Beef Sustainability Project

National Cattlemen's Beef Association

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- **Overview of U.S. Beef Industry**
  - Largest food and fiber sector
  - Own/manage 670 million acres of land in US
  - $73 billion in U.S. consumer spending on beef annually
  - 742,000 beef herds (90% < 100 head); 67,000 dairy herds
  - 30.9M beef cows; 9.3M dairy cows; 26.7M feeder calves
  - 2,140 feedyards with at least 1000 head capacity
- **With large impact, great responsibility**
  - Industry acceptance through history
    - Enhance environmental stewardship/food safety
    - Improve efficiencies throughout
    - Rely on fewer inputs to produce more beef
    - Increase economic contributions to Rural America
    - Preserve open spaces
    - Contribute time, talent, treasure to communities
- **Cattle/beef industry segments largely independent of eachother**
  - Equity, management, financial

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Environmental Footprint of U.S. Beef Production (1977 vs. 2007)

- Productivity has increased
  - Beef carcass yield increased 22%
  - Time to slaughter reduced 21% (609 d v 485 d)
  - Total beef prod. increased 11%
  - Slaughter population decreased 5 million head
- Why?
  - Management
  - Genetic selection
  - Ration formulation
  - Growth enhancing technologies

Source: Capper, J.L. (2011). The Environmental Impact of U.S. Beef Production: 1977 compared with 2007. J. Animal Science

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- In 1977, it took five animals (3,030 animal days) to produce the same amount of beef as four animals (1,928 animal days) in 2007
- Why does this matter?
  - We are producing more using fewer resources
  - Smaller environmental footprint
    - 30% fewer animals
    - 19% less feed
    - 12% less water
    - 33% less land
    - 18% less manure
    - 16% lower carbon footprint
      - 18% less methane
      - 12% less nitrous oxide

Source: Capper, J.L. (2011). The Environmental Impact of U.S. Beef Production: 1977 compared with 2007. J. Animal Science

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Current Challenge:
9 billion people by 2050
70-100% more food
Solution: Produce More with Less

- U.S. Beef Industry is Part of Solution
- Increased Beef Demand Will be Met Sustainably
- How?
- Assess and Address Three Pillars of Sustainability
  - Reduce environmental Impact
    - Water, soil, air, land use, biodiversity
  - Maintain or Improve Industry Economics
    - Production costs, price, trade
  - Produce in a Socially Diligent Way
    - Working conditions, animal welfare, food safety
- Sustainability is a journey, not a destination
  - Continuous improvement over time

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- **US Beef Check-off funded project**
  - Contracted with National Cattlemen's Beef Association to conduct study
- **Collaborators**
  - BASF Corporation
    - Eco-Efficiency Model
      - » Certified by National Standards Foundation (NSF)
  - U.S. Department of Agriculture-Agricultural Research Service
    - Meat Animal Research Center
      - » Clay Center, Nebraska
  - Combined over 600 LCA Projects

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Project Objective

- Conduct a comprehensive sustainability assessment of entire U.S. beef industry
  - Cradle to grave assessment
  - LCA equally compares environmental impact and production costs (i.e. economics) to optimize sustainability
    - Over time: compares 1970s, 2005, 2011
  - Social component (first ever to be completed)
  - Largest, most comprehensive study of its kind
- Discover new opportunities for improvement

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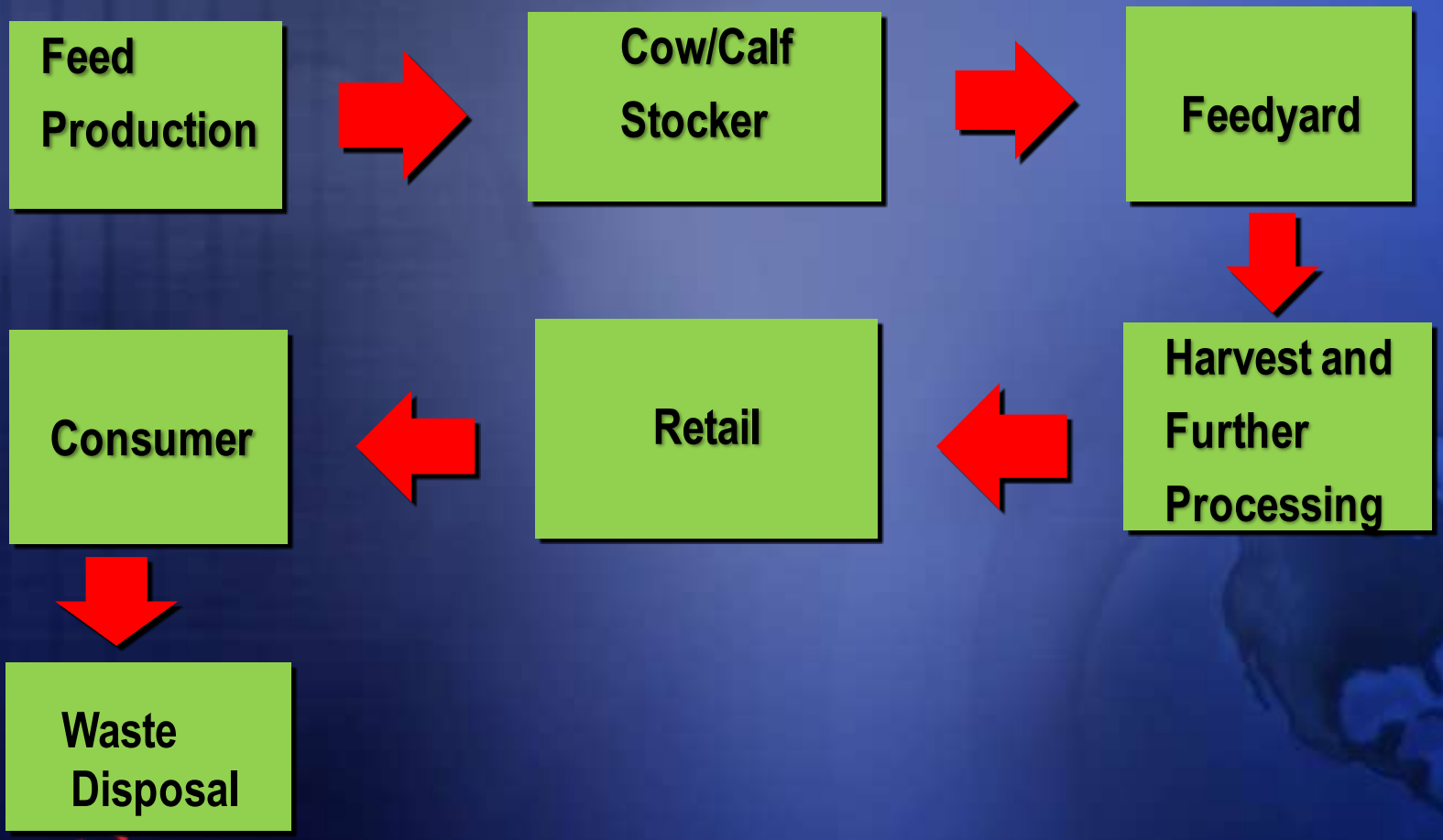
Project Boundaries



Project Scope

1. "Hot Spot" analysis (stakeholder survey, literature review)
   - Qualitative tool
2. Life Cycle Assessment (environmental, economic and social parameters)
3. On-line tool for individual producer use

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Life Cycle Assessment

- Cradle to Grave
  - Cradle to Farm Gate
    - Integrated Farm System Model (USDA-ARS)
      - » Process-based model – mathematical representation of processes in nature
    - Assess biological processes, animal performance, economics
    - Published extensively, Transparent
    - Validation: USDA ARS Meat Animal Research Center – 6,600 head cow/calf, 5,000 head feedlot, feed production, feed processing
      - Extensive data available
    - Inputs to BASF's Eco-Efficiency Analysis
  - Harvest to Waste Disposal
    - BASF's Eco-Efficiency Analysis
    - ISO 14040 &14044 Compliant

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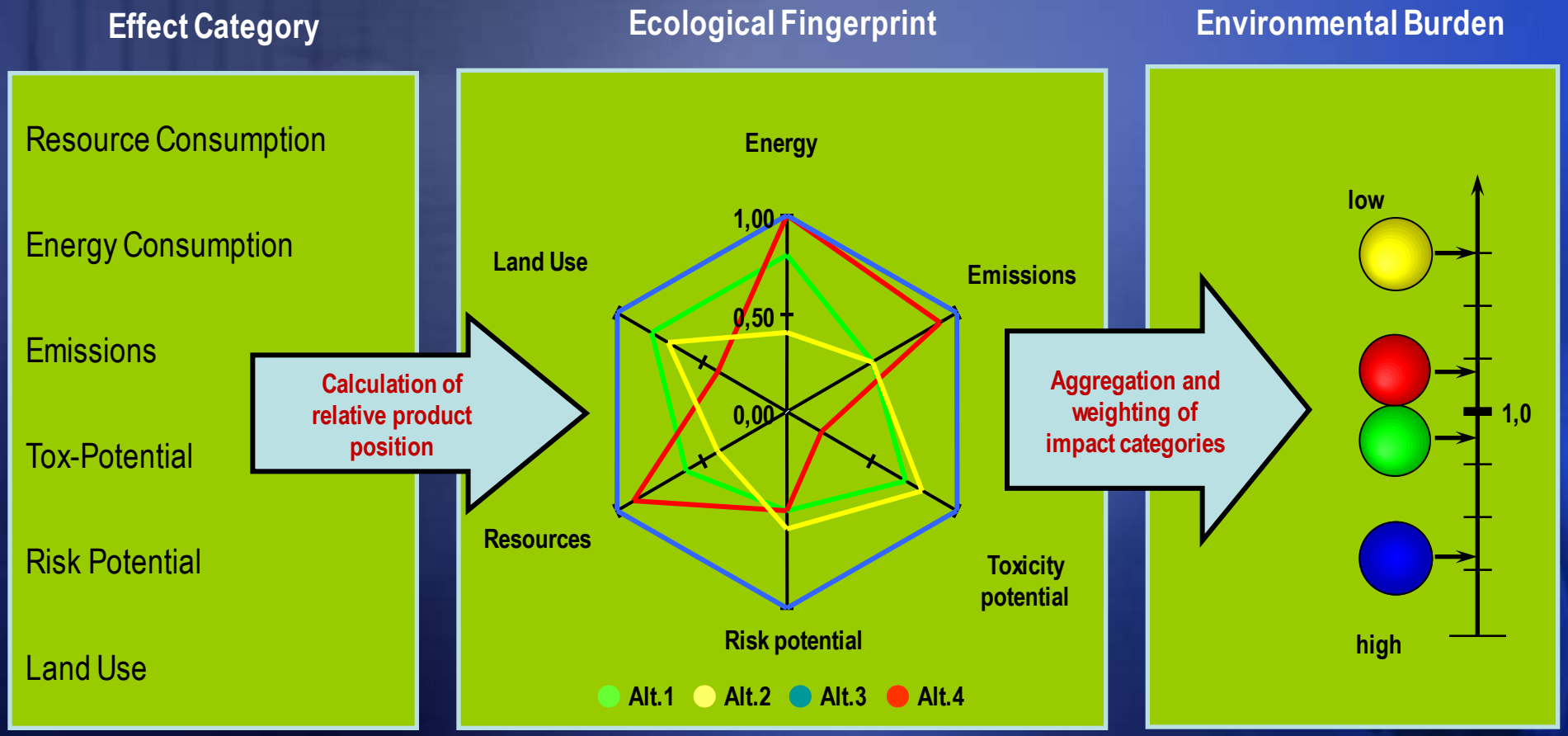
Sample Product Sustainability Improvement Environmental Assessment



Calculation ➔ Normalization ➔ Weighting ➔ Aggregation

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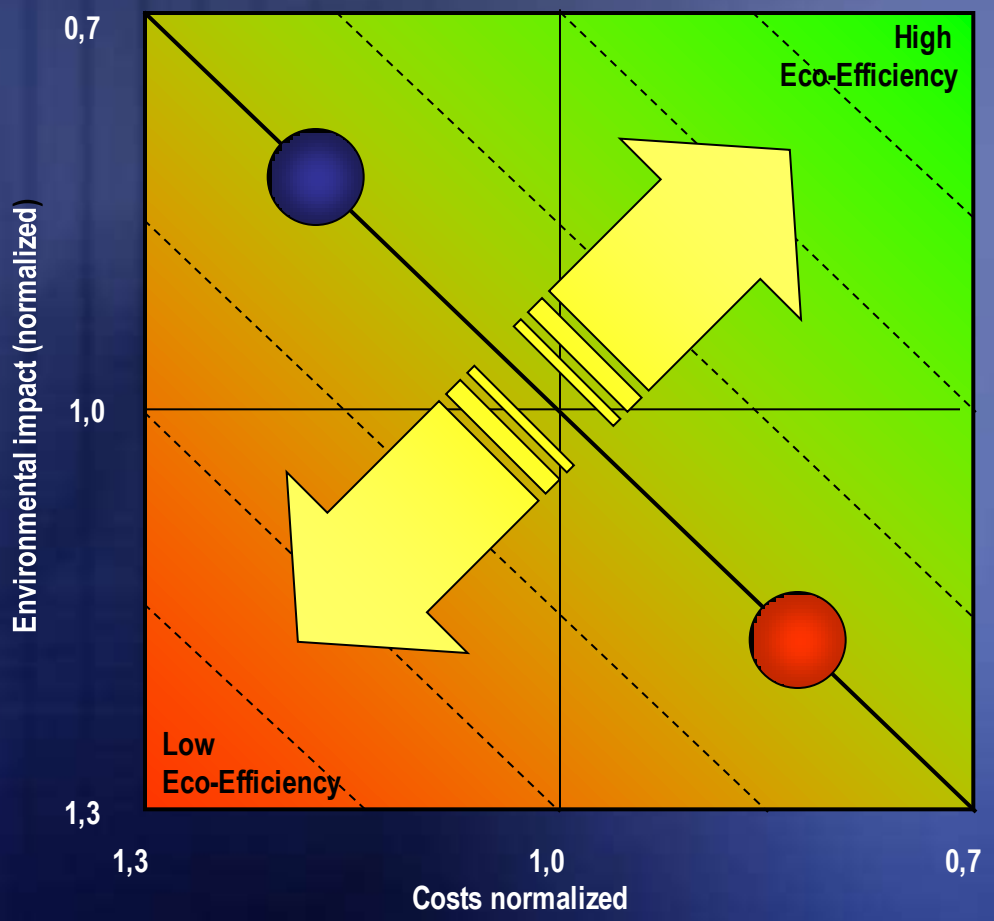
Eco-Efficiency Portfolio



- Distance from diagonal line is a direct measurement for eco-efficiency

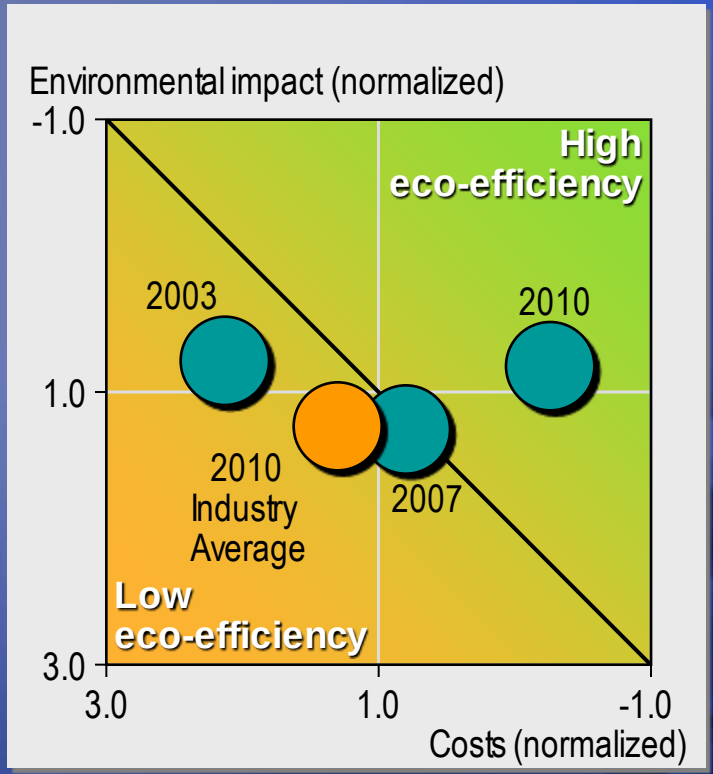
  Alternative "blue":
  - High costs. Low environmental impact

  Alternative "red":
  - Low costs. High environmental impact
- Both alternatives have the same eco-efficiency

Portfolio is balanced at all times!

More Sustainable Products in Time
Example of Product Improvement
Eco-Efficiency Analysis

Customer benefit
product improvement
over time



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Sustainability Assessment Methods and Eco-Efficiency Analysis

ISO 14040-44

Life Cycle Inventory

... quantification of inputs and outputs

Life Cycle Assessment

... evaluation of environmental impacts

Eco-Efficiency Analysis

... comparison of products or processes

... including all life cycle costs

... ecological and economic aspects have equal weight in the assessment

... standard tool in the BASF Group; more than 400 analyses carried out

... method certified by TÜV and National Sanitation Foundation

SEEBALANCE

... including social aspects

Matryoshka principle:
each step "nests" the previous one

Status of Sustainability Assessment

- All data collection and analysis is complete for the eco-efficiency portion of the project
- Submit to National Standards Foundation (NSF) for certification soon
- Social component and producer tool will be complete by April 2013
- Next steps
  - Regional variation
  - Restaurant inclusion

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Questions?