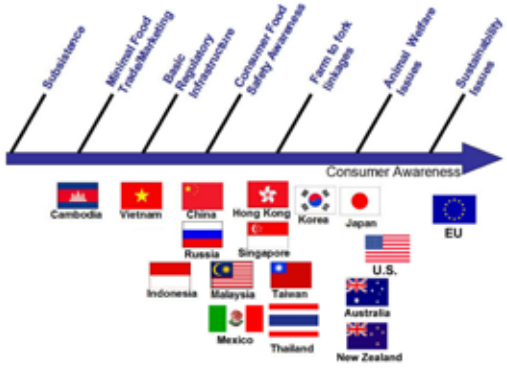
And Don't Forget Jobs

Every $1 billion in agricultural exports supports an estimated 8,400 jobs

- Last year red meat exports alone supported about 74,000 jobs
- Proposed Free Trade Agreements with South Korea, Colombia and Panama would add another 20,000 jobs

The Global Export Environment

USMEF Food "Awareness" Spectrum



Critical Issues

- **Animal welfare**
  - Need for baseline for measurement
  - Lower priority in countries where hunger is an issue
- **Private standards**
  - Differing views in established vs. developing countries
  - Potential for trade problems
- **Sustainability**
  - Lacking consistent definition, measurement

UK retailer leads the way

- Morrisons becomes first top 4 UK retailer to use 100% British free-range eggs for its private label
  - **9 months ahead of forecast**
  - **2 years ahead of EU-wide ban on battery cages**
- Australian supermarket chain Coles
  - **Refused to buy pork after 2014 from farms that confine pregnant sows in stalls**
  - **Pork producers phasing out practice by 2017**

Korea Beef Traceability System (www.mtrace.go.kr): April 2009

Japan: In-store Beef Traceability Kiosks

"We must remember what we are here to accomplish. In time, agriculture will face the challange of feeding an ignorant world, but it must first overcome the domestic war fought between its own producers."

Kyle Thoman
University of Wyoming

Don Collins
Western Research Institute

Science to Technology to Commercialization

AgriEnergy–BioEnergy–BioProducts

AgriFuture

October 13, 2011
Laramie, WY

Don Collins
Chief Executive Officer
Western Research Institute
365 North 9th Street
Laramie, WY 82070
307-721-2208
http://www.westernresearch.org/

WesternResearch INSTITUTE

WesternResearch

Outline

- Brief Introduction – Western Research Institute
- Energy Resource Picture
- Agriculture-Water-Energy Nexus
- U.S. Dept of Energy Biomass-Bioenergy Program
- Biomass Feedstock Inventory and Future Forecasts
- Biomass-to-Bioenergy Conversion Technologies
- Biomass Torrification R&D at WRI
- BioConversion of CO_2 into Biofuels and Bioproducts
- Wrap Up

 2

WesternResearch

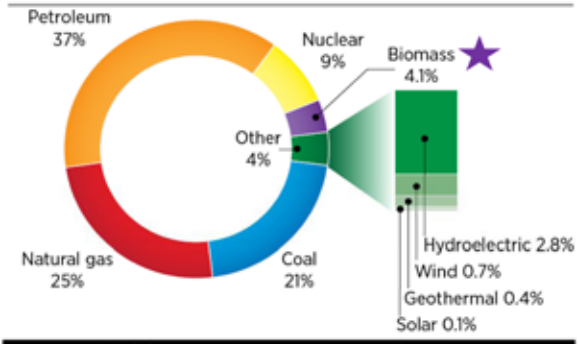
Western Research Institute Introduction

- WRI is a $15 million per year research and development 501(c)(3) non-profit institute with a multidisciplinary team of 76 highly skilled scientists, engineers and support personnel.
- Established as the University of Wyoming Research Corporation, d/b/a WRI in 1983 when the Laramie Energy Technology Center, a U.S. DOE laboratory, was de-Federalized.
- The State of Wyoming via UW retained WRI's expertise in WY with a charter to:
  - Further the educational, research, developmental and public service objectives of the University of Wyoming.
  - Carry out scientific research to aid Wyoming by attracting new industry, encouraging development of and retention of industries.

 3

WesternResearch

Energy Resource Picture Today

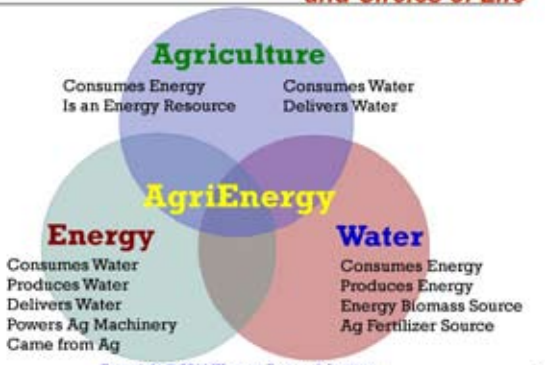


Source: U.S. DOE, Energy Information Administration, Monthly Energy Review, July, 2010

 4

WesternResearch

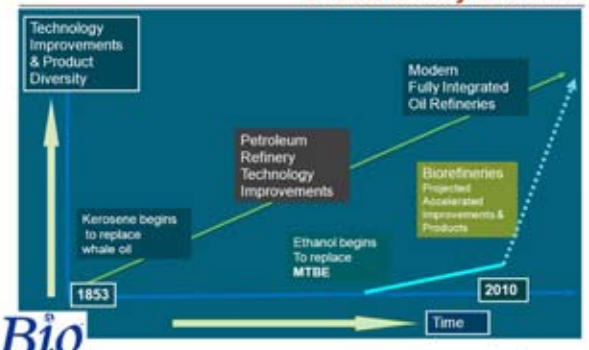
Agriculture-Water-Energy Nexus and Circles of Life



 5

WesternResearch

We are Just at the Beginning of Biorefinery Evolution



Bio BIOTECHNOLOGY INDUSTRY ORGANIZATION

Source: Brent Erickson, Biotechnology Industry Organization, Bio.org

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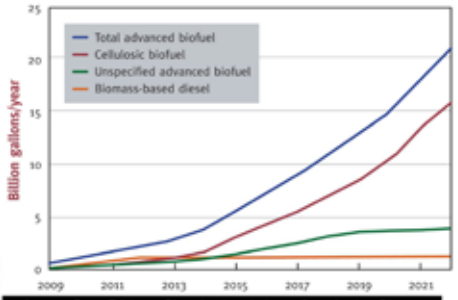
Advanced Biofuels Production to 2022 Under the Federal Renewable Fuel Standard

U.S. Production of Advanced Biofuels under RFS



Bio BIOTECHNOLOGY INDUSTRY ORGANIZATION

Source: Brent Erickson, Biotechnology Industry Organization, Bio.org

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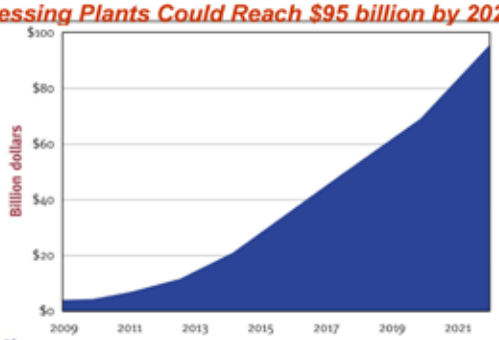
Cumulative Investment in Advanced Biofuels Processing Plants Could Reach $95 billion by 2022



Bio BIOTECHNOLOGY INDUSTRY ORGANIZATION

Source: Brent Erickson, Biotechnology Industry Organization, Bio.org

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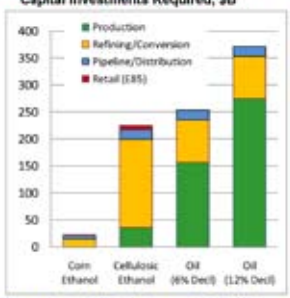
Capital Needs for Biofuels is Significant, But Developing New Oil Supplies Will Be Equally Capital Intensive

- CAPEX for 60 BGY ethanol: $250B
- CAPEX for 40 BGY petroleum: $250B-$370B
  - $160B to $270B for exploration and production

Sandia National Laboratories

GM

Capital Investments Required, $B



*New production of 40B gal oil per year in Gulf of Mexico assumes 6% or 12% decline in field over a 50-year period. (Requires ongoing investment in oil field production)

Bio BIOTECHNOLOGY INDUSTRY ORGANIZATION

Source: Brent Erickson, Biotechnology Industry Organization, Bio.org

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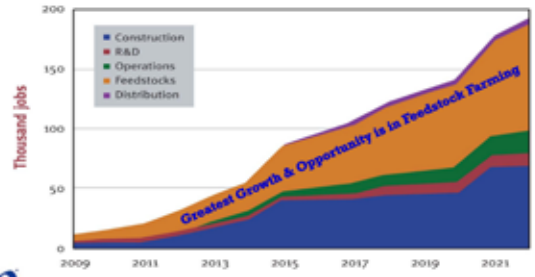
Job Creation Potential in Agriculture, Construction, Research, Operations

Jobs Directly Created from U.S. Advanced Biofuels Production



Bio BIOTECHNOLOGY INDUSTRY ORGANIZATION

Source: Brent Erickson, Biotechnology Industry Organization, Bio.org

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Increasing Advanced Biofuel Production to 45 BGY by 2030

- *Would create:*
  - More than 400,000 jobs within the industry
  - Nearly 1.9 million jobs throughout the economy
  - Direct economic activity of $113 billion
  - Total economic boost of $300 billion

Direct Economic Output from 45 BGY Advanced Biofuels Production (billion dollars)

Bio BIOTECHNOLOGY INDUSTRY ORGANIZATION

Source: Brent Erickson, Biotechnology Industry Organization, Bio.org

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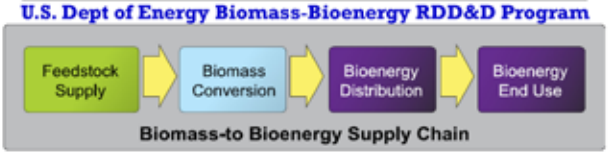
Sustainable Biomass-Bioenergy Industry

U.S. Dept of Energy Biomass-Bioenergy RDD&D Program



Biomass-to Bioenergy Supply Chain

- **Feedstock Supply**: Produce large, sustainable supplies of regionally available biomass and implement cost-effective biomass feedstock infrastructure, equipment, and systems for biomass harvesting, collection, storage, preprocessing, and transportation.
- **Bioenergy Production**: Develop and deploy cost-effective, integrated biomass conversion technologies for the production of biofuels, bioproducts, and biopower.
- **Bioenergy Distribution**: Implement biofuels distribution infrastructure (storage, blending, transportation—both before and after blending, and dispensing).
- **Bioenergy End Use**: Assess impact of fuel blends on end-user vehicles.

Source: U.S. Dept of Energy Biomass Multi-Year Program Plan April, 2011

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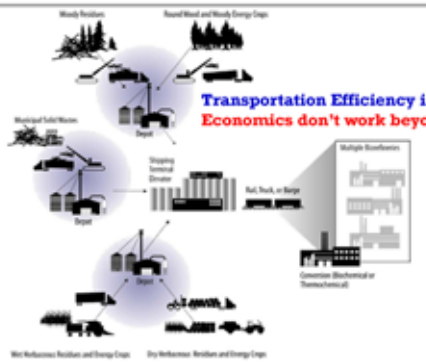
Advanced Feedstock Supply Chain



Transportation Efficiency is Vital!
Economics don't work beyond 40-60 miles.

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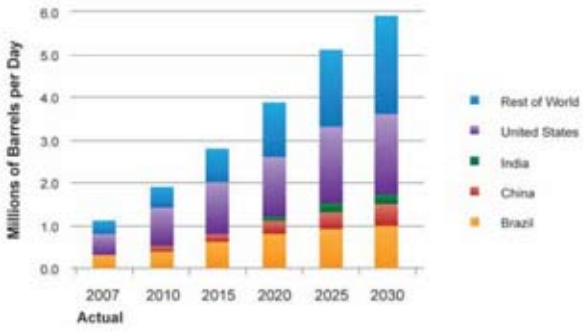
Biofuel Production Forecast



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DOE Biomass R&D Performance Goals

- Cellulosic biofuels become cost competitive with petroleum fuels
  - $1.76/gallon for ethanol ($2.62/GGE*) by 2012
  - $2.85/gallon for renewable gasoline by 2017
  - $2.84/gallon for renewable diesel by 2017
- Maximize biofuels production by 2022
- Increase biopower contribution to renewable energy goals

* GGE = Greenhouse Gas Equivalent

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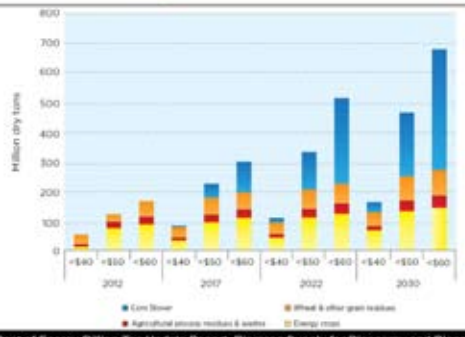
Agricultural Biomass Forecast



Source: U.S. Dept of Energy Billion Ton Update Report, Biomass Supply for Bioenergy and Bioproducts Industry, August, 2011

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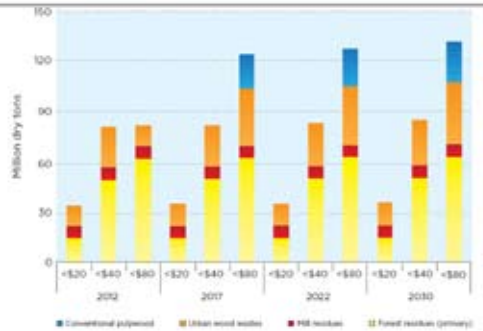
Forest Biomass Forecast



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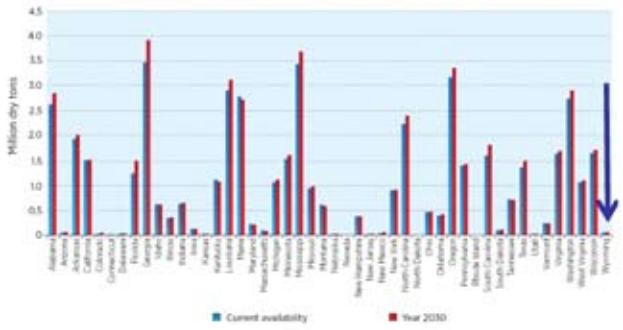
Logging Residue



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Coal Bed Methane Produced Waters

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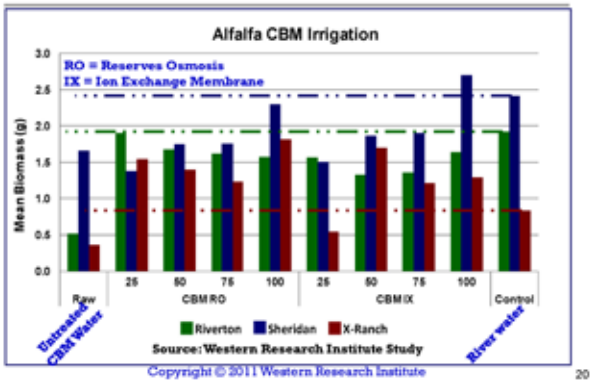
Coal Bed Methane Produced Waters



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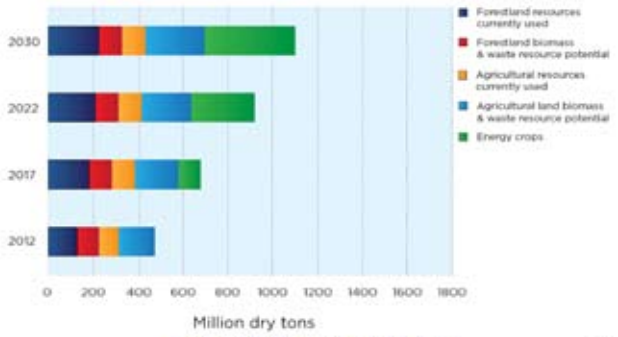
Present Potential @ ≥$60/Dry Ton



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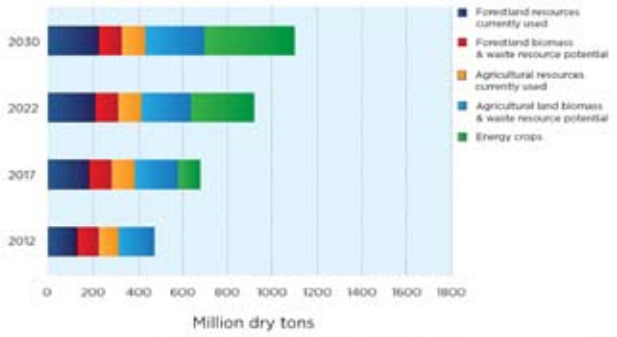
Present Potential @ ≥$60/Dry Ton



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Biochemical Conversion Cost Est.

	2009 $/DT	2010 $/DT	2011 Projected	2012 Projected	2017 Projected
Total Feedstock Logistics, $/DT	**$46.15**	**$37.80**	**36.10**	**$35.00**	**$35.00**
Harvest and Collection	$13.30	$13.80	$13.80	$13.15	$13.15
Storage and Queuing	$7.25	$3.50	$2.65	$2.45	$2.45
Preprocessing	$14.15	$11.45	$10.65	$11.50	$11.50
Transportation and Handling	$11.45	$9.05	$9.00	$7.90	$7.90
Total Feedstocks Logistics, $/gal Ethanol	**$0.63**	**$0.50**	**$0.46**	**$0.44**	**$0.44**
Harvest and Collection	$0.18	$0.18	$0.18	$0.17	$0.17
Storage and Queuing	$0.10	$0.05	$0.03	$0.03	$0.03
Preprocessing	$0.19	$0.15	$0.14	$0.14	$0.14
Transportation and Handling	$0.16	$0.12	$0.11	$0.10	$0.10
Gallons Ethanol/Dry Ton	73	75	78	79	79

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Gasification Conversion Cost Est.

	2009 $/DT	2010 $/DT	2011 Projected	2012 Projected	2017 Projected
Total Feedstock Logistics, $/DT	**$71.05**	**$67.50**	**$56.40**	**$48.37**	**$48.37**
Harvest and Collection	$22.30	$21.30	$19.40	$18.75	$18.75
Storage and Queuing	$0.00	$0.00	$0.00	$0.00	$0.00
Landing Preprocessing	$13.60	$13.60	$12.20	$11.42	$11.42
Transportation and Handling	$12.50	$12.00	$10.50	$8.95	$8.95
Plant Receiving and In-Feed Preprocessing	$22.65	$20.60	$14.30	$7.25	$7.25
Total Feedstock Logistics, $/gal Ethanol	**$1.02**	**$0.85**	**$0.71**	**$0.55**	**$0.55**
Harvest and Collection	$0.32	$0.27	$0.24	$0.22	$0.22
Storage and Queuing	$0.00	$0.00	$0.00	$0.00	$0.00
Landing Preprocessing	$0.19	$0.17	$0.15	$0.14	$0.14
Transportation and Handling	$0.18	$0.15	$0.13	$0.11	$0.11
In - Plant Receiving and Preprocessing	$0.32	$0.26	$0.18	$0.09	$0.09
Gallons Ethanol/Dry Ton	70	79	80	84	84

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Biomass Gasification to Fuels & H_2

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Pyrolysis Conversion Cost Est.

	2009 SOT	2010 SOT	2011 Projected	2012 Projected	2017 Projected
Total Feedstock Logistics, $/DT	**$81.45**	**$77.90**	**$66.80**	**$56.77**	**$56.77**
Harvest and Collection	$22.30	$21.30	$19.40	$18.75	$18.75
Storage and Queuing	$0.00	$0.00	$0.00	$0.00	$0.00
Landing Preprocessing	$13.60	$13.60	$12.20	$11.42	$11.42
Transportation and Handling	$12.50	$12.00	$10.50	$8.95	$8.95
Plant Receiving and In-Feed Preprocessing	$33.05	$31.00	$24.70	$17.65	$17.65
Total Feedstock Logistics, $/gal Ethanol	**$1.12**	**$0.98**	**$0.80**	**$0.68**	**$0.68**
Harvest and Collection	$0.31	$0.27	$0.23	$0.21	$0.22
Storage and Queuing	$0.00	$0.00	$0.00	$0.00	$0.00
Landing Preprocessing	$0.19	$0.17	$0.16	$0.14	$0.14
Transportation and Handling	$0.17	$0.15	$0.13	$0.11	$0.11
In-Plant Receiving and Preprocessing	$0.45	$0.39	$0.30	$0.20	$0.21
Gallons Ethanol/Dry Ton	72.5	79.6	83.7	83.7	83.7

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Enhancing Biomass Contribution to U.S. Energy Security

- Torrification of woody biomass to enhance BioEnergy Plants
- Enables long term storage with decomposition and rotting
- Compatible with existing plant feed preparation - Handles and grinds just like coal
- Suitable for small and large scale applications
- Improves wood and biomass pellet integrity – does not fall apart after getting wet
- Under commercialization

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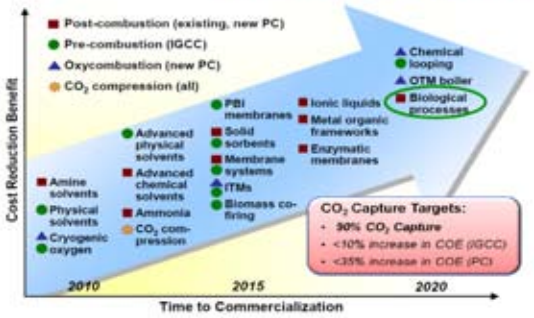
U.S. DOE Office of Fossil Energy CO_2 Capture R&D Roadmap



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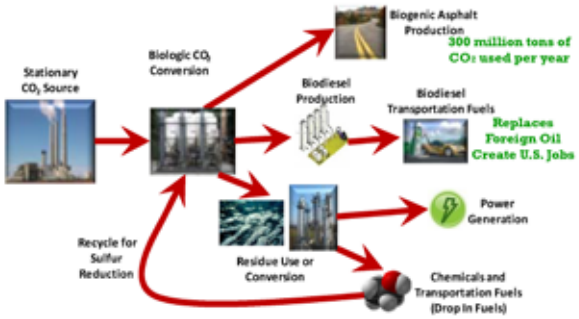
CO_2 into BioFuels and BioAsphalt

without hurting food supplies



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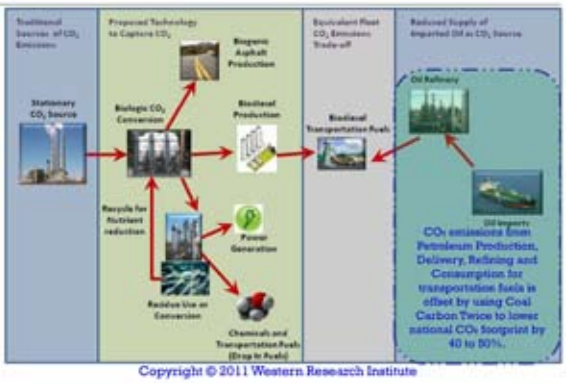
Lowers National CO_2 Footprint 40-50%



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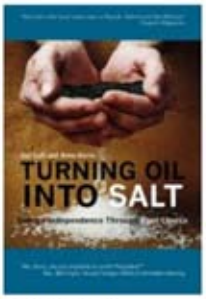
National Benefits

- **U.S. Economy is Bolstered from within**
  - Domestic jobs for greater BioFuel capacity
  - New domestic BioAsphalt industry
  - Enables more BioAsphalt products
  - Enables domestic BioPharmaceutical industry
  - Enables domestic BioFertilizer industry
  - Helps save high CO_2 emitter industries in U.S.
  - Adds to Federal revenue to lower U.S. debt
  - Applicable to all States



- **Foreign Trade Deficit is Lowered**
  - Substantially less foreign crude oil imported
  - Enables new domestic products for export
- **Foreign Policy Position/Options are Enhanced**
  - Lessens strength of oil as political weapon and foreign policy constraint
  - "Turning Oil into Salt – Energy Independence Through Fuel Choice" G. Luft, A. Korin

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Energy & Environmental Benefits

- **Energy Security is Enhanced**
  - Increases domestic energy resources
  - Enough BioFuel to saturate U.S. diesel market
  - Asphalt BioBinder supplied domestically

WRI CAT Process
CO_2 to BioAsphalt and Fuels

- **Environmental Concern Solved with Economy Benefit**
  - Makes CO_2 a beneficial resource to address climate change concerns
  - No longer a waste that costs the U.S. Economy
  - Enhances Fossil and BioEnergy value while lowering CO_2, SOx, NOx emissions
  - Use Carbon in fossil and bio-feedstocks at least twice
  - Locks 300MMtons of CO_2 annually in BioAsphalt long-term with asphalt recycling
  - Creates a constructive nexus between Energy Emissions and Highway Infrastructure

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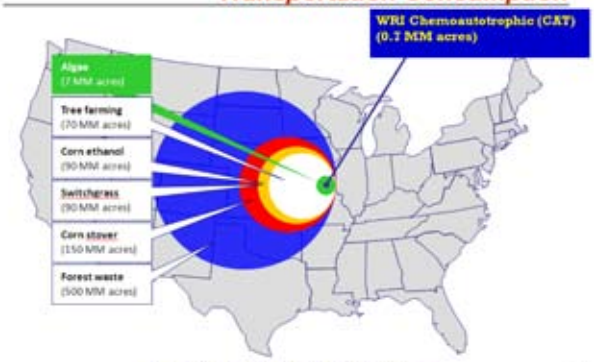
Land Required for Biofuel = 15% of Transportation Consumption



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Wrap Up

- AgriEnergy-BioEnergy-BioProducts in AgriFuture
- AgriEnergy enables Sustainable Economies
- AgriEnergy enables local job growth
- BioEnergy enhances Energy & Economic Security
- Biomass-to-Bioenergy Conversion Technologies
- Technologies are coming
- BioConversion of CO_2 into Biofuels and Bioproducts
- U.S. DOE and Bio.org are great resources
- Agriculture-Water-Energy Nexus

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"I enjoyed the opportunity to exchange views and learn from so many various representatives from agriculture. I have gained some ideas and financial opportunities to explore in my ag adventure. It was a great experience and I look forward to next years conference."

BREN LIESKE
Bren's Hens

Milton Geiger

Wyoming Cooperative Extension Service

Agriculture and Energy – A consuming producer...

Milton Geiger
Energy Extension Coordinator
AgriFuture
October 13, 2011

University of Wyoming
Cooperative Extension Service

School of Energy Resources

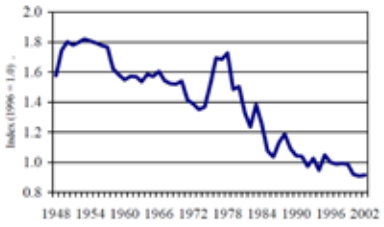
Outline

- Energy and agriculture – Context
- Agriculture as a user of energy
  - Efficiency first...
- Agriculture as a producer of energy
  - The renewables...

Agriculture's energy use – National context

14.4%

Agriculture's energy use – Declining energy intensity



Agriculture's energy use – Impact on expenses

15%

Agriculture's energy use – Volatility

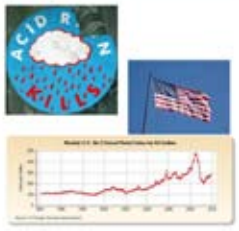
Agriculture's energy use – What you can do...

Agriculture as a producer – Renewable energy (RE)

- Biomass
  - Heat, power, and transportation fuels
- Geothermal
  - Direct use and heat pumps
- Hydroelectric
  - Micro and small
- Solar
  - Thermal
  - Photovoltaic (PV)
- Wind
  - Small and utility-scale

Agriculture as a producer – Why own a small RE system

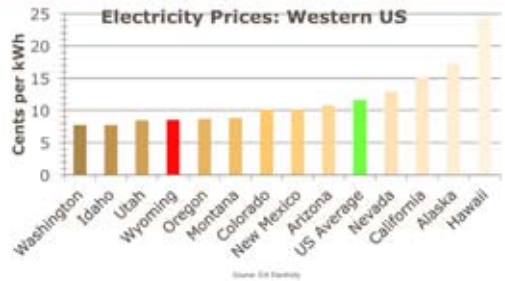
- Energy Independence
  - Limited assistance to national independence
  - Important component of individual independence
- Environmental concerns
  - Air pollution
  - Climate change
  - Sustainability
- Education/Community
  - Technical fascination
- **Save money**
  - Know the cost of your energy into the future



Agriculture as a producer – Why to not own a small RE system

- Maintenance
  - Responsible for energy production, not simply delivered as a service
- Intermittent resource
  - Sun and wind cannot economically be stored
- **Cost**
  - Can be more expensive than existing energy from grid or fossil fuel heating resources

Agriculture as a producer – Responding to price signals



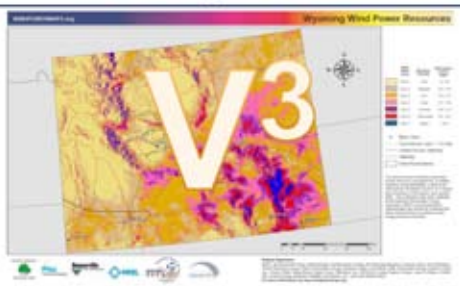
Agriculture as a producer – Big and small renewable energy systems

- "Small"
  - Reduce costs to address that 15%
    - Electricity
    - Thermal
    - Transportation fuel
  - Includes: Biodiesel, geothermal heat pumps, hydropower (micro), solar thermal, solar electric, and wind (small)
- "Big"
  - Increase revenues
    - Sell electricity or biomass
  - Includes: Biofuels, hydropower (small or large), wind (large)

Small RE – Generate electricity

- Micro-hydropower
- Solar electric (e.g. PV)
- Wind (small)

Small RE – Why small wind



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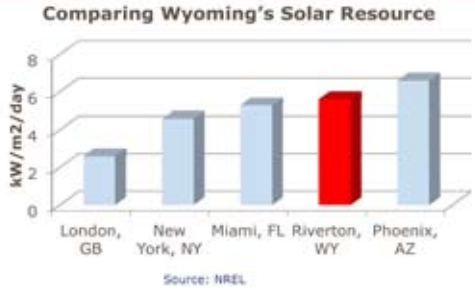
Small RE – Why solar electric



Solar and wind – Why isn't it everywhere?

Cost!

- **Solar produces electricity at 12-16+¢/kWh!**
  - **US Department of Energy has goal of $1/watt installed**
- **Wind can cost can be 8-12+¢/kWh**
  - **Location matters!**

Small RE – Heat and cool buildings

- Biomass
- Geothermal heat pumps
  - Heat and cool
- Solar thermal
  - Hot water and space heating

Often cost effective!

Small RE – Incentives

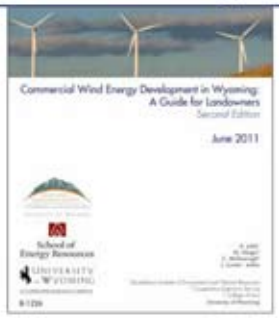
- 30% federal tax credit
  - For all except biomass and hydro
- Accelerated deprecation
  - MACRS
- USDA Rural Development REAP
  - 25% grant
- Net metering
  - Allows for retail rate for grid-tied electrical systems
- Sales tax abatement
  - All electrical RE systems

Agriculture as a producer – Incentives

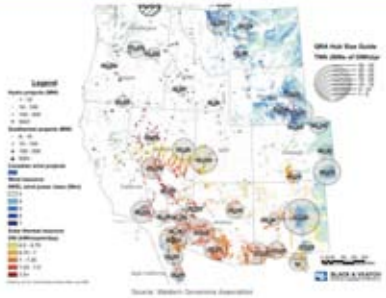
- University of Wyoming Cooperative Extension Service and the State Energy Office offer energy audits and renewable energy development assistance
- Federal funds pay for 75% of services
  - E.g. $1000 assessment for $250
- If act upon the assessment, the State Energy Office will refund your 25%!

http://renewables.uwyo.edu

Agriculture as a producer – Large scale renewable energy

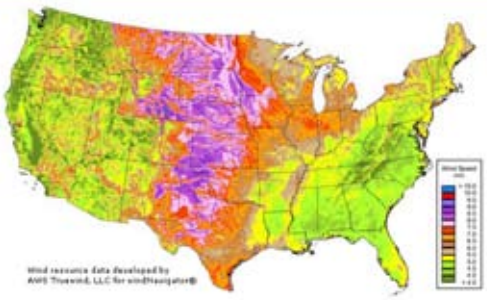


Large-scale RE – Getting the Electricity to Market

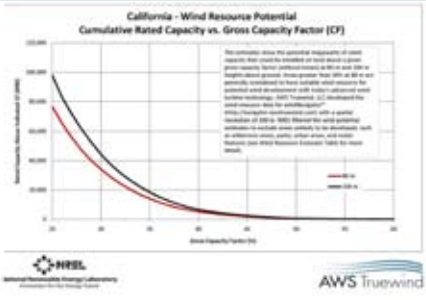


Large-scale RE – Getting the Electricity to Market

Large-scale RE – The wind resource



Large-scale RE – The wind resource



Large-scale RE – The growth of wind energy

Large-scale RE – The power of falling water

- Small Hydro
  - 100 kW-20MW
- Large Hydro
  - 20MW+

Focus of existing water systems: Irrigation and municipal

Large-scale RE – Forgotten hydro potential

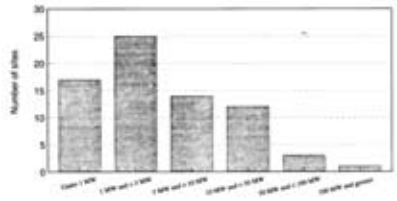


Figure 1. Number of sites with various capacity potentials.

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University of Wyoming
Cooperative Extension Service

School of
Energy Resources

Margaret Fogarty

Farm Credit

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Agriculture and the Media

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Denver, CO

AgriFuture
October 13, 2011

Agriculture and Media

- Why does the media matter?
- A new media model
- How to navigate this space effectively
- Measuring success

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Reputation Drives the Bottom Line

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What's at Stake?

Your reputation

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A New Media Model

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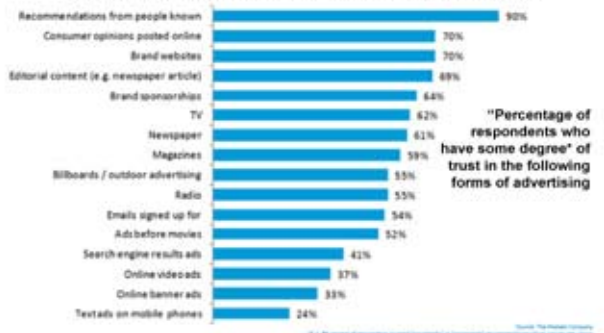
Social Media Influence

Social Media Influence

"Consumers Trust Real Friends and Virtual Strangers the Most"



"Percentage of respondents who have some degree" of trust in the following forms of advertising

Who is Online?

- Nearly 2.1 billion Internet users.
- 71% of the U.S. Web audience is on Facebook.
- 460,000 new Twitter accounts created in the average month.
- LinkedIn has more than 101 million members, and executives from all Fortune 500 companies are LinkedIn members.
- 35% of farmers and ranchers are using ag Internet sites at least monthly – up 53% from 2005 and the only medium in which use grew significantly in the past 5 years.
- Nearly two-thirds who use ag sites find digital media essential to running their farm or ranch.
- 61% of ag media use Facebook and 54% use Twitter "all the time" or "somewhat regularly."

Sources: internetworldstats.com; digitalbuzzblog.com, twitter.com; LinkedIn, Agri Council 2010 Media Channel Study, Truffle Media Networks Spring 2010 survey

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Media Relations

- Proactive
- Reactive
- How they work together

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What's Your Story?

- Weigh risks and benefits
- Create a plan
- Outline clear objectives
- Develop key messages
- Commit to a strategy
- Continually evaluate progress
- Measure your success

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What's Your Story?

- Great Messages:
  - Directed to a specific audience
  - Convey a benefit of relevant information to the target audience
  - Reinforce your brand

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What's Your Story?

- The Interview:
  - Not a conversation
  - Headline first
  - Keep it simple
  - Use examples
  - Repeat your key messages
  - Be brief

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Tips for Working with Media

- Schedule an interview for some point in the future
- Ask who else they are interviewing
- Find out the reporters deadline
- Provide your name, organization, title and background information in writing
- Ask to have the questions in advance

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Sample Objective

- Objective: Raise awareness of the Farm Credit System's 95th Anniversary through national media relations, social media and event outreach.

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Sample Plan

- Create mutlimedia program to celebrate Farm Credit's 95th Anniversary
- Publish interactive content on farmcredit.com and distribute across social media channels
- Distribute press release to launch program at industry event
- Conduct media outreach to secure media interviews
- Draft bylined articles and blogs to place in industry publications

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Sample Program

Sample Program

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Questions & Answers

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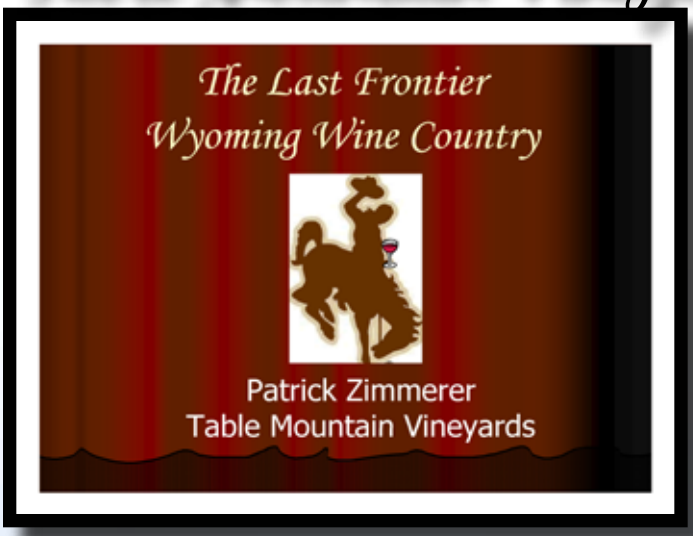
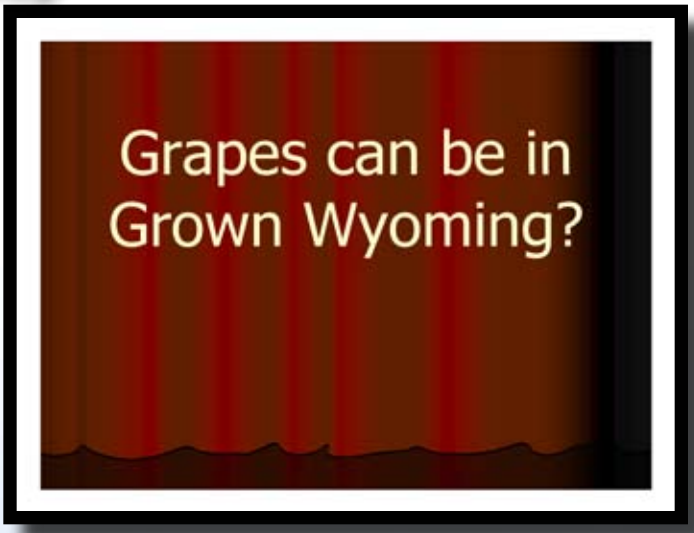
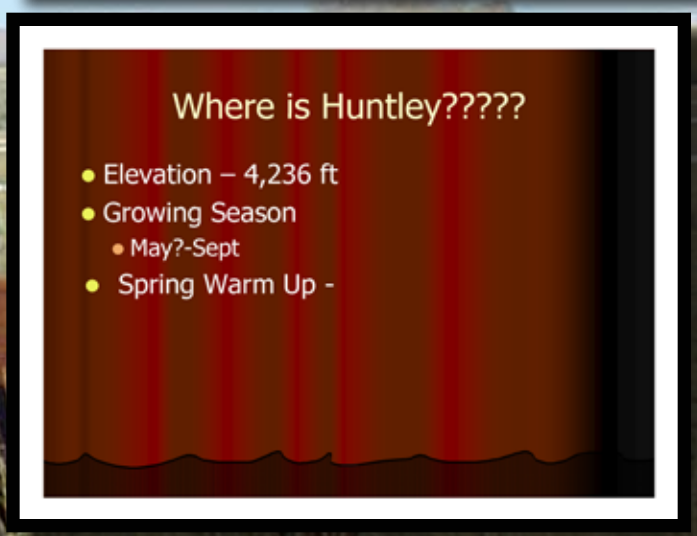
Patrick Zimmerer

Table Mountain Vineyards







Operation History

- 1926 Homestead, Currently 1600 Acres
- Crops Grown
  - Corn, Alfalfa, Beets
- Livestock
  - 150 Head, PB Cattle
  - Feedlot/Wintering Operation
    - Corn, Hay, Silage Mix

How We Got Started

- Create a Value Added Ag Industry
- UWYO Thesis Project
- Education in Action
- 2001 Planted First Vines
- 2004 – Created Business Plan
- UWYO $10K Competition Winners

The Basics

- Small Amount of land needed-corners
- Long Term Investment
- Research/Trials show opportunity for profits and market success

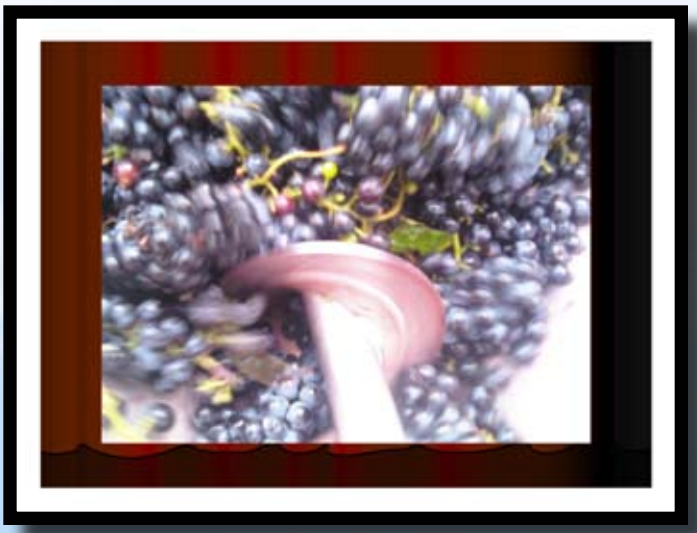
Variety Selection

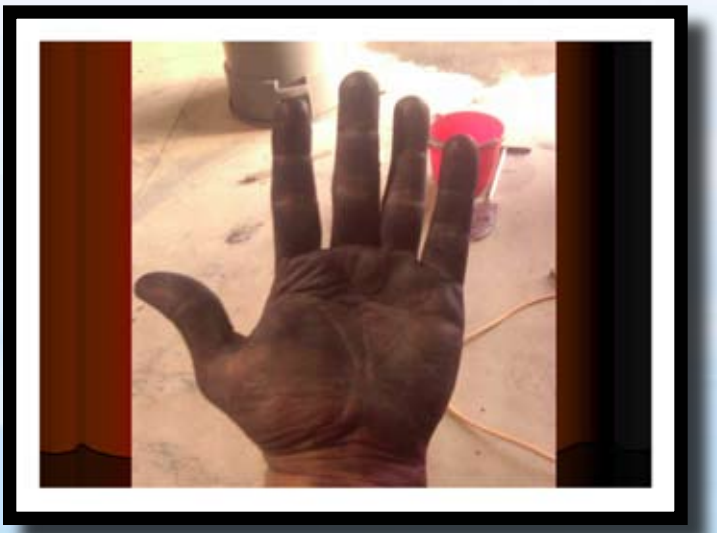
- Cold Hardy
- Quality Wine vrs Survivability
  - Can't Make Wine from Grapes that Won't Grow
- Vines Ordered one Year in advance
  - 2 yr old Rootstock
  - Shipped from NY or MN Nurseries

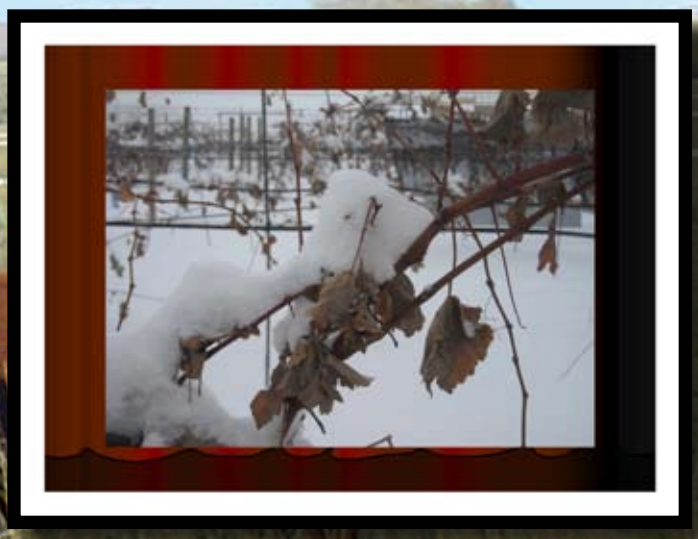
Taking the First Sip: Trial Planting

- Surveyed Sites
- Ordered 300 Vines
- May 2001 first planting
- Good Growth, Viability
- Potentially Climate for Growing


S.O.B.
WINE
RAZ







Support Wyo Wine!

A New CSA –
Comm. Supported Winery

"Vinetages" Wine Club –
*10 Years of Wine
* Lifetime Membership Discount
* Wine Discounts
* Special Offers
* Custom Labels
*Special Invites to Events

Our Wine Philosophy

- Utilize 100% Wyoming Products
  - Locally Grown Grapes, Fruit, Honey
  - Other Wyoming Products for Tasting
- Create and Capture Wyoming's Taste
  - "Wyoming Character"
  - Keeping the Grapes how Nature intended them

Wine Making Process

- Pick-Proper Sugar Levels
- Crush-Stomp away
- Press-Red vrs. White
- Yeast-Sugar to Alcohol
- Age: Sweet 2-3 Months; Reds 4-6 Months

Contact Info

- Patrick Zimmerer
- **www.WyoWine.com**
- **307.459.0233**

Kim Cullen
K2 Red Angus

An Ag degree does not limit you, it only gives you opportunities. What you make of those opportunities is up to you!

Some of the things I have done with mine:

Federal Beef processors – Fargo, ND
Cow Country Genetics – Cody, WY
UW Co Extension – Douglas, WY
K2 Genetics, Alta Genetics, Genex Beef - started in 1999
K2 Red Angus - started in 1999
South Street Rentals, LLC - 2008
Espress…OH!, LLC – 2009
Farming - started in 2011

1. Realize it is not just the degree but everything you do before and after that can be an asset to your future.

An Ag degree is not the end point… but is could be seen as the end of the beginning. All your experiences up to this point add up that beginning. Growing up, maybe working in Ag as a kid, your schooling and other activities will all be valuable to your future and what you can to with your degree

2. The best job is one with learning potential.

I encourage you to look at what you can learn from a job, what you can gain from the experience. Your first job out of college will not be your end point… even if you stay at the same job your whole career…. You will grow in it and change. When you are first getting out of college and receive the first paycheck after the lean college year, the dollar signs look pretty nice. But I would say the learning experience of these jobs is far more valuable and will ultimately lead you farther toward your goals in life.

3. Do something you are passionate about… or do many things you are passionate about!

- When you choose to do something that you are passionate about, it will show in the quality of work, the sincere commitment, the ultimate success of your career or business.

- Do many things… Don't be afraid to try different things. Off the wall completely unrelated things. If you are passionate about it, that is the foundation that makes them all worthwhile.

- For example, cows are my first love and I have built two businesses that center on cattle. Espresso was another, so I built another business around that. The challenge of quality and customer service that will get a customer to pay $4-5 for a cup of coffee… and smile about it!

4. Keep learning!!!

This is the single most important thing you can do with your Ag degree and your future. When I was getting ready for college and filling out scholarship applications, one of my favorite phrases was that I wanted to gain from my education the ability to continue learning throughout my life. Little did I know, I was actually right! To tell you the truth, I didn't even take it that seriously. I just thought it fit well for my purpose. I thought I knew a lot… most of which turned out wrong. And the things I didn't even realize I knew turned out to be the most important.

Learn from work, people you encounter every day, experts in a field, customers, educators, seminars and continuing education, magazines, books, Audio books, etc… Basically if something interests you, find a way to learn about it. If you don't know the answers, look for them. If you are stuck in one place, find something new to learn about. If you think you know all you need to on a subject, challenge yourself to new levels and find a way to learn more. Because your Ag degree and all you have done leading up to it, does give you the ability to keep learning the rest of your life.

Troy Randall
TR Custom Wicking

The Catcher of the Rye

by Matt Cox, Wyoming Business Council

Troy Randall has been fostering an entrepreneurial spirit since his junior high school days in Pine Bluffs, and now as a junior at the University of Wyoming, Randall is a journeyman in the ways of small business

The 22 year-old is the proud principal of TR Custom Wicking, a rye wicking service operating in southeastern Wyoming and the Nebraska panhandle. Randall started his company in 2004 as a way to earn extra money in the summers , but seven years later, TR Custom Wicking is still going strong.

Although rye wicking is a longstanding, traditional and necessary part of agriculture, Randall's business model addresses a lack of the service in the southeastern prarie of Wyoming and the fields of the Nebraska panhandle.

Rye wicking is very specific type of agricultural spraying that wheat growers inplement to remove common rye plants from their wheat fields. the process includes wiping a mixture of chemicals and water over the wheat fields when the rye hits its bloom stage – when the rye has grown about a foot above the wheat – to make sure the chemical only is transferred to the taller rye, thus not affecting the wheat.

"I operate the entire business," said Randall. "From the actual wicking in the fields to marketing and finances, it's essentially a one-man show."

However, Randall employs a friend or two during the wicking season – beginning in late may and ending mid-July – if the workload calls for it, and as all young business people often do, Randall's dad Donn has supported him since the very beginning helping anyway needed.

When Randall was in eighth grade, he bought his first wicker cart. His business quickly expanded so much that he purchased a second wicker cart and a second four-wheeler to handle the workload.

"I have always advertised in the local papers before the wicking season really gets going," he said. "But word-of-mouth has really helped build a strong customer base."

This growth stems from Randall's work ethic, reputation and integrity, and over the years he's honed his on-the-field and off-the-field skills to maximize his service while minimizing costs.

His business really took off once he started using a retro-fitted spray coupe to wick with, he said.

"I purchased a used spray coupe and then designed a system to convert it into a wicker by desiging and building all the components myself," he said. "This has decreased my downtime and increased my productivity."

As far as future plans for his business, Randall says he'd love to grow it and continue working with it, but as it is strictly a summer activity, he can manage while he's still a college student.

"Wicking is not a full-time business," he said. "After I graduate from college, I would still like to do it when I can."

Randall's past is in agriculture, and as an Agriculture Business major at UW, his future is in agriculture, so when he offers advice to other young folks in Wyoming interested in agriculture, it would do those well to listen:

"I would say that today, more than ever, opportunities are out there to be successful in agriculture, so don't hold back and make the most of it," he said. "If you have an idea – go for it."